

T2000 Instrument Panel

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For System Description and Operation, click on [“T2000 Instrument Panel”](#).



NOTE: All links to Troubleshooting information have been removed from “T2000 Instrument Panel”. For Troubleshooting information, click on a subject below.

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NOTE: All of the individual components for the A-Cluster, B-Cluster and A/D Module can be replaced separately and are available through PACCAR Parts.

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Troubleshooting the A-Cluster

Possible causes: Defective A-Cluster circuit board, J1708 data link, voltage/wiring problems or engine ECU.

All A-Cluster Gauges Inoperative

All A-Cluster gauges (except voltmeter, fuel and air pressure gauges) receive information from the J1708 data link via the engine ECU.

STEP	CHECK	RESULT	NEXT STEP
1A	Turn ignition key on to see if gauge pointers go to mid scale, right peg, mid scale, left peg and then return to normal indications for self-test.	<p>Gauges fail self-test. Gauges do not move from stationary position.</p> <p>Gauges fail self-test. Warning lights, turn signal, high beam indicator lamps flash and buzzer may sound.</p> <p>Gauges pass self-test, "SVC CLTR" (Service Cluster) fault message appears on multi-function display.</p>	<p>Go to 1B.</p> <p>May indicate low vehicle battery voltage (approx. 11.0 volts or less) Go to 1B.</p> <p>Replace circuit board.</p>
1B	Gain access to back of A-Cluster. With ignition key on, measure voltage between E1 connector pins 9 and 10 and pins 19 and 20.	<p>Gauges pass self-test, then gauges begin sweeping (wig-wag) motion.</p> <p>Meter reads system voltage (12+ volts) for both tests.</p> <p>Meter does not read system voltage.</p>	<p>Go to 1C.</p> <p>Replace circuit board.</p> <p>Check harness wires from E1 pins 9 and 10 back to source and E1 pins 19 and 20 back to source. <i>Note: battery power (pin 20) receives power from clock fuse.</i></p>
1C	Unplug E1 harness connector at back of A-Cluster circuit board. With ignition key on, start engine. Measure AC voltage at E1 connector pins 1 and 2.	<p>Reading is approx. 2.5 to 4 volts AC.</p> <p>Reading is approx. 1.5 volts AC or less.</p>	<p>Use a diagnostic tool to verify if engine ECU is transmitting data.</p> <p>If data is being transmitted from ECU, replace circuit board. If engine ECU is not transmitting data, problem could be ECU.</p> <p>Check for open or short in J1708 data link wiring from engine ECU to A-Cluster circuit board.</p>

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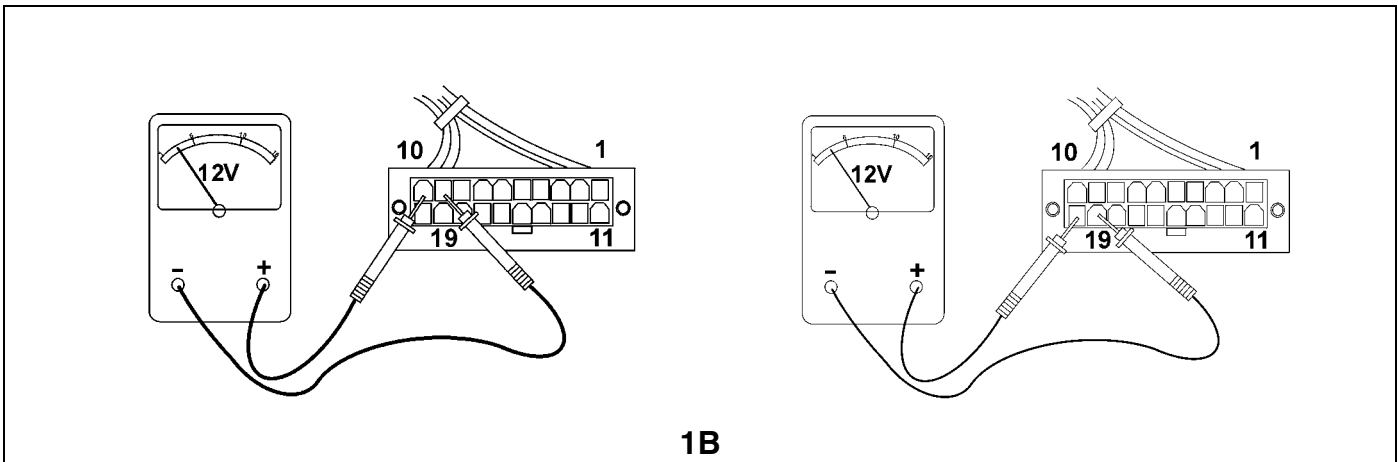


Figure 14-1 All A-Cluster Gauges Inoperative

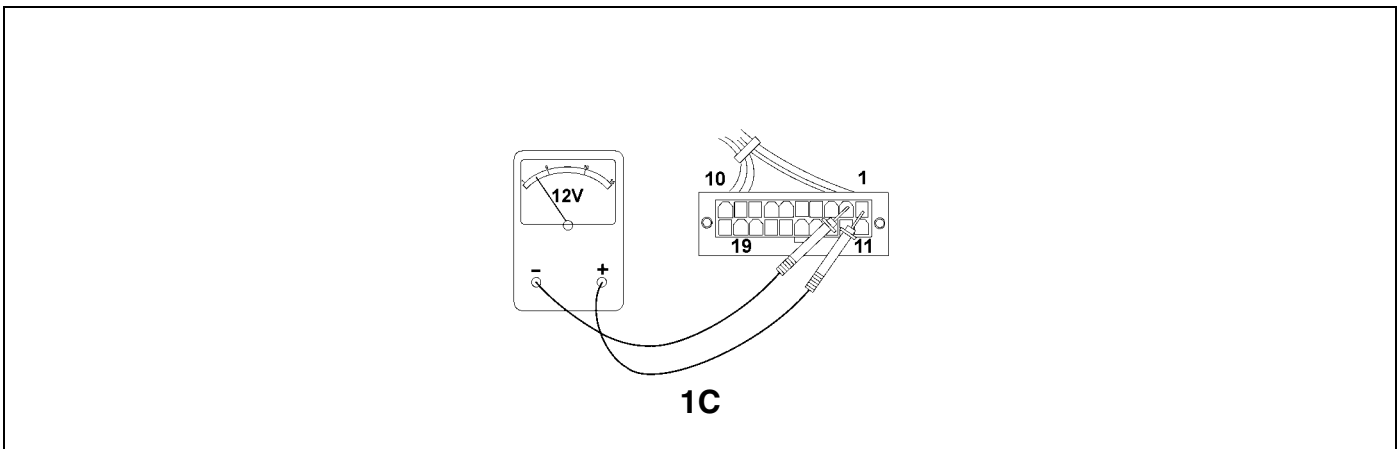


Figure 14-2 All A-Cluster Gauges Inoperative

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Speedometer Inoperative or Inaccurate

The Speedometer receives its data from the J1708 data link via the engine ECU, which receives its data from the vehicle speed sensor on the transmission.

Possible causes: Defective speedometer, A-Cluster Circuit Board, or wiring problem.

STEP	CHECK	RESULT	NEXT STEP
1A	Turn ignition key on to see if gauge pointers go to mid scale, right peg, mid scale, left peg and then return to normal indications for self-test.	Gauge fails self-test.	Go to 1B .
		Gauge erratic or pointer sticks.	Replace gauge.
		Gauge passes self-test.	Check to determine if J1708 data link is transmitting information from engine ECU. Go to 1C .
		No gauges perform self-test.	Go to 1D .
1B	Check for open or shorted gauge coil by connecting an ohmmeter across opposite pins of gauge.	Meter does not read 272 - 278 ohms resistance.	Replace gauge.
		Meter reads 272 - 278 ohms resistance.	Gauge is okay. Replace circuit board.
1C	Unplug E1 harness connector at back of A-Cluster circuit board. With ignition key on, start engine. Measure AC voltage at E1 connector pins 1 and 2.	Reading is approx. 2.5 to 4 volts AC.	Data link is okay. Use a diagnostic tool to determine if engine ECU is transmitting speed data. If speed data is being transmitted from ECU, replace circuit board. If speed data is not being transmitted from ECU, check speed sensor and/or wiring.
		Reading is approx. 1.5 volts AC or less.	Check for open or short in J1708 data link wiring from A-Cluster to engine ECU. Use a diagnostic tool to determine if engine ECU is transmitting any data.
1D	With ignition key on, measure voltage between E1 connector pins 9 and 10 and pins 19 and 20.	Meter reads system voltage (12+ volts) for both tests. Meter does not read system voltage.	Replace circuit board. Check harness wires from E1 pins 9 and 10 back to source and E1 pins 19 and 20 back to source. <i>Note: battery power (pin 20) receives power from clock fuse.</i>

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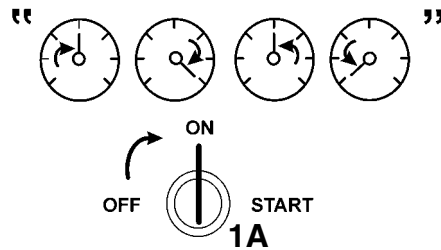


Figure 14-3 Speedometer Inoperative or Inaccurate

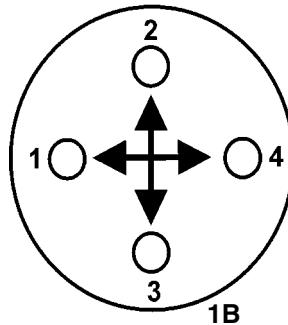


Figure 14-4 Speedometer Inoperative or Inaccurate

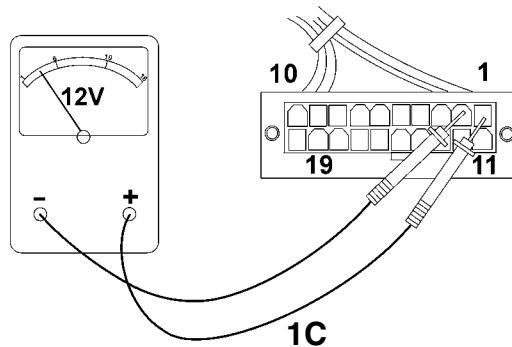


Figure 14-5 Speedometer Inoperative or Inaccurate

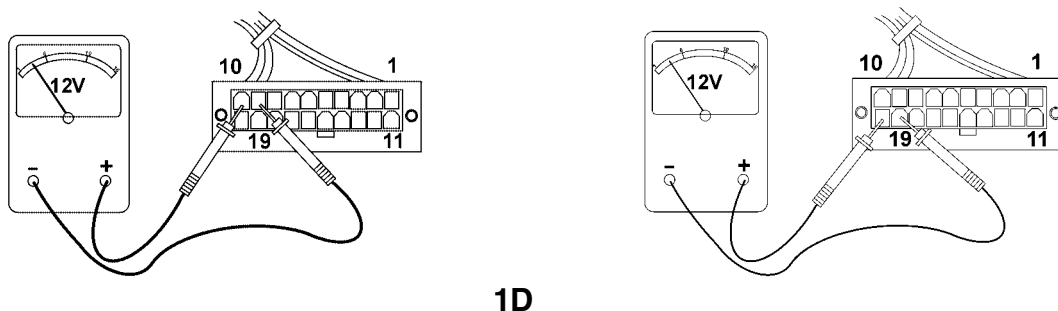


Figure 14-6 Speedometer Inoperative or Inaccurate

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Tachometer Inoperative or Inaccurate

Possible causes: Defective tachometer, A-Cluster Circuit Board, or wiring problem.

The Tachometer receives its data from the J1708 data link, which receives its data from the engine ECU.

STEP	CHECK	RESULT	NEXT STEP
1A	Turn ignition key on to see if gauge pointers go to mid scale, right peg, mid scale, left peg and then return to normal indications for self-test.	Gauge fails self-test. Gauge erratic or pointer sticks. Gauge passes self-test. No gauges perform self-test.	Go to 1B . Replace gauge. Check to determine if J1708 data link is transmitting information from engine ECU. Go to 1C . Go to 1D .
1B	Check for open or shorted gauge coil by connecting an ohmmeter across opposite pins of gauge.	Meter does not read 272 - 278 ohms resistance. Meter reads 272 - 278 ohms resistance.	Replace gauge. Gauge is okay. Replace circuit board.
1C	Unplug E1 harness connector at back of A-Cluster circuit board. With ignition key on, start engine. Measure AC voltage at E1 connector pins 1 and 2.	Reading is approx. 2.5 to 4 volts AC. Reading is approx. 1.5 volts AC or less.	Data link is okay. Use a diagnostic tool to determine if engine ECU is transmitting rpm data. If rpm data is being transmitted from ECU, replace circuit board. If rpm data is not being transmitted from ECU, problem is with ECU or rpm sensor. Check for open or short in J1708 data link wiring from A-Cluster to engine ECU. Use a diagnostic tool to determine if engine ECU is transmitting any data.
1D	With ignition key on, measure voltage between A-Cluster harness connector E1 pins 9 and 10 and E1 pins 19 and 20.	Meter reads system voltage (12+ volts) for both tests. Meter does not read 12 volts.	Replace circuit board. Check harness wires from E1 pins 9 and 10 back to source and E1 pins 19 and 20 back to source. <i>Note: battery power (pin 20) receives power from clock fuse.</i>

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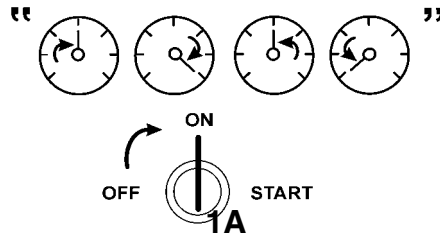


Figure 14-7 Tachometer Inoperative or Inaccurate

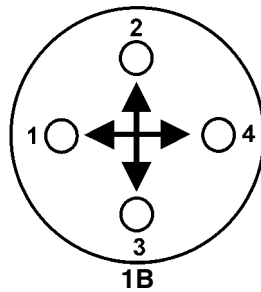


Figure 14-8 Tachometer Inoperative or Inaccurate

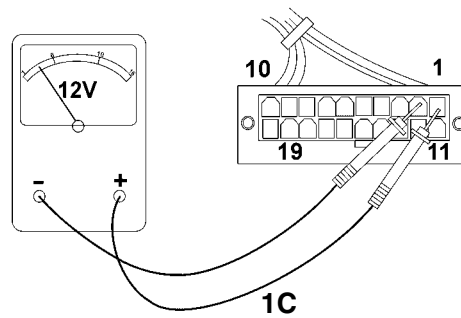


Figure 14-9 Tachometer Inoperative or Inaccurate

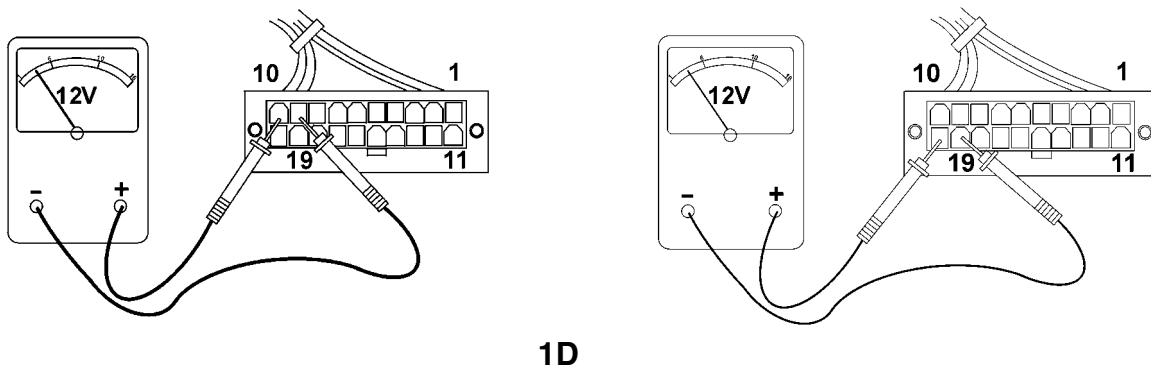


Figure 14-10 Tachometer Inoperative or Inaccurate

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Engine Oil Pressure Gauge Inoperative or Inaccurate

Possible causes: Defective oil pressure gauge, A-Cluster Circuit Board, or wiring problem.

The Engine Oil Pressure Gauge receives its data from the J1708 data link via the engine ECU, which receives its data from a sensor on the engine.

STEP	CHECK	RESULT	NEXT STEP
1A	Turn ignition key on to see if gauge pointers go to mid scale, right peg, mid scale, left peg and then return to normal indications for self-test.	Gauge fails self-test. Gauge erratic or pointer sticks. Gauge passes self-test AND display reads ENGINE OIL PRESS LOW . No gauges perform self-test.	Go to 1B . Replace gauge. Check to determine if J1708 data link is transmitting information from engine ECU. Go to 1C . Go to 1D .
1B	Check for open or shorted gauge coil by connecting an ohmmeter across opposite pins of gauge.	Meter does not read 272 - 278 ohms resistance. Meter reads 272 - 278 ohms resistance.	Replace gauge. Gauge is okay. Replace circuit board.
1C	Unplug E1 harness connector at back of A-Cluster circuit board. With ignition key on, start engine. Measure AC voltage at E1 connector pins 1 and 2.	Reading is approx. 2.5 to 4 volts AC. Reading is approx. 1.5 volts AC or less.	Data link is okay. Use a diagnostic tool to determine if engine ECU is transmitting oil pressure data. If oil pressure data is being transmitted from ECU, replace circuit board. If oil pressure data is not being transmitted from ECU, check oil pressure sensor and/or wiring. Check for open or short in J1708 data link wiring from A-Cluster to engine ECU. Use a diagnostic tool to determine if engine ECU is transmitting any data.
1D	With ignition key on, measure voltage between E1 connector pins 9 and 10 and pins 19 and 20.	Meter reads system voltage (12+ volts) for both tests. Meter does not read system voltage.	Replace circuit board. Check harness wires from E1 pins 9 and 10 back to source and E1 pins 19 and 20 back to source. <i>Note: battery power (pin 20) receives power from clock fuse.</i>

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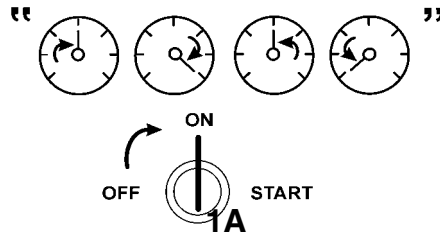


Figure 14-11 Engine Oil Pressure Gauge Inoperative or Inaccurate

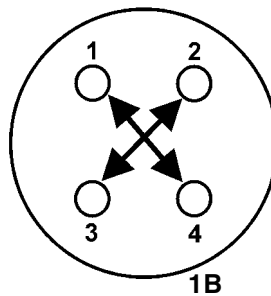


Figure 14-12 Engine Oil Pressure Gauge Inoperative or Inaccurate

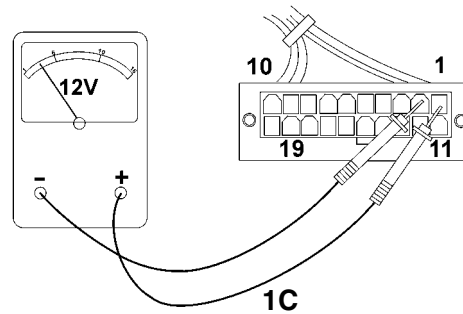


Figure 14-13 Engine Oil Pressure Gauge Inoperative or Inaccurate

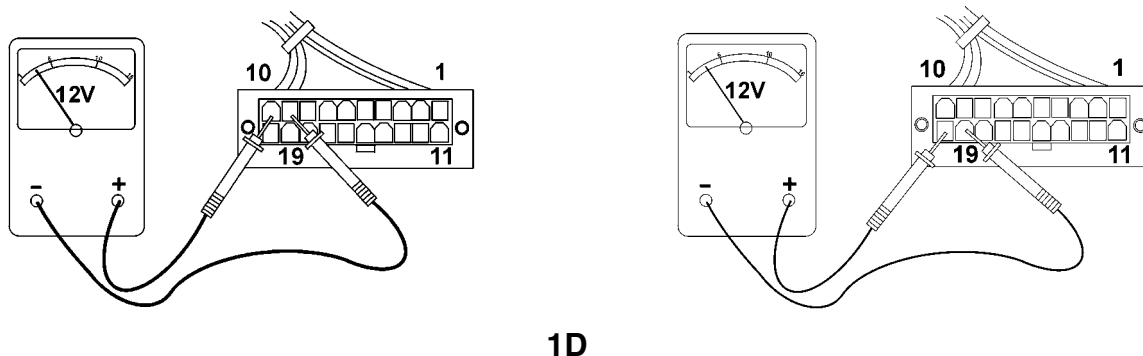


Figure 14-14 Engine Oil Pressure Gauge Inoperative or Inaccurate

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Engine Coolant Temperature Gauge Inoperative or Inaccurate

Possible causes: Defective coolant temperature gauge, A-Cluster Circuit Board, or wiring problem.

The Engine Coolant Temperature Gauge receives its data from the J1708 data link via the engine ECU, which receives its data from a sensor on the engine.

STEP	CHECK	RESULT	NEXT STEP
1A	Turn ignition key on to see if gauge pointers go to mid scale, right peg, mid scale, left peg and then return to normal indications for self-test.	Gauge fails self-test. Gauge erratic or pointer sticks. Gauge passes self-test. No gauges perform self-test.	Go to 1B . Replace gauge. Check to determine if J1708 data link is transmitting information from engine ECU. Go to 1C . Go to 1D .
1B	Check for open or shorted gauge coil by connecting an ohmmeter across opposite pins of gauge.	Meter does not read 272 - 278 ohms resistance. Meter reads 272 - 278 ohms resistance.	Replace gauge. Gauge is okay. Replace circuit board.
1C	Unplug E1 harness connector at back of A-Cluster circuit board. With ignition key on, start engine. Measure AC voltage at E1 connector pins 1 and 2.	Reading is approx. 2.5 to 4 volts AC. Reading is approx. 1.5 volts AC or less.	Data link is okay. Use a diagnostic tool to determine if engine ECU is transmitting coolant temperature data. If coolant temperature data is being transmitted from ECU, replace circuit board. If coolant temperature data is not being transmitted from ECU, check coolant temperature sensor and/or wiring. Check for open or short in J1708 data link wiring from A-Cluster to engine ECU. Use a diagnostic tool to determine if engine ECU is transmitting any data.
1D	With ignition key on, measure voltage between E1 connector pins 9 and 10 and pins 19 and 20.	Meter reads system voltage (12+ volts) for both tests. Meter does not read system voltage.	Replace circuit board. Check harness wires from E1 pins 9 and 10 back to source and E1 pins 19 and 20 back to source. <i>Note: battery power (pin 20) receives power from clock fuse.</i>

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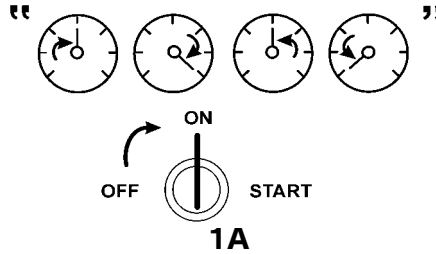


Figure 14-15 Engine Coolant Temperature Gauge Inoperative or Inaccurate

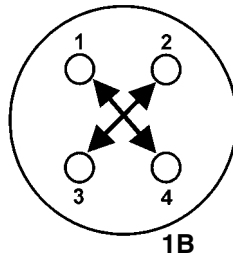


Figure 14-16 Engine Coolant Temperature Gauge Inoperative or Inaccurate

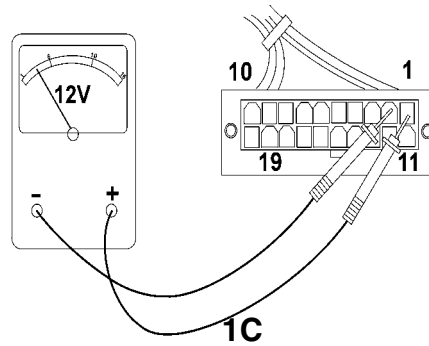


Figure 14-17 Engine Coolant Temperature Gauge Inoperative or Inaccurate

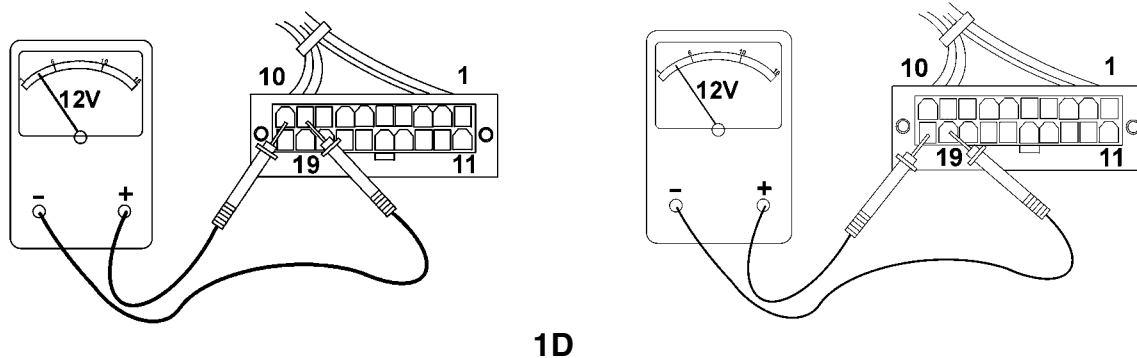


Figure 14-18 Engine Coolant Temperature Gauge Inoperative or Inaccurate

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Voltmeter Inoperative or Inaccurate

The voltmeter does *not* receive data from the J1708 data link. It indicates the voltage between A-Cluster connector E1 pins 10 and 19 (ground). This should be battery voltage when the ignition is on and 0 voltage when the key is off. The voltmeter does not perform a self-test.

NOTE: Check calibration of your test voltmeter prior to use.

Possible causes: Defective voltmeter, A-Cluster Circuit Board, or wiring problem.

STEP	CHECK	RESULT	NEXT STEP
1A	Turn ignition key on and measure voltage between A-Cluster harness connector E1 pins 9 and 10.	Test voltmeter measurement is the same as indicated by gauge.	Gauge is okay.
		Test voltmeter measurement is different than battery voltage or 0 voltage.	Check dash harness wiring for loose or broken pin connectors, open/short in wiring or fuse.
		Test voltmeter measurement is different than indicated by gauge.	Go to Step 1B .
1B	Check for open or shorted gauge coil by connecting an ohmmeter across pins 1 and 3 of gauge.	Meter does not read 133 - 137 ohms resistance.	Replace gauge.
		Meter reads 133 - 137 ohms resistance.	Gauge is okay. Replace circuit board.

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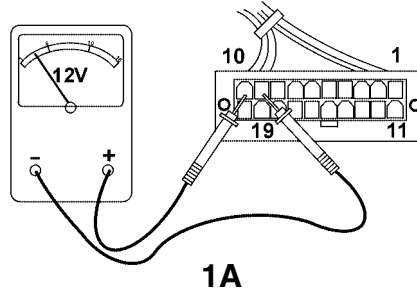


Figure 14-19 Voltmeter Inoperative or Inaccurate

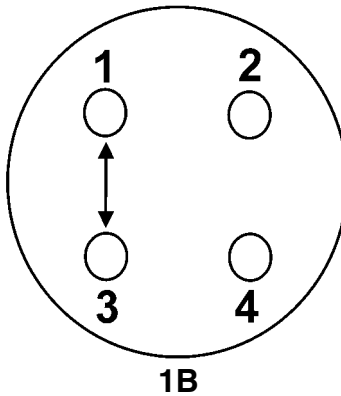


Figure 14-20 Voltmeter Inoperative or Inaccurate

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Fuel Gauge Inoperative or Inaccurate

The fuel gauge receives its input from a sensor at the fuel tank. The sensor is connected to a float mechanism inside the tank. The float is connected to a variable resistor to ground. As the fuel level rises and falls, the float changes the resistance, causing the fuel gauge pointer to

move. When the fuel level reaches 1/8 tank, the red LED in the fuel gauge lights. The fuel gauge does not perform a self-test.

NOTE: Before troubleshooting, check and record the approximate fuel level in the tank.

Possible causes: Fuel level sensor, fuel gauge, A-Cluster circuit board or wiring.

STEP	CHECK	RESULT	NEXT STEP
1A	Turn ignition key on. Observe gauge needle.	Gauge does not move. Gauge moves but does not read correct fuel level.	Go to Step 1B . Check pin to circuit board connections. If good, go to Step 1C .
1B	Turn ignition key off. Unplug E1 connector from back of A-Cluster and measure resistance between pins 11 and 19. Compare readings to chart below.	Reading measures 0 or greater than 300 ohms.	Check wiring and connections to sensor. If good, go to Step 1D .
1C	Check for open or shorted gauge coil by connecting an ohmmeter across opposite pins of gauge.	Meter does not read 272 - 278 ohms resistance. Meter reads 272 - 278 ohms resistance.	Replace gauge. Replace circuit board.
1D	Reconnect E1 connector to circuit board. Disconnect fuel sender harness connector at sender. Connect a known resistance (similar to the table below) between both sender wires. Compare resistance to fuel gauge reading.	Gauge pointer reads approximately same fuel level as table below. Similar ohm resistance was used.	Replace fuel sender.

Fuel Level	Resistance
Full	33 ohms
1/2	120 ohms
1/4	170 ohms
LED on	193 ohms
Empty	240 ohms

Table 14-1 Fuel Level Gauge Inaccurate

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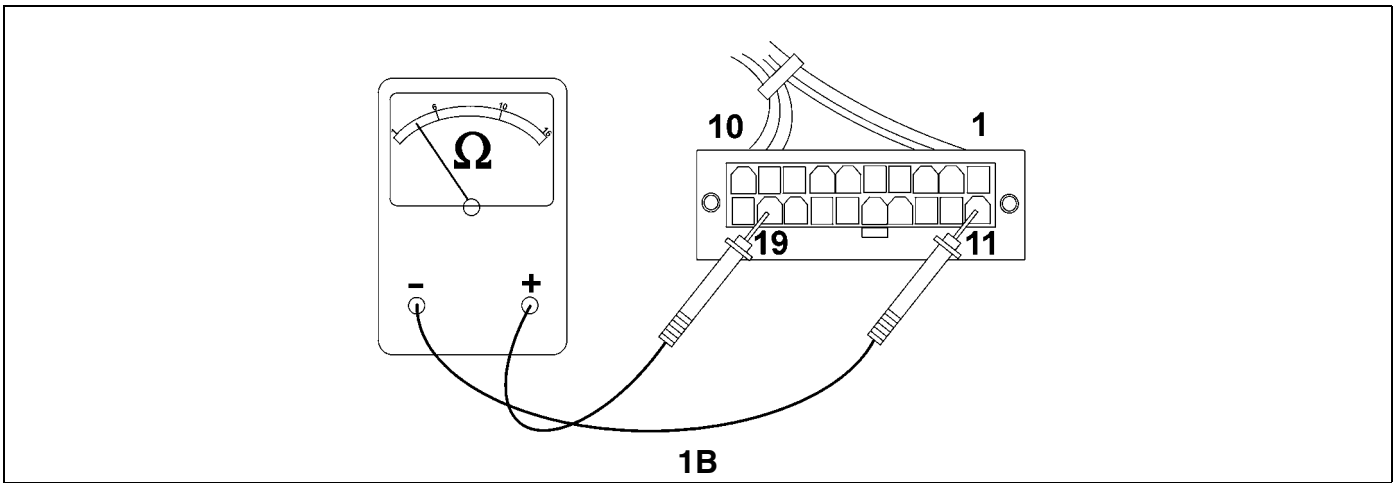


Figure 14-21 Fuel Gauge Inoperative or Inaccurate

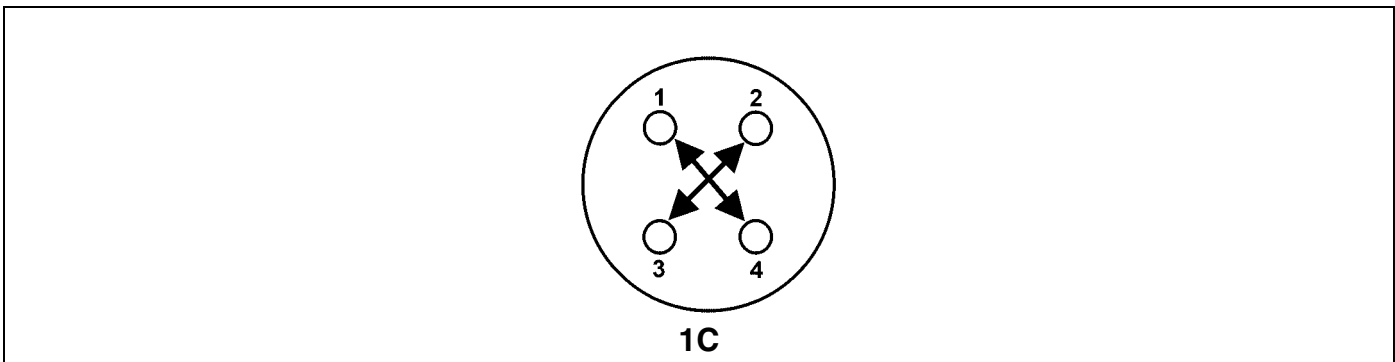


Figure 14-22 Fuel Gauge Inoperative or Inaccurate

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Application/Trailer Application Air, Primary Secondary Air Gauges Not Working or Inaccurate

These gauges are connected directly to the air system by air hoses.

STEP	CHECK	RESULT	NEXT STEP
1A	Build up air pressure, disconnect air line from suspect gauge and connect line to a standard air pressure gauge.	Standard gauge indicates pressure.	Replace suspect gauge.
		Standard gauge does not indicate pressure.	Check air line and source.

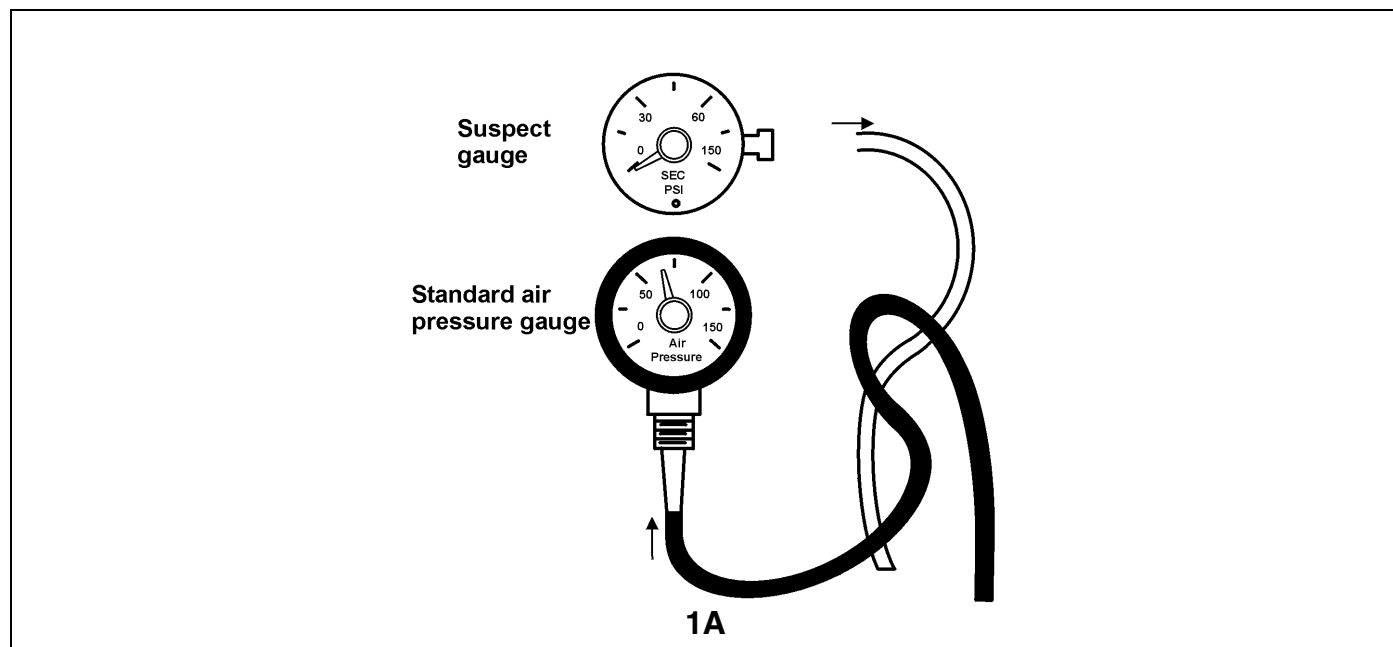


Figure 14-23 Application/Trailer Application Air, Primary Secondary Air Gauges Not Working or Inaccurate

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Primary Or Secondary Pressure Gauge Warning LEDs Light Incorrectly

Possible Cause: defective air pressure switch.

STEP	CHECK	RESULT	NEXT STEP
1A	Turn key ON, observe gauge LED.	LED turns ON. LED does not turn ON.	Go to 1B . Go to 1E .
1B	Build air pressure to greater than 65 psi and observe LED.	LED stays ON. LED turns OFF.	Go to 1C . System OK.
1C	Disconnect wire at pressure switch.	LED stays ON. LED turns OFF.	Go to 1D . Replace faulty air switch.
1D	Turn key OFF. Unplug connector E1. Remove pins 4 and 5. Reconnect E1. Turn key ON and observe LED.	LED stays ON. LED turns OFF.	Replace A-Cluster Main board. Wire to air switch shorted to ground. Fix or replace wire.
1E	Either reduce air pressure to 0, or disconnect wire from air switch and ground wire to frame. Observe LED.	LED stays ON. LED turns OFF.	Replace faulty air switch. Go to 1F .
1F	Ground E1 pins 4 and 5 to frame and observe LED.	LED turns ON. LED stays OFF.	Repair/replace open wire to switch. Replace A-Cluster Main board.

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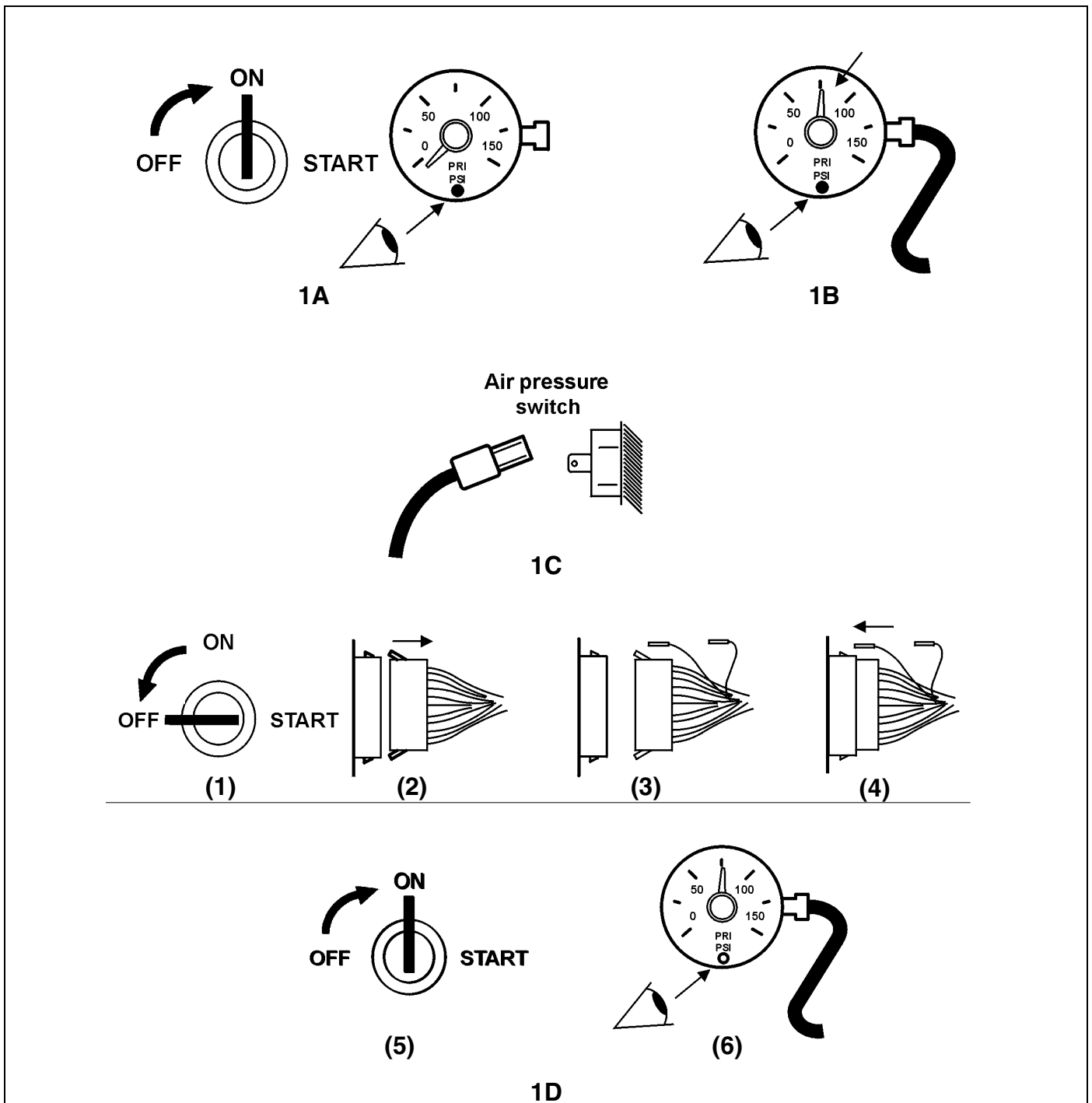


Figure 14-24 Primary Or Secondary Pressure Gauge Warning LEDs Light Incorrectly

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Oil Pressure Or Engine Coolant LEDs Light Incorrectly

Possible Cause: Electronic Control Unit calibration.

STEP	CHECK	RESULT	NEXT STEP
1A	Turn key ON, observe LEDs while gauge pointers go to mid scale, right peg, mid scale, left peg and then return to normal indications for self test.	LEDs turn ON while pointers are moving, but do not turn OFF at end of self test. No buzzer. LEDs turn ON during self test and then turn OFF.	Replace Main A-Cluster board. Go to 1B .
1B	After self test.	LEDs turn ON during self test and stay ON. Buzzer sounds.	Check Electronic Control Unit.

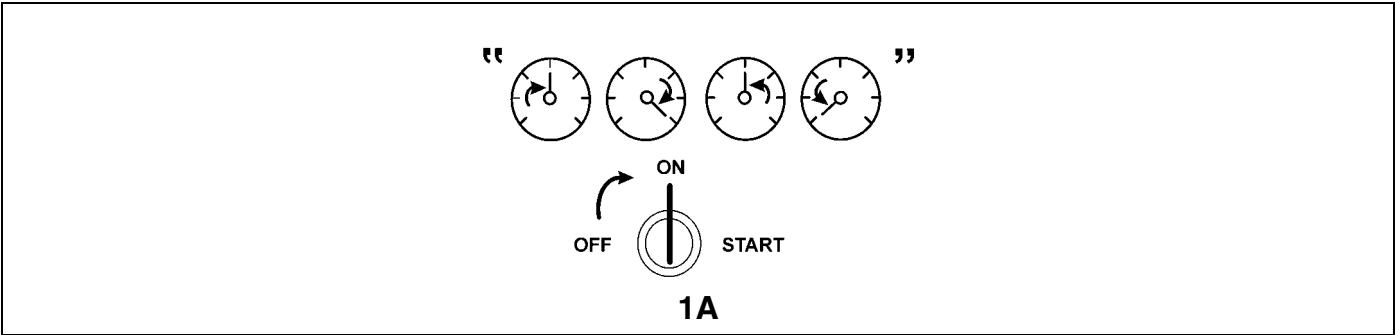


Figure 14-25 Oil Pressure Or Engine Coolant LEDs Light Incorrectly

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Warning Symbols Not Working

Possible Causes: Burned out lamp, faulty sensor, faulty wiring, faulty Main A-Cluster board.

STEP	CHECK	RESULT	NEXT STEP
1A	Turn key ON, observe Left and Right Turn indicators, High Beam and Engine Fan indicators during next 5 seconds.	One or more indicators fails to light. One or more indicators remains On after 5 seconds.	Replace bulb. If still not lighting, replace A-Cluster Main board. Go to 1B .
1B	Unplug connectors E1 and E2 from A-Cluster and measure resistance between board connector pins.	Measures 13 ohms (470 ohms for Stop Engine circuit). Measures 0 ohms.	Check harness and related switch. Replace bulb and remeasure for 13 ohms. If 0 ohms, replace A-Cluster Main board.

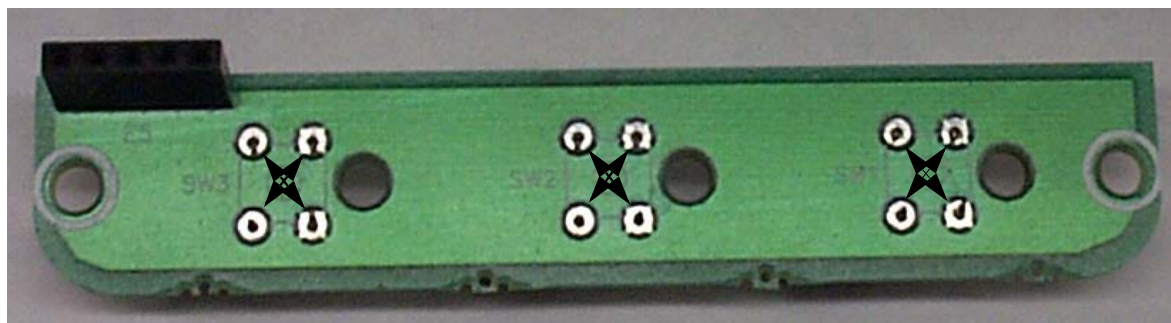
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Multi-Function Display Inoperative

Possible causes: Defective display unit, A-Cluster Circuit Board, or component ECU.

STEP	CHECK	RESULT	NEXT STEP
1A	Turn ignition key on to test for normal operation.	Display segments are missing or faded.	Replace multi-function display.
		Display loses or does not change miles.	Replace A-Cluster circuit board.
		"SVC CLTR" (Service Cluster) fault message appears on multi-function display.	Replace A-Cluster circuit board.
		Display will not step from function to function.	Go to 1B .
		Erroneous diagnostic messages are displayed.	Go to 1C .
1B	To test function switch, remove switch circuit board from A-Cluster printed circuit board. Place volt-ohm meter probes across each switch at diagonal corners. (Reading should indicate very high resistance or an open circuit). Keeping probes at diagonal corners, press and hold switch button in.	Resistance reading is very high when switch button is pressed.	Replace switch circuit board.
		Resistance reading is low when switch button is pressed.	Switch circuit board is okay. Replace A-Cluster circuit board.
1C	To test for erroneous diagnostic messages, check component ECU's (i.e. engine, ABS, transmission).	No active faults are recorded on component ECU.	Clear erroneous faults from multi-function display.



1B

Figure 14-26 Multi-Function Display Inoperative

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A-Cluster Connector Pin Assignments

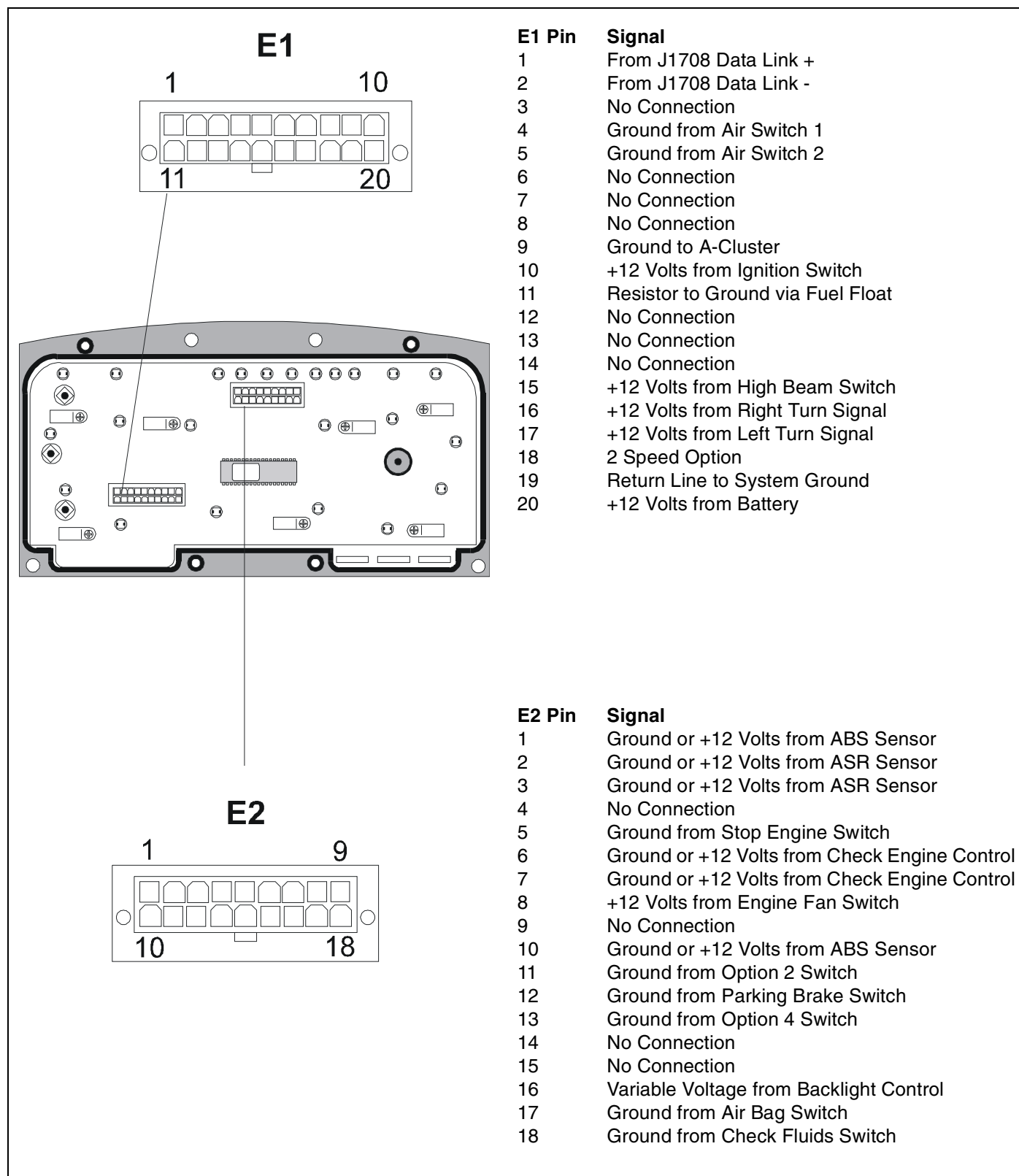


Figure 14-27 A-Cluster Pin Assignments

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Warning Symbol Connector Pin Assignments (A-Cluster)

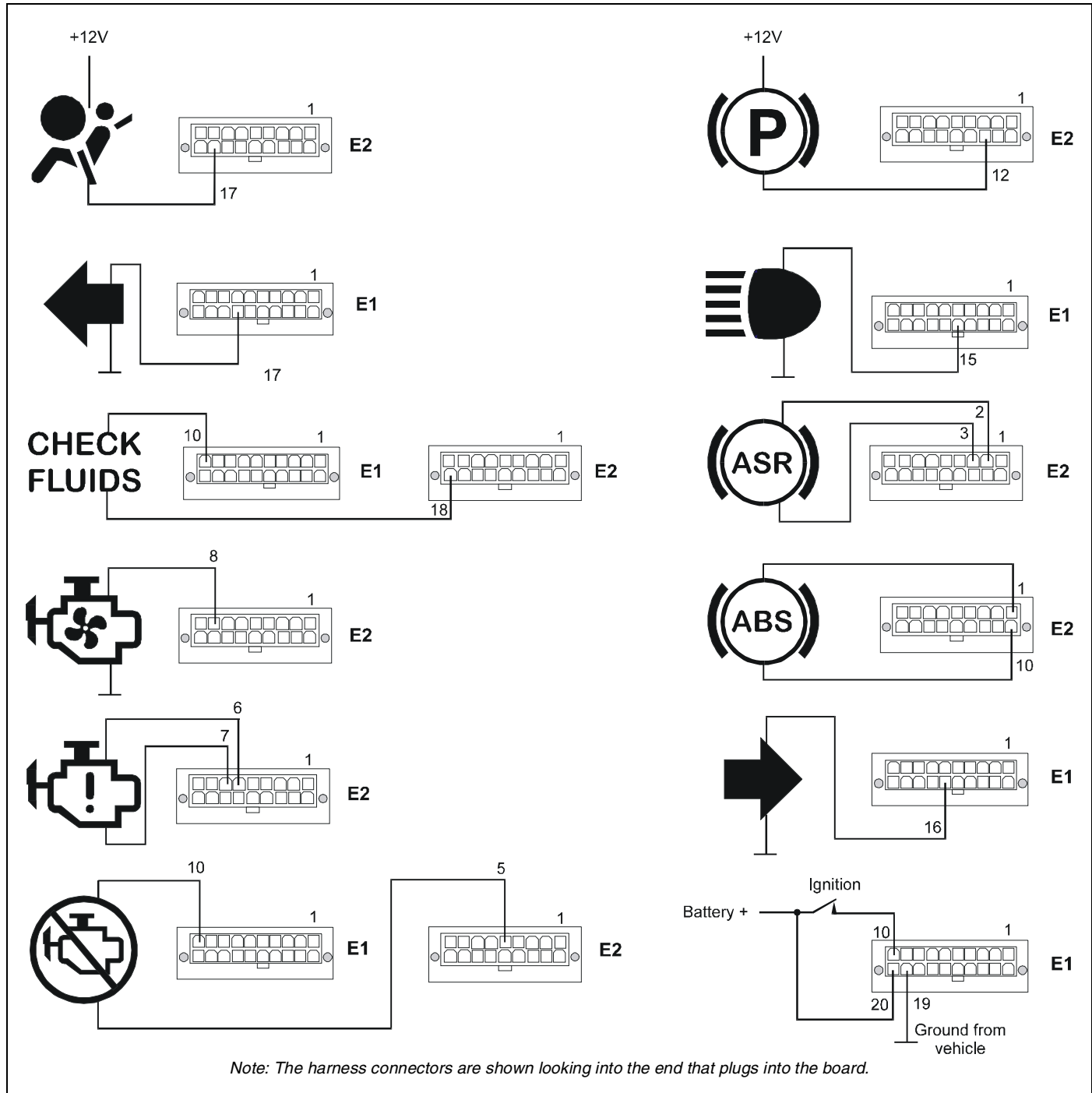


Figure 14-28 Warning Symbol Pinouts (A-Cluster)

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Troubleshooting the B-Cluster

Possible causes: Defective B-Cluster circuit board, A/D Module, or wiring problem.

All B-Cluster Gauges Inoperative

All B-Cluster gauges receive information from the A/D Module via a private data link.

STEP	CHECK	RESULT	NEXT STEP
1A	Turn ignition ON.	Gauge pointers go to 12 o'clock position for up to ten seconds, then return to normal indications (possibly left peg). Self-test complete. Gauge pointers do not move.	Go to 1B . Go to 1C .
1B	Wait 5 seconds to test private data bus.	Gauge pointers remain stationary, no sweeping motion. Gauge pointers sweep between 1/3 and 2/3 scales (wig-wag motion).	Test complete. Problem is not private data bus related. If a specific gauge is inoperative, refer to the appropriate troubleshooting procedure for that gauge. Go to 1D .
1C	Unplug E8 connector from B-Cluster and measure voltage between pins 1 and 2.	Meter reading equals system voltage. Meter reading is 0 volts.	Replace B-Cluster circuit board. Check fuses, wiring harness for open in power or ground circuit.
1D	Unplug E3 connector from A/D Module and measure voltage between pins A (+) and K (-).	Meter reading equals system voltage. Meter reading is 0 volts.	Go to 1E . Check fuses, wiring harness for open in power or ground circuit.
1E	Turn ignition OFF. Unplug E8 connector from B-Cluster circuit board. Unplug E3 connector from A/D Module. Test for continuity between: E3 pin D and E8 pin 5. E3 pin G and E8 pin 10.	No continuity in wires or resistance is more than 5 ohms. Continuity in both wires.	Check harness for open in wiring, poor harness connections or bad crimps. Private data bus wiring is okay. Go to 1F .

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1F	<p>Plug E3 connector back into A/D Module.</p> <p>Turn ignition ON and start engine.</p> <p>With B-Cluster E8 connector unplugged, check AC voltage between pins 5 and 10.</p>	<p>Meter reading is approx. 2.5 - 4 AC volts.</p> <p>Meter reading is 1.5 AC volts or less.</p>	<p>Replace B-Cluster circuit board.</p> <p>Replace A/D Module.</p>
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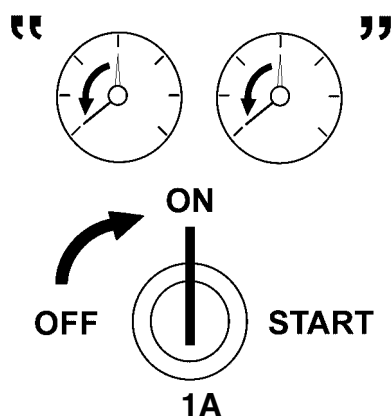


Figure 14-29 All B-Cluster Gauges Inoperative

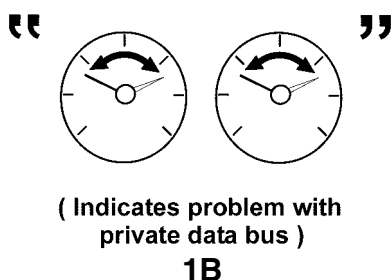


Figure 14-30 All B-Cluster Gauges Inoperative

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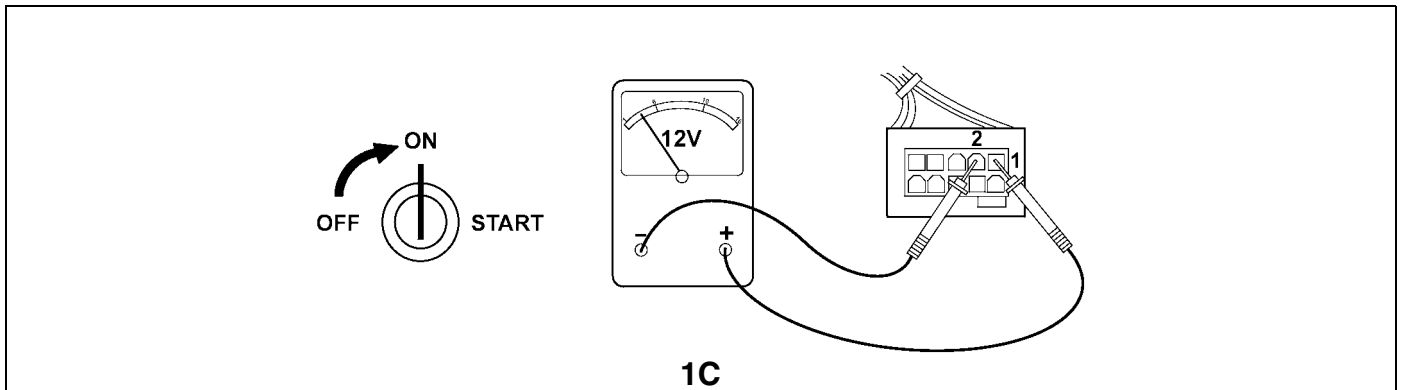


Figure 14-31

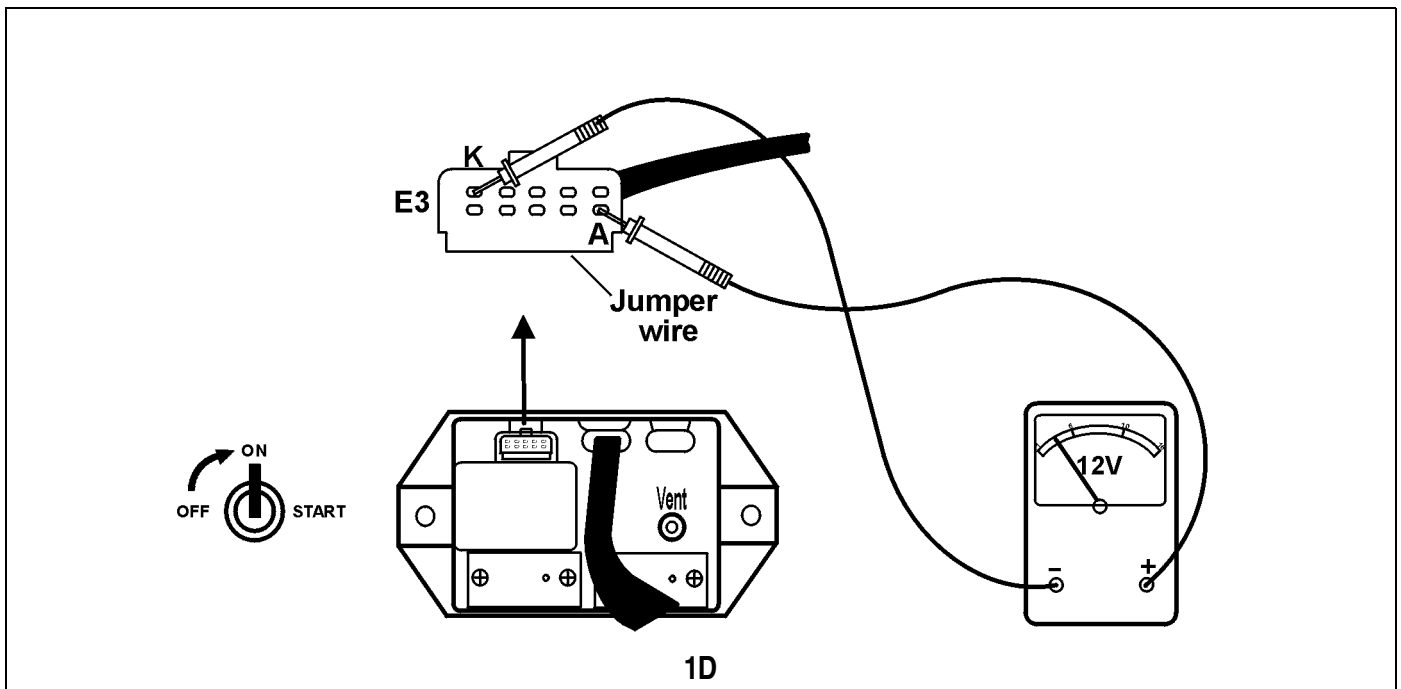


Figure 14-32 All B-Cluster Gauges Inoperative

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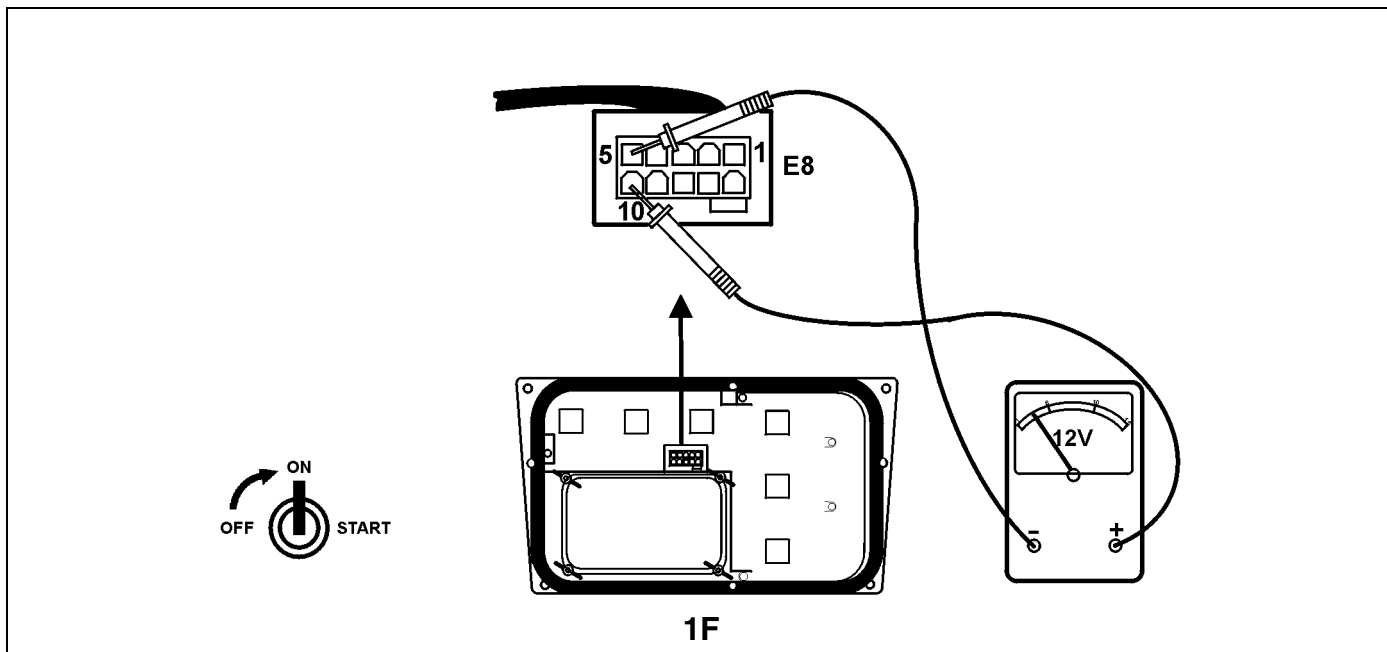


Figure 14-33 All B-Cluster Gauges Inoperative

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Turbo Boost Gauge Inoperative

The turbo boost gauge receives information from the engine ECU via the J1708 data link to the A/D Module. All data from the A/D Module is then transmitted to the B-Cluster gauges via a private data link.

Possible causes: Defective gauge, B-Cluster circuit board, engine ECU or sensor, J1708 data link, or other wiring problem.

STEP	CHECK	RESULT	NEXT STEP
1A	Turn ignition ON.	Gauge pointer goes to 12 o'clock position for up to ten seconds, then returns to normal indication (possibly left peg). Self-test complete. Gauge pointer does not move during self-test. Turbo boost <i>and</i> engine oil temperature gauges perform self-test, then begin sweeping (wig-wag) motion.	Go to 1B . Go to 1C . Go to 1D .
1B	Use a diagnostic tool to verify if engine ECU is transmitting turbo boost pressure data. <i>Note: Engine RPM must be increased significantly to register boost pressure.</i>	Engine ECU is transmitting turbo boost pressure data. Engine ECU is not transmitting turbo boost pressure data.	Replace A/D Module or B-Cluster circuit board. <i>Note: There is no means of testing the A/D module or circuit board to determine which component is defective. If possible, install a test A/D module before replacing the circuit board.</i> Check engine ECU for possible problem.
1C	Check for open or shorted gauge coil by connecting an ohmmeter across opposite pins of gauge.	Meter does not read 272 - 278 ohms resistance. Meter reads 272 - 278 ohms resistance.	Replace gauge/driver board. Gauge is okay. Replace B-Cluster circuit board.
1D	Unplug E3 connector at A/D module. With ignition key on, start engine. Measure AC voltage at E3 connector pins E and F.	Reading is approx. 2.5 to 4 volts AC. Reading is approx. 1.5 volts AC or less.	J1708 data link is okay. Use a diagnostic tool to determine if engine ECU is transmitting turbo boost pressure and engine oil temperature. If data is not being transmitted, problem is related to engine ECU. If data is being transmitted, replace A/D module. Check for open or short in J1708 data link wiring from engine ECU to A/D module. Use a diagnostic tool to determine if ECU is transmitting data.

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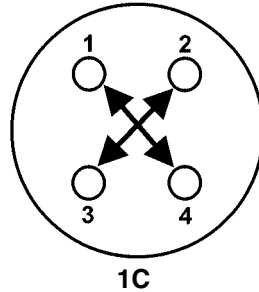


Figure 14-34 Turbo Boost Gauge Inoperative

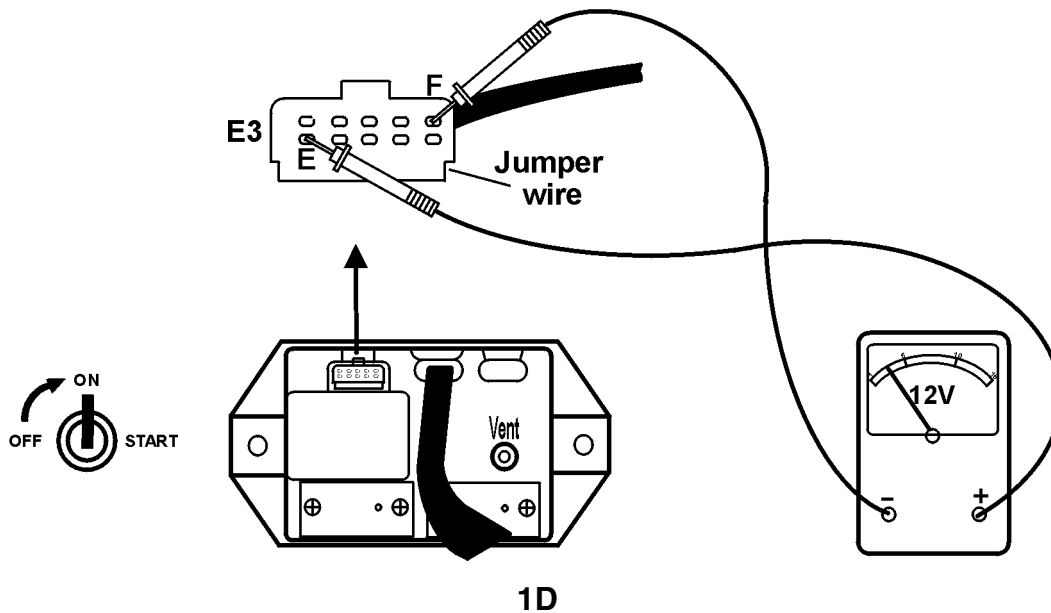


Figure 14-35 Turbo Boost Gauge Inoperative

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Engine Oil Temperature Gauge Inoperative

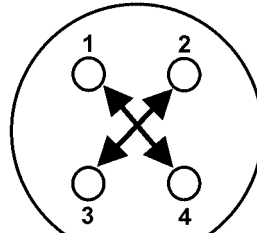
The engine oil temperature gauge receives information from the engine ECU via the J1708 data link to the A/D Module. All data from the A/D Module is then transmitted to the B-Cluster gauges via a private data link.

Possible causes: Defective gauge, B-Cluster circuit board, engine ECU or sensor, J1708 data link, or other wiring problem.

STEP	CHECK	RESULT	NEXT STEP
1A	Turn ignition ON.	Gauge pointer goes to 12 o'clock position for up to ten seconds, then returns to normal indication (possibly left peg). Self-test complete. Gauge pointer does not move during self-test. Engine oil temperature <i>and</i> turbo boost gauges perform self-test, then begin sweeping (wig-wag) motion.	Go to 1B . Go to 1C . Go to 1D .
1B	Use a diagnostic tool to verify if engine ECU is transmitting engine oil temperature data.	Engine ECU is transmitting engine oil temperature data. Engine ECU is not transmitting engine oil temperature data.	Replace A/D Module or B-Cluster circuit board. <i>Note: There is no means of testing the A/D module or circuit board to determine which component is defective. If possible, install a test A/D module before replacing the circuit board.</i> Check engine ECU and/or sender for possible problem.
1C	Check for open or shorted gauge coil by connecting an ohmmeter across opposite pins of gauge.	Meter does not read 272 - 278 ohms resistance. Meter reads 272 - 278 ohms resistance.	Replace gauge/driver board. Gauge is okay. Replace B-Cluster circuit board.
1D	Unplug E3 connector at A/D module. With ignition key on, start engine. Measure AC voltage at E3 connector pins E and F.	Reading is approx. 2.5 to 4 volts AC. Reading is approx. 1.5 volts AC or less.	J1708 data link is okay. Use a diagnostic tool to determine if engine ECU is transmitting engine oil temperature and turbo boost pressure. If data is not being transmitted, problem is related to engine ECU. If data is being transmitted, replace A/D module. Check for open or short in J1708 data link wiring from engine ECU to A/D module. Use a diagnostic tool to determine if ECU is transmitting data.

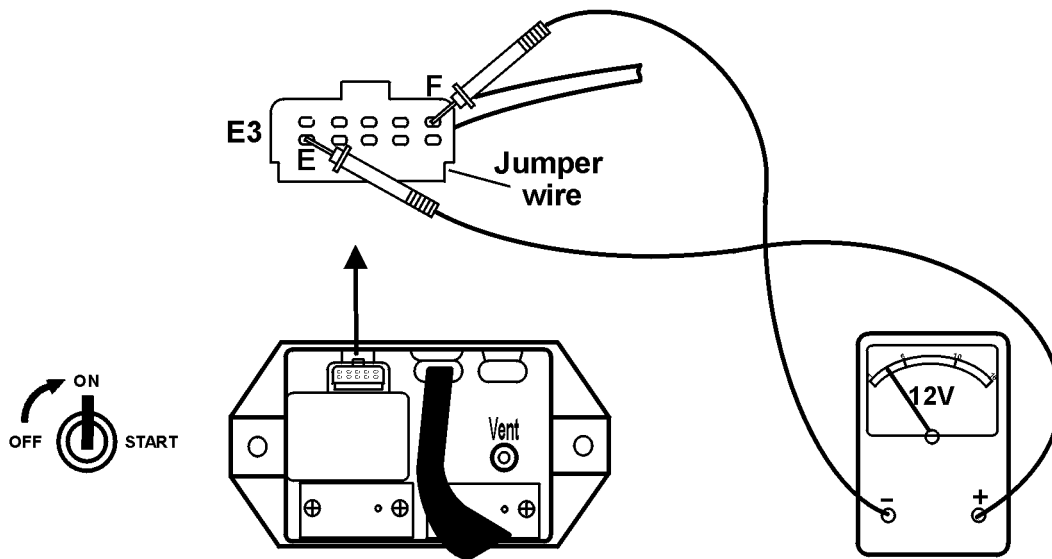
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1C

Figure 14-36 Engine Oil Temperature Gauge Inoperative



1D

Figure 14-37 Engine Oil Temperature Gauge Inoperative

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Forward Rear Axle Temperature Gauge Inoperative

Possible causes: Defective gauge, sensor, B-Cluster circuit board, A/D Module, or wiring problem.

Rear axle and transmission temperature gauges use input from component sensors and sensor harnesses that connect to the A/D Module. The A/D Module then transmits the data to the B-Cluster gauges via a private data link.

STEP	CHECK	RESULT	NEXT STEP
1A	Turn ignition ON.	Gauge pointer goes to 12 o'clock position for up to ten seconds, then returns to normal indication (possibly left peg). Self-test complete. Gauge pointer does not move during self-test.	Go to 1B . Go to 1C .
1B	Unplug sensor at connector and simulate sensor by connecting a resistor decade box or appropriate resistance value across sensor wires. Observe gauge temperature reading.	Gauge temperature reads approx. same as table below. Gauge does not move.	Replace sensor. Go to 1D .
1C	Check for open or shorted gauge coil by connecting an ohmmeter across opposite pins of gauge.	Meter does not read 272 - 278 ohms resistance. Meter reads 272 - 278 ohms resistance.	Replace gauge/driver board. Gauge is okay. Replace B-Cluster circuit board.
1D	Unplug E3 connector from A/D Module and install a jumper between pins H and K at harness connector. Measure resistance between wires at sensor harness connector end.	Ohmmeter reads near 0 ohms. Ohmmeter reads near infinity.	Wiring is okay. Replace A/D Module. Open in wiring harness. Repair as required.
1E	Check gauge driver board pin connections on B-Cluster circuit board.	Ensure all four pins are tight in pin sockets and driver board connector pins correctly engage in main board.	Reassemble correctly if needed.

Ohms Resistance	Degrees F
700	150
270	200
120	250

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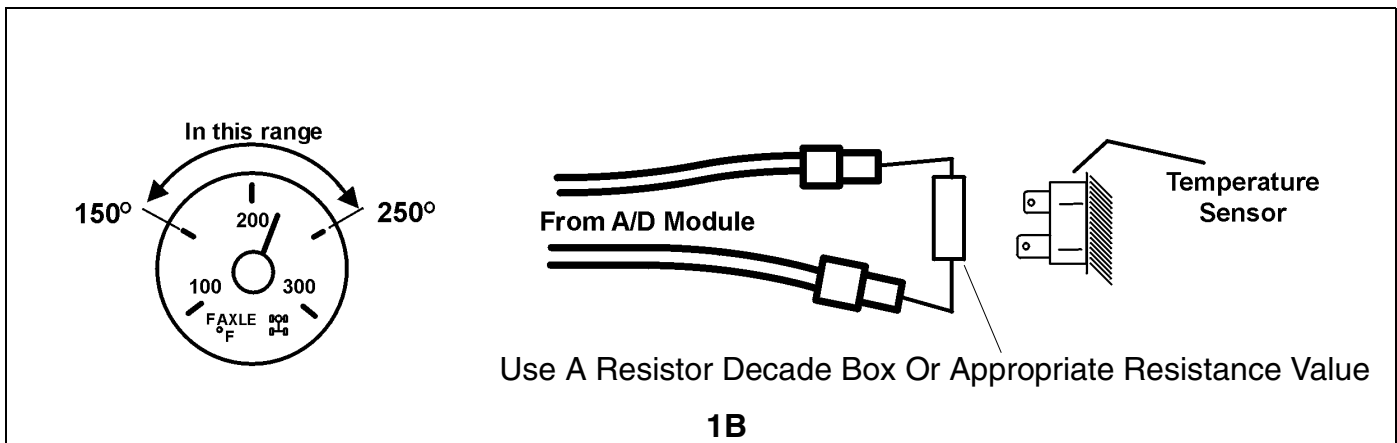


Figure 14-38 Forward Rear Axle Temperature Gauge Inoperative

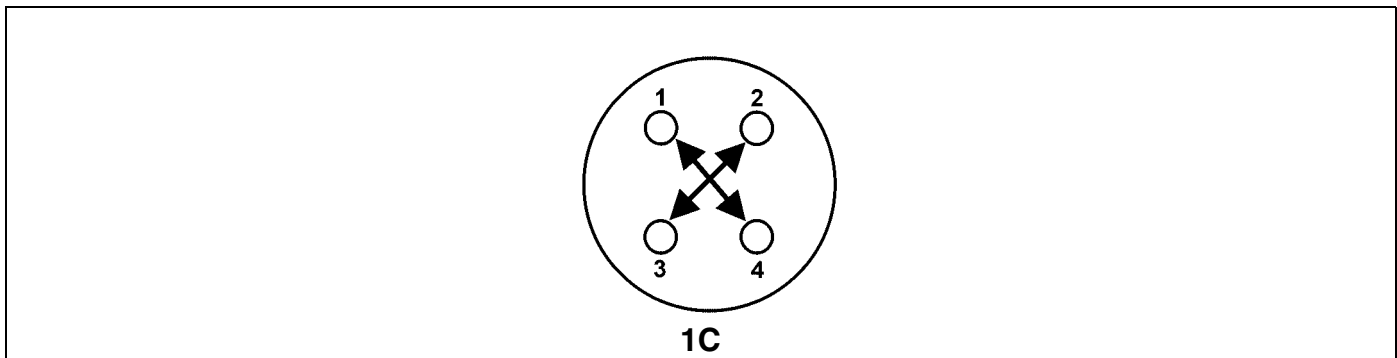


Figure 14-39 Forward Rear Axle Temperature Gauge Inoperative

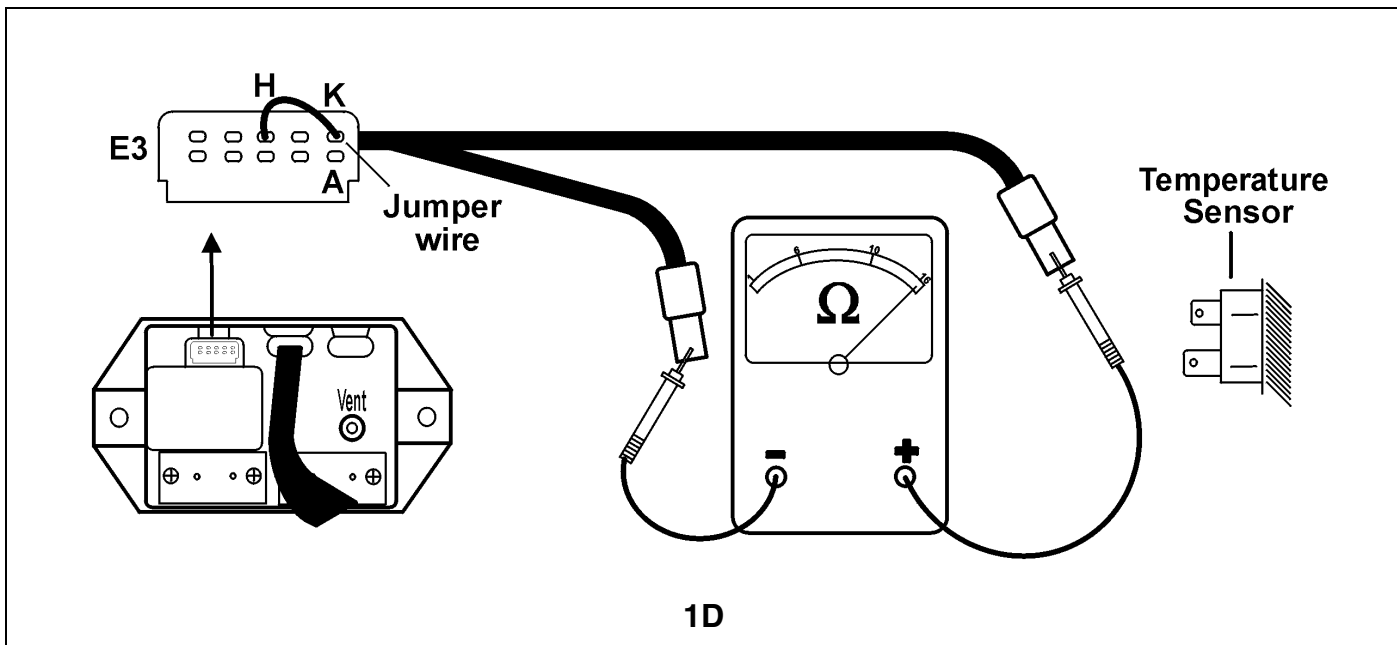


Figure 14-40 Forward Rear Axle Temperature Gauge Inoperative

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Rear Rear Axle Temperature Gauge Inoperative

Possible causes: Defective gauge, sensor, B-Cluster circuit board, A/D Module, or wiring problem.

Rear axle and transmission temperature gauges use input from component sensors and sensor harnesses that connect to the A/D Module. The A/D Module then transmits the data to the B-Cluster gauges via a private data link.

STEP	CHECK	RESULT	NEXT STEP
1A	Turn ignition ON.	Gauge pointer goes to 12 o'clock position for up to ten seconds, then returns to normal indication (possibly left peg). Self-test complete. Gauge pointer does not move during self-test.	Go to 1B . Go to 1C .
1B	Unplug sensor at connector and simulate sensor by connecting a resistor decade box or appropriate resistance value across sensor wires. Observe gauge temperature reading.	Gauge temperature reads approx. same as table below. Gauge does not move.	Replace sensor. Go to 1D .
1C	Check for open or shorted gauge coil by connecting an ohmmeter across opposite pins of gauge.	Meter does not read 272 - 278 ohms resistance. Meter reads 272 - 278 ohms resistance.	Replace gauge/driver board. Gauge is okay. Replace B-Cluster circuit board.
1D	Unplug E3 connector from A/D Module and install a jumper between pins C and K at harness connector. Measure resistance between wires at sensor harness connector end.	Ohmmeter reads near 0 ohms. Ohmmeter reads near infinity.	Wiring is okay. Replace A/D Module. Open in wiring harness. Repair as required.
1E	Check gauge driver board pin connections on B-Cluster circuit board.	Ensure all four pins are tight in pin sockets and driver board connector pins correctly engage in main board.	Reassemble correctly if needed.

Ohms Resistance	Degrees F
700	150
270	200
120	250

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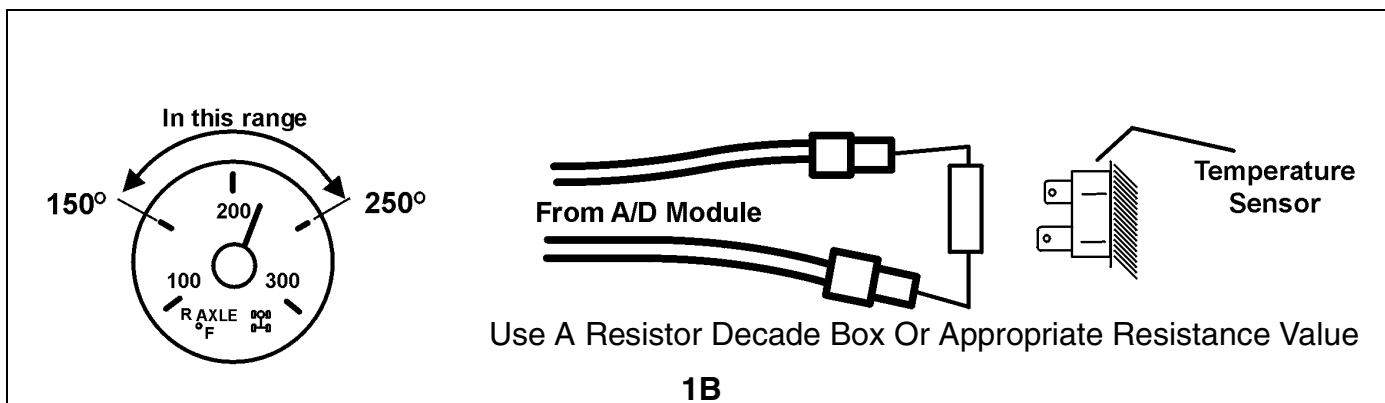


Figure 14-41 Rear Rear Axle Temperature Gauge Inoperative

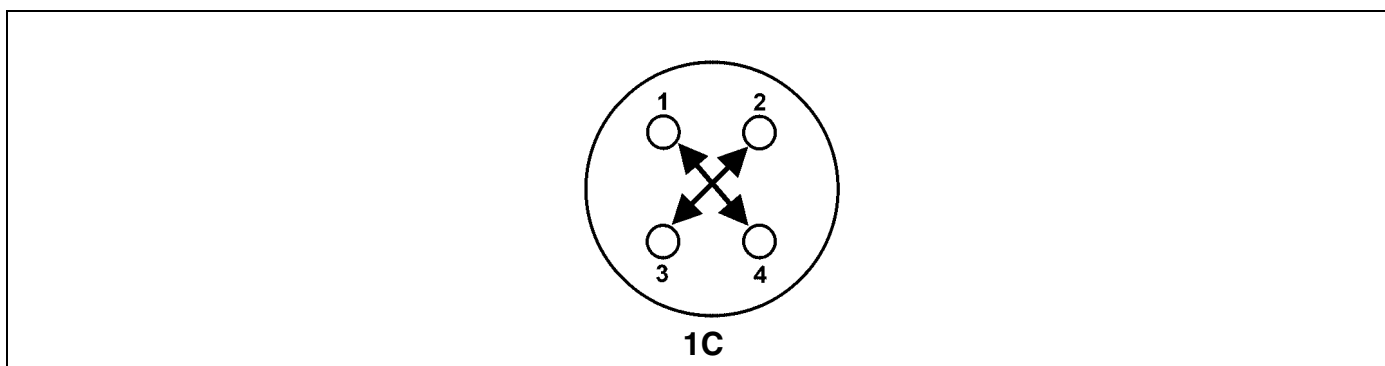


Figure 14-42 Rear Rear Axle Temperature Gauge Inoperative

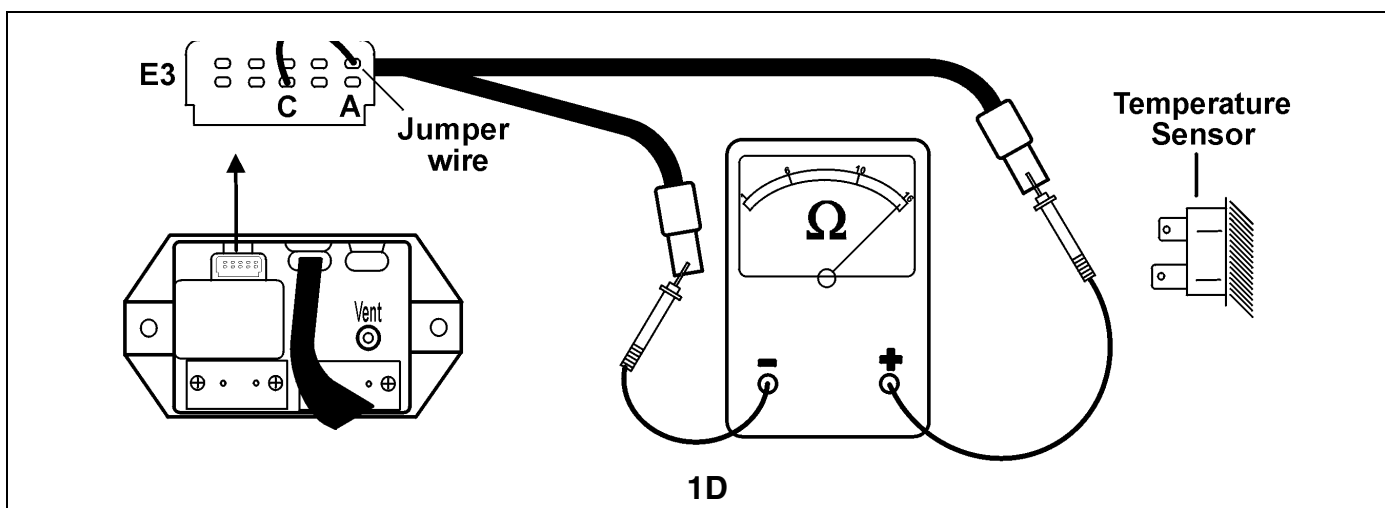


Figure 14-43 Rear Rear Axle Temperature Gauge Inoperative

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Transmission Temperature Gauge Inoperative

Possible causes: Defective gauge, sensor, B-Cluster circuit board, A/D Module, or wiring problem.

Rear axle and transmission temperature gauges use input from component sensors and sensor harnesses that connect to the A/D Module. The A/D Module then transmits the data to the B-Cluster gauges via a private data link.

STEP	CHECK	RESULT	NEXT STEP
1A	Turn ignition ON.	Gauge pointer goes to 12 o'clock position for up to ten seconds, then returns to normal indication (possibly left peg). Self-test complete. Gauge pointer does not move during self-test.	Go to 1B . Go to 1C .
1B	Unplug sensor at connector and simulate sensor by connecting a resistor decade box or appropriate resistance value across sensor wires. Observe gauge temperature reading.	Gauge temperature reads approx. same as table below. Gauge does not move.	Replace sensor. Go to 1D .
1C	Check for open or shorted gauge coil by connecting an ohmmeter across opposite pins of gauge.	Meter does not read 272 - 278 ohms resistance. Meter reads 272 - 278 ohms resistance.	Replace gauge/driver board. Gauge is okay. Replace B-Cluster circuit board.
1D	Unplug E3 connector from A/D Module and install a jumper between pins B and K at harness connector. Measure resistance between wires at sensor harness connector end.	Ohmmeter reads near 0 ohms. Ohmmeter reads near infinity.	Wiring is okay. Replace A/D Module. Open in wiring harness. Repair as required.
1E	Check gauge driver board pin connections on B-Cluster circuit board.	Ensure all four pins are tight in pin sockets and driver board connector pins correctly engage in main board.	Reassemble correctly if needed.

Ohms Resistance	Degrees F
270	200
120	250
50	300

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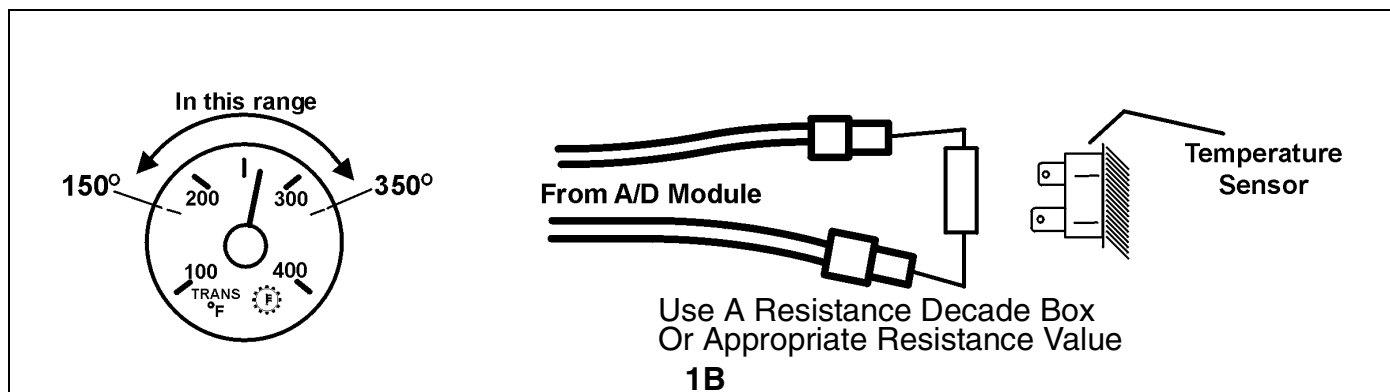


Figure 14-44 Transmission Temperature Gauge Inoperative

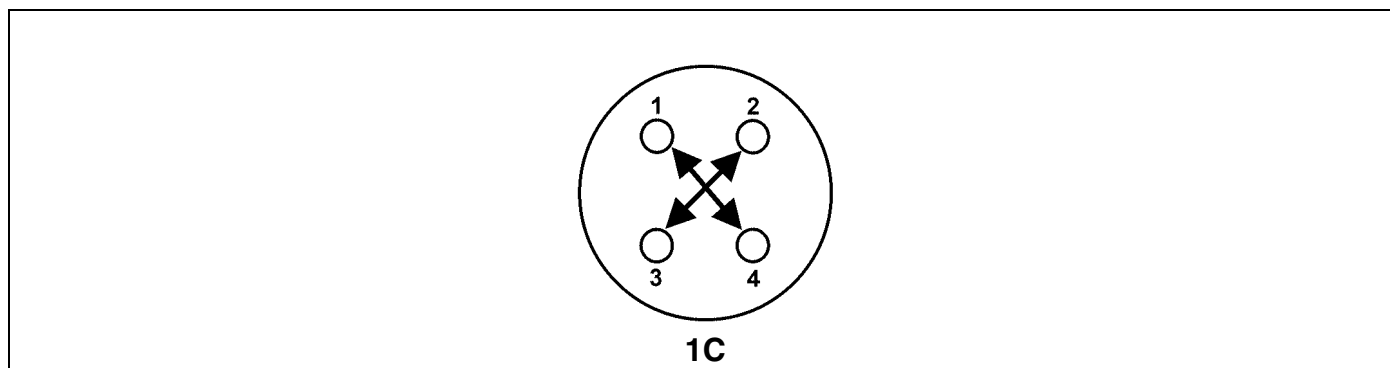


Figure 14-45 Transmission Temperature Gauge Inoperative

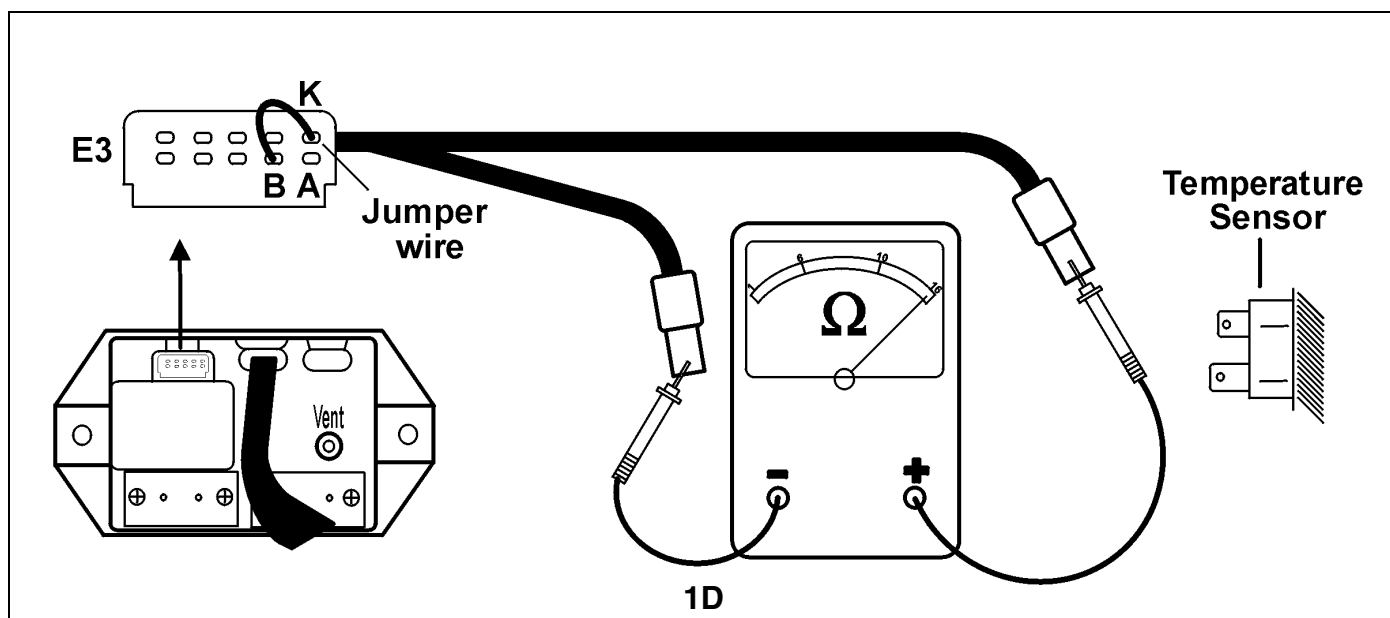


Figure 14-46 Transmission Temperature Gauge Inoperative

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Fuel Filter Restriction Gauge Inoperative

Possible causes: Defective gauge, vacuum source, vacuum hose, B-Cluster circuit board or A/D Module.

This gauge receives its input from the A/D Module. The A/D Module receives its inputs from a vacuum module attached to it. The vacuum module is connected to the vacuum source by a vacuum hose.

STEP	CHECK	RESULT	NEXT STEP
1A	Turn ignition ON.	Gauge pointer goes to 12 o'clock position for up to ten seconds, then returns to normal indication (possibly left peg). Self-test complete. Gauge pointer does not move during self-test.	Go to 1B . Go to 1C .
1B	Disconnect vacuum hose from A/D Module and connect it to a vacuum test gauge. With engine running, observe test gauge.	Test gauge reads 0. Test gauge has a reading.	Check vacuum source. Go to 1D . Vacuum source and hose are okay. Go to 1E .
1C	Check for open or shorted gauge coil by connecting an ohmmeter across opposite pins of gauge.	Meter does not read 272 - 278 ohms resistance. Meter reads 272 - 278 ohms resistance.	Replace gauge/driver board. Gauge is okay. Replace B-Cluster circuit board.
1D	Install short length of vacuum hose between vacuum source and vacuum test gauge. With engine running, observe gauge reading.	Gauge reads 0. Gauge has a reading.	Repair vacuum source. Replace vacuum hose between source and A/D Module.
1E	Remove vacuum module from A/D Module and rotate 180 degrees. Reinstall module. Reconnect vacuum hose. With engine running, observe gauge reading.	Gauge reads 0. Gauge has a reading.	Replace A/D Module. Replace vacuum module.
1F	Check gauge driver board pin connections on B-Cluster circuit board.	Ensure all four pins are tight in pin sockets and driver board connector pins correctly engage in main board.	Reassemble correctly if needed.

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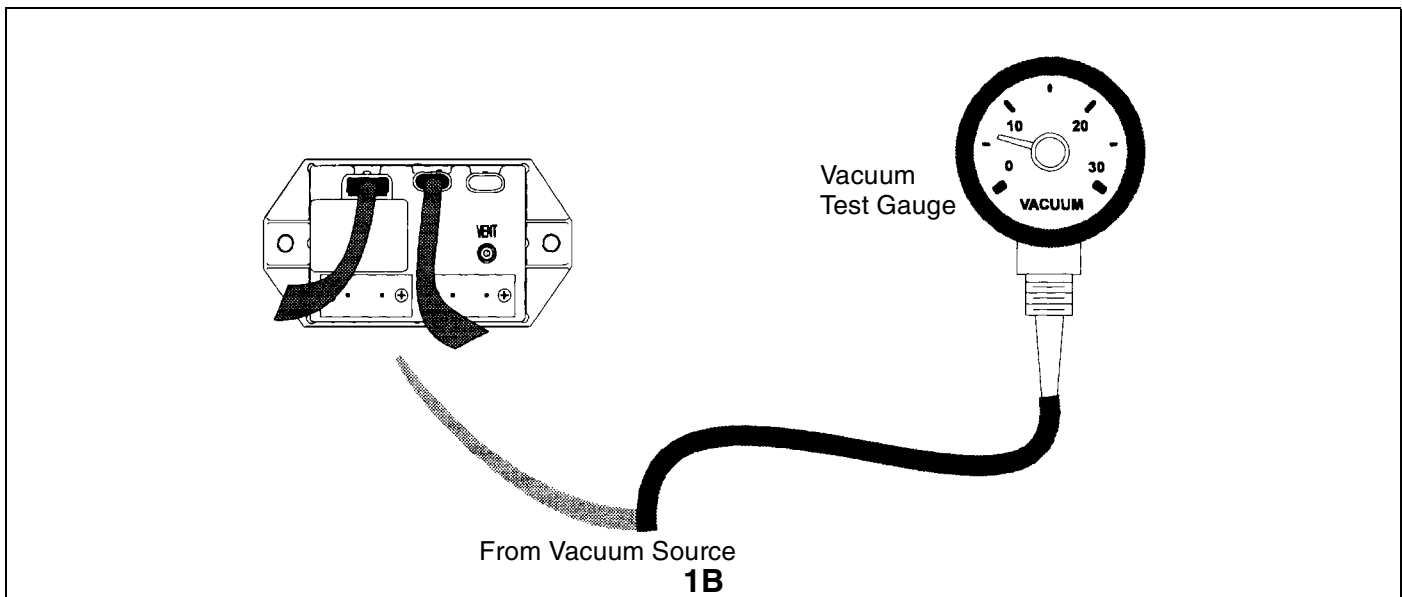


Figure 14-47 Fuel Filter Restriction Gauge Inoperative

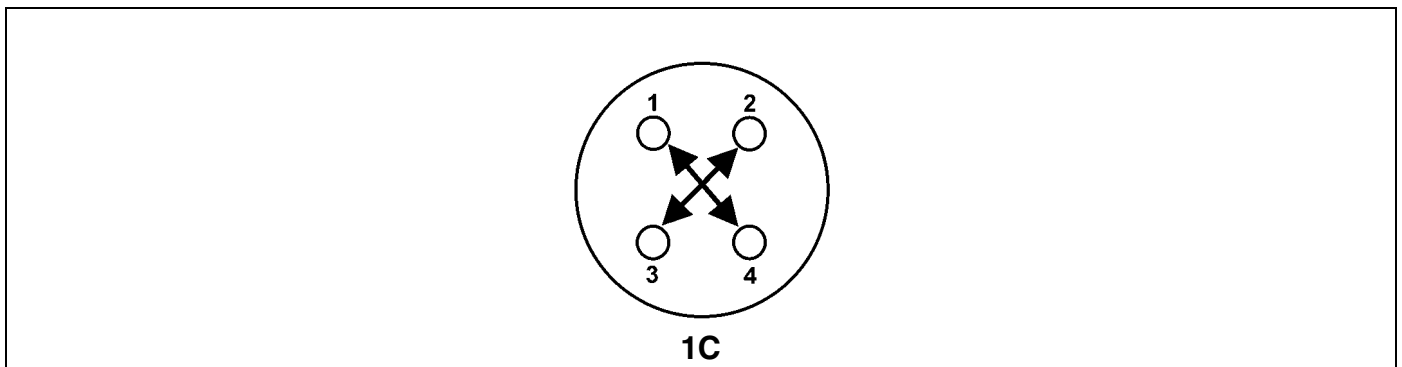


Figure 14-48

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Air Cleaner Restriction Gauge Inoperative

Possible causes: Defective gauge, vacuum source, vacuum hose, B-Cluster circuit board or A/D Module.

This gauge receives its input from the A/D Module. The A/D Module receives its inputs from a vacuum module attached to it. The vacuum module is connected to the vacuum source by a vacuum hose.

STEP	CHECK	RESULT	NEXT STEP
1A	Turn ignition ON.	Gauge pointer goes to 12 o'clock position for up to ten seconds, then returns to normal indication (possibly left peg). Self-test complete. Gauge pointer does not move during self-test.	Go to 1B . Go to 1C .
1B	Disconnect vacuum hose from A/D Module and connect it to a vacuum test gauge. With engine running, observe test gauge.	Test gauge reads 0. Test gauge has a reading.	Check vacuum source. Go to 1D . Vacuum source and hose are okay. Go to 1E .
1C	Check for open or shorted gauge coil by connecting an ohmmeter across opposite pins of gauge.	Meter does not read 272 - 278 ohms resistance. Meter reads 272 - 278 ohms resistance.	Replace gauge/driver board. Gauge is okay. Replace B-Cluster circuit board.
1D	Install short length of vacuum hose between vacuum source and vacuum test gauge. With engine running, observe gauge reading.	Gauge reads 0. Gauge has a reading.	Repair vacuum source. Replace vacuum hose between source and A/D Module.
1E	Remove vacuum module from A/D Module and rotate 180 degrees. Reinstall module. Reconnect vacuum hose. With engine running, observe gauge reading.	Gauge reads 0. Gauge has a reading.	Replace A/D Module. Replace vacuum module.
1F	Check gauge driver board pin connections on B-Cluster circuit board.	Ensure all four pins are tight in pin sockets and driver board connector pins correctly engage in main board.	Reassemble correctly if needed.

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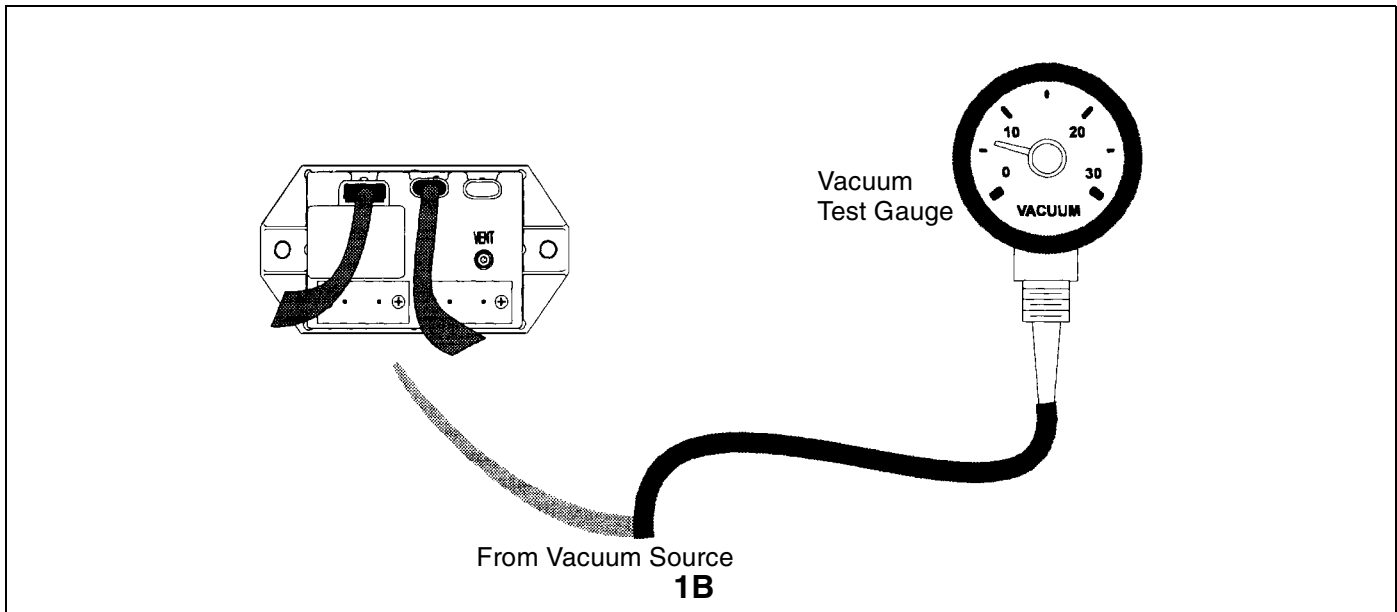


Figure 14-49 Air Cleaner Restriction Gauge Inoperative

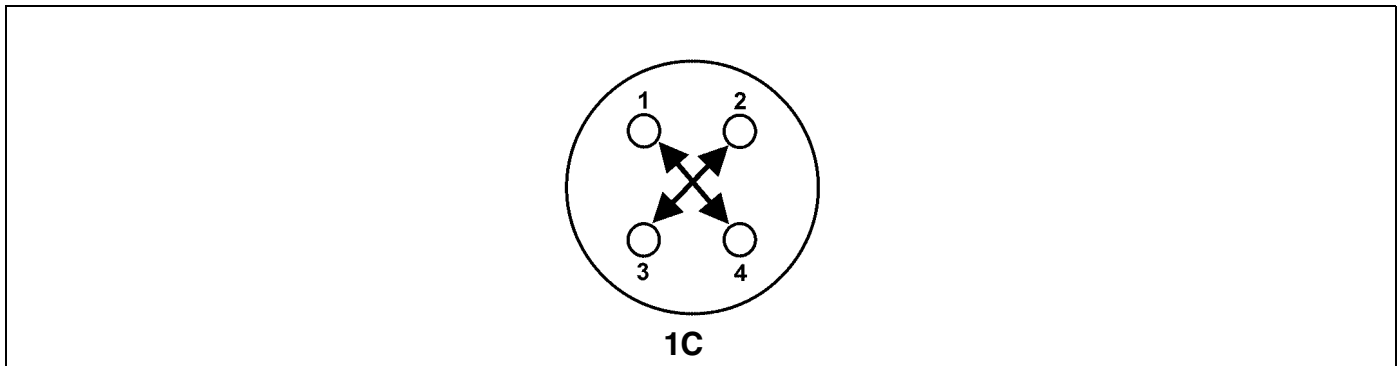


Figure 14-50 Air Cleaner Restriction Gauge Inoperative

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Air Suspension Gauge Inoperative

Possible causes: Defective gauge, pressure source, pressure hose, B-Cluster circuit board or A/D Module.

This gauge receives its input from the A/D Module. The A/D Module receives its inputs from a pressure module attached to it. The pressure module is connected to a pressure source by a pressure hose.

STEP	CHECK	RESULT	NEXT STEP
1A	Turn ignition ON.	Gauge pointer goes to 12 o'clock position for up to ten seconds, then returns to normal indication (possibly left peg). Self-test complete. Gauge pointer does not move during self-test.	Go to 1B . Go to 1C .
1B	Disconnect air hose from A/D Module and connect it to an air pressure test gauge. With engine running, observe test gauge.	Test gauge reads 0. Test gauge has a reading.	Replace air hose between pressure source and A/D Module. Pressure source and hose are okay. Go to 1D .
1C	Check for open or shorted gauge coil by connecting an ohmmeter across opposite pins of gauge.	Meter does not read 272 - 278 ohms resistance. Meter reads 272 - 278 ohms resistance.	Replace gauge/driver board. Gauge is okay. Replace B-Cluster circuit board.
1D	Remove pressure module from A/D Module and rotate 180 degrees. Reinstall module. Reconnect air hose. With engine running, observe gauge reading.	Gauge reads 0. Gauge has a reading.	Go to 1E . Replace pressure module.
1E	Install short length of air hose (with pressure regulator) to pressure module on A/D Module. Pressurize module to 50 psi and observe gauge reading.	Gauge reads 0.	Replace A/D Module.
1F	Check gauge driver board pin connections on B-Cluster circuit board.	Ensure all four pins are tight in pin sockets and driver board connector pins correctly engage in main board.	Reassemble correctly if needed.

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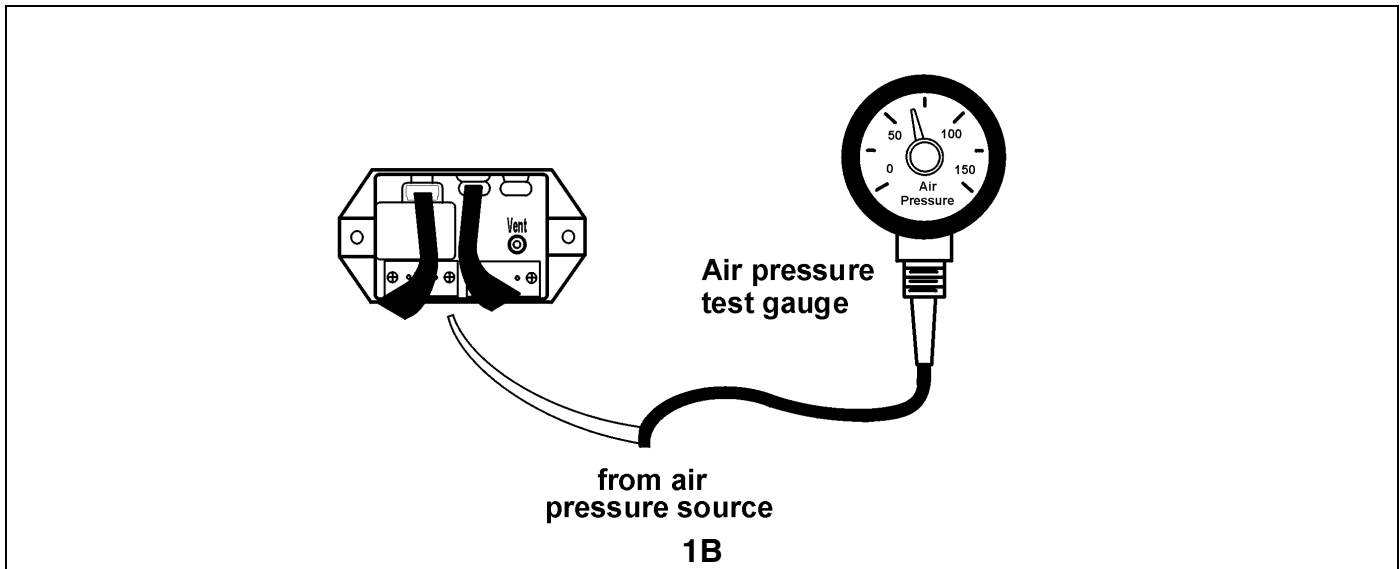


Figure 14-51 Air Suspension Gauge Inoperative

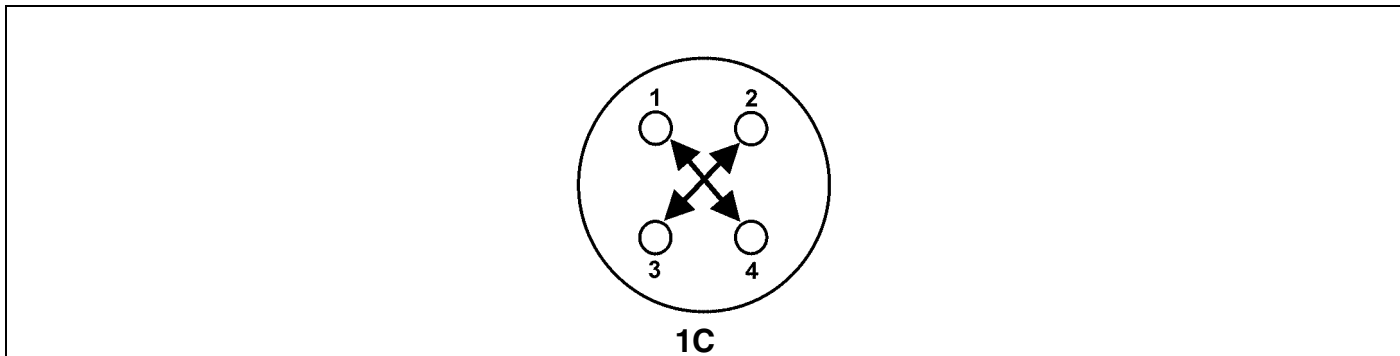


Figure 14-52 Air Suspension Gauge Inoperative

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Pyrometer Gauge Inoperative

Possible causes: Defective gauge, sensor, harness wiring, B-Cluster circuit board or A/D Module.

The pyrometer uses an ungrounded temperature sensor and a wiring harness that plugs into the A/D Module. The A/D Module then transmits the data to the B-Cluster gauges via a private data link.

STEP	CHECK	RESULT	NEXT STEP
1A	Turn ignition ON.	Gauge pointer goes to 12 o'clock position for up to ten seconds, then returns to normal indication (possibly left peg). Self-test complete. Gauge pointer does not move during self-test.	Go to 1B . Go to 1C .
1B	Unplug sensor at connector and simulate sensor by connecting a resistor decade box, or about a 22-ohm resistor across sensor wires. <i>Note: Positive meter lead must be connected to positive end of resistor and negative meter lead must be connected to negative end of resistor.</i> Observe pyrometer gauge reading.	Gauge reads approx. 1000 degrees F. Gauge reads 0.	Replace sensor. Check sensor harness. Go to 1D .
1C	Check for open or shorted gauge coil by connecting an ohmmeter across opposite pins of gauge.	Meter does not read 272 - 278 ohms resistance. Meter reads 272 - 278 ohms resistance.	Replace gauge/driver board. Gauge is okay. Replace B-Cluster circuit board.
1D	Unplug E4 connector from A/D Module and install a jumper between pins E and F in harness connector. Measure the resistance between the wires at the sensor harness connector end.	Infinite resistance reading. 0 resistance reading.	Open in harness wires. Repair as required. Replace A/D Module.
1E	Check gauge driver board pin connections on B-Cluster circuit board.	Ensure all four pins are tight in pin sockets and driver board connector pins correctly engage in main board.	Reassemble correctly if needed.
	<i>Note: If the pyrometer leads are connected backwards, other B-Cluster gauges can become upset (work but have incorrect readings). If other B-Cluster gauges show signs of fluctuation, check to see if the pyrometer leads are reversed between the A/D Module.</i>		

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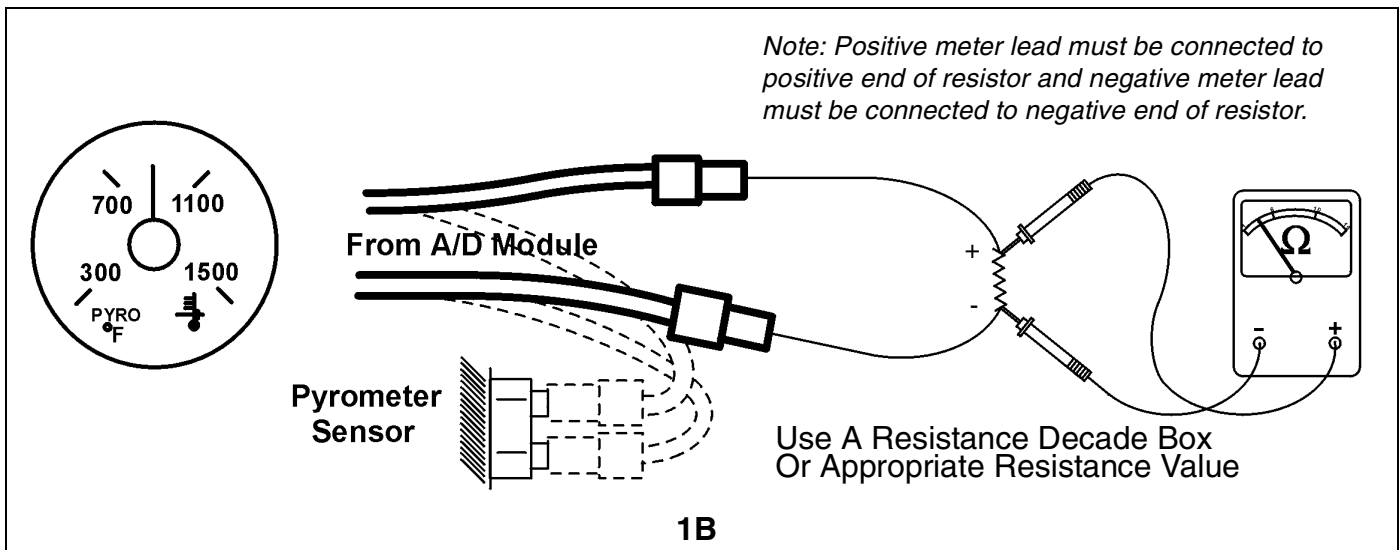


Figure 14-53 Pyrometer Gauge Inoperative

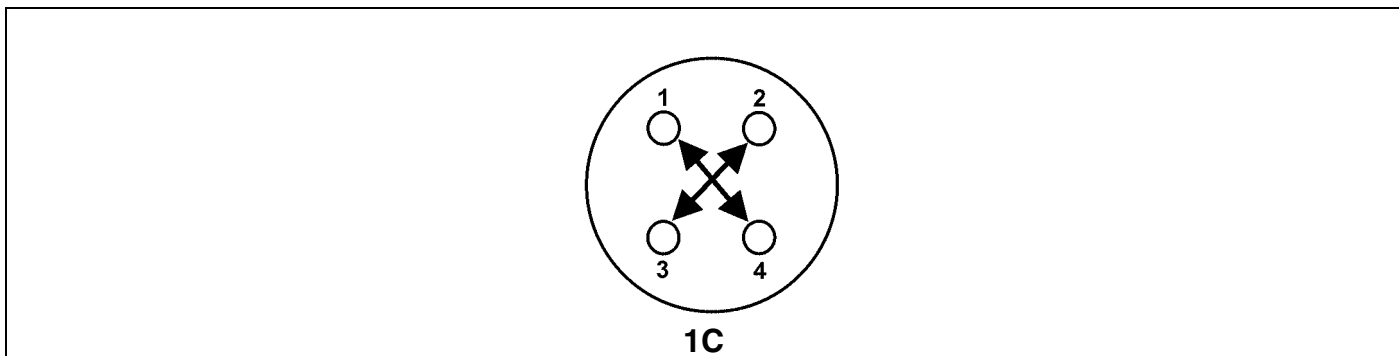


Figure 14-54 Pyrometer Gauge Inoperative

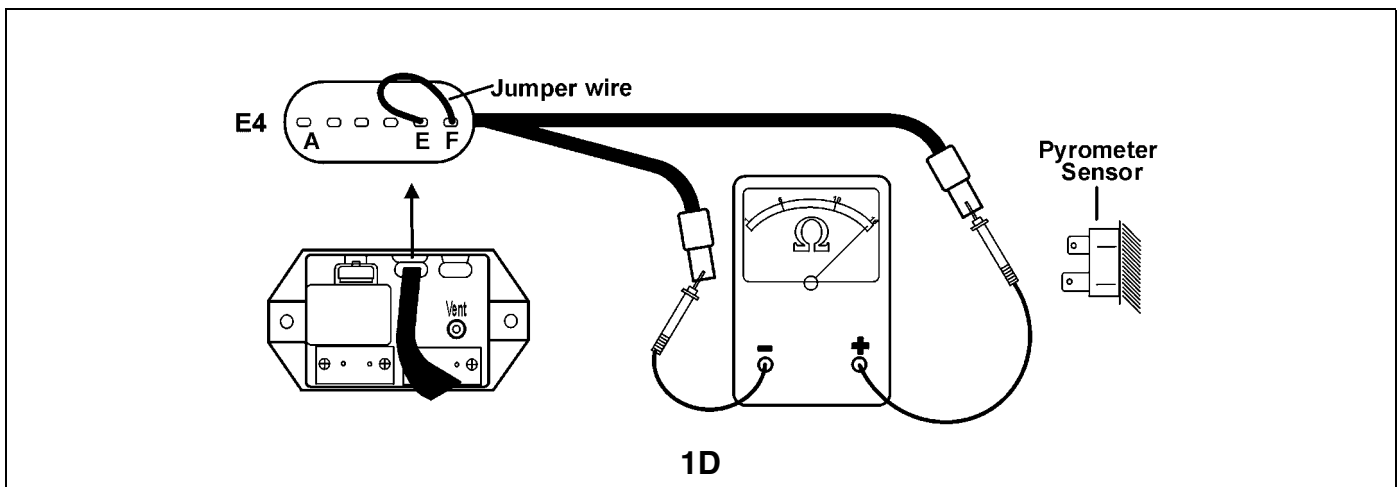


Figure 14-55 Pyrometer Gauge Inoperative

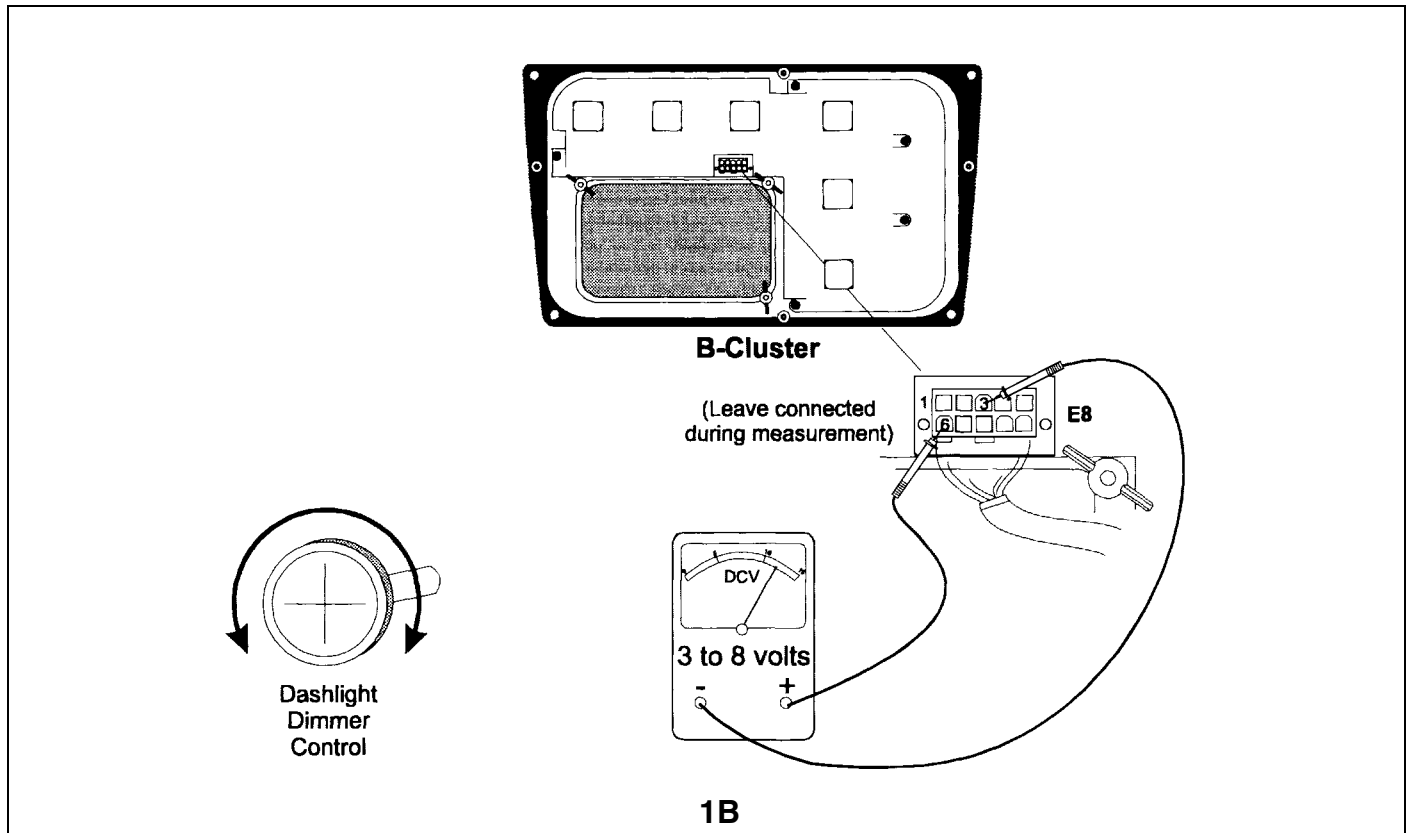
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B-Cluster Backlighting Inoperative

Possible causes: Defective dashlight dimmer control, B-Cluster circuit board, fuse, or wiring.

STEP	CHECK	RESULT	NEXT STEP
1A	Gain access to rear of B-Cluster and turn headlights on. (Do not unplug any connectors).		Continue to Step 1B .
1B	Measure voltage between E8 connector pins 3 and 6 while rotating dimmer control from one stop to the other.	Voltage reading varies between 3 and 8 volts. Voltage reading is 0.	Dimmer control okay. Replace B-Cluster circuit board. Check for open or short in wiring from dimmer control to E8 connector. Check fuse and dimmer control module.



B-Cluster Backlighting Inoperative

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B-Cluster Individual Gauge Circuit Board Identification

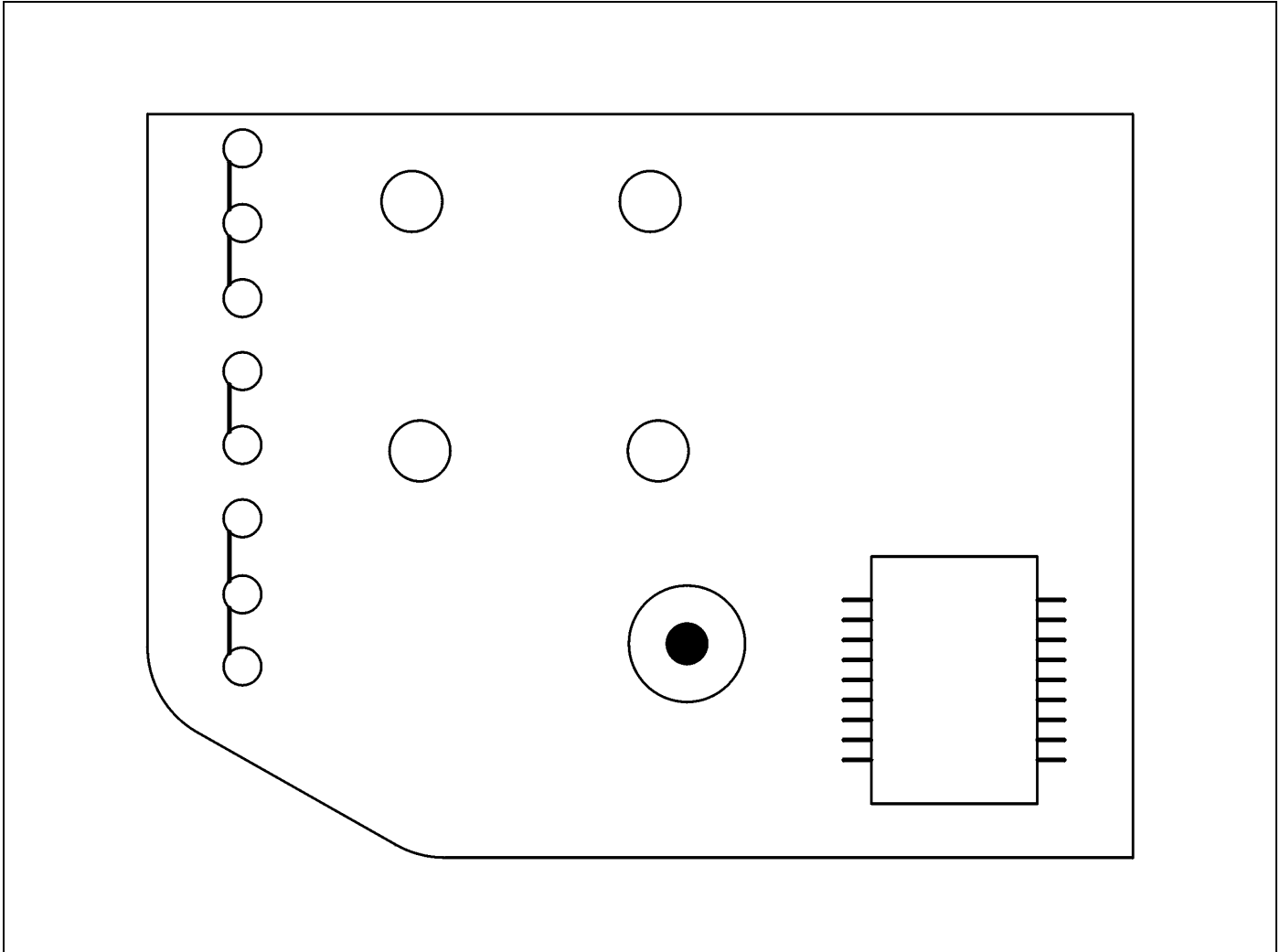


Figure 14-56 Example of individual B-cluster gauge circuit board. See Figure 14-55 (next page) for actual gauge identification.

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Printed Circuit Board Identification

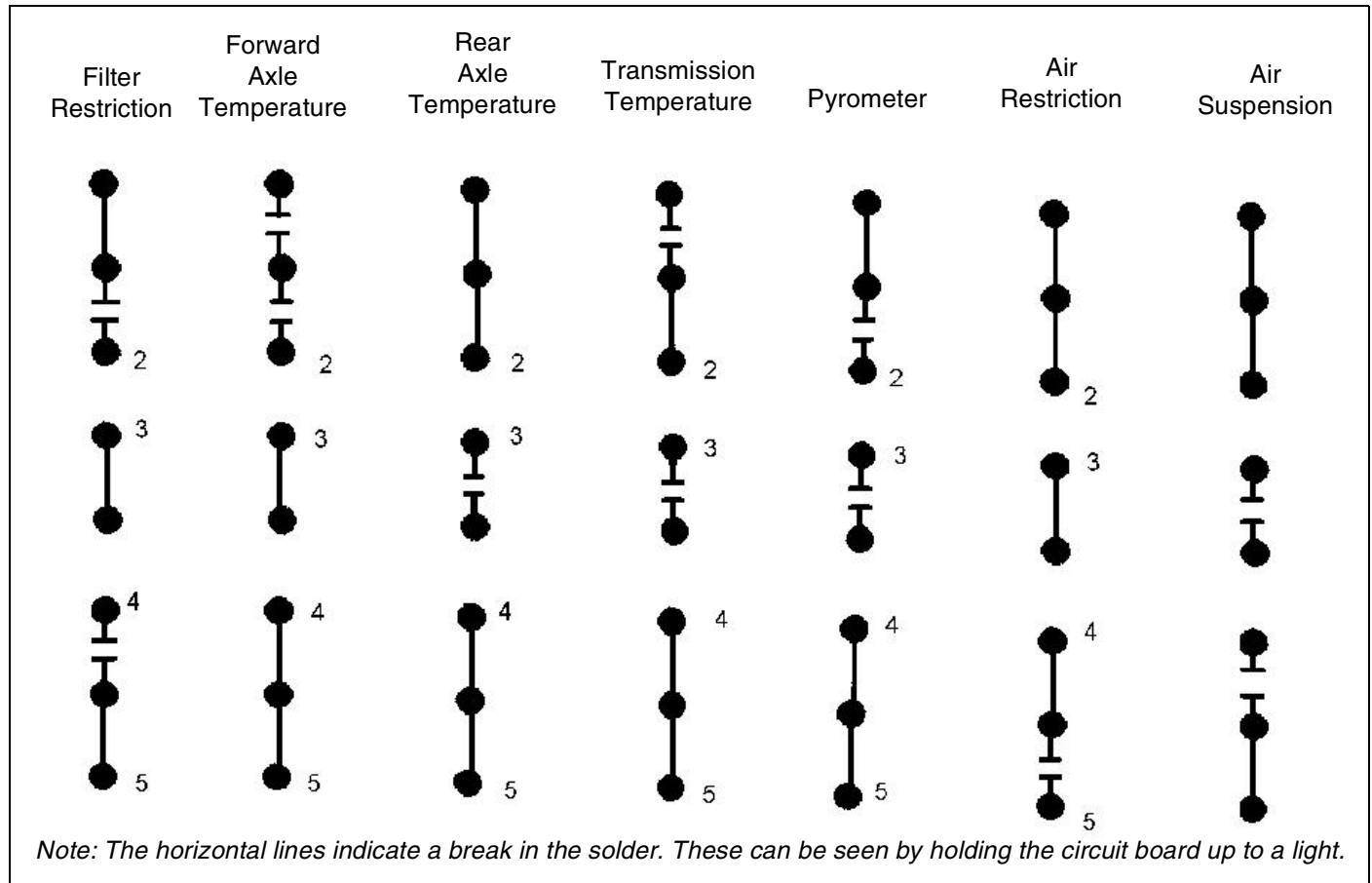


Figure 14-57 B-Cluster Individual Circuit Board Identification.

Troubleshooting the T2000 Instrument Panel

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B-Cluster Connector Pin Assignments

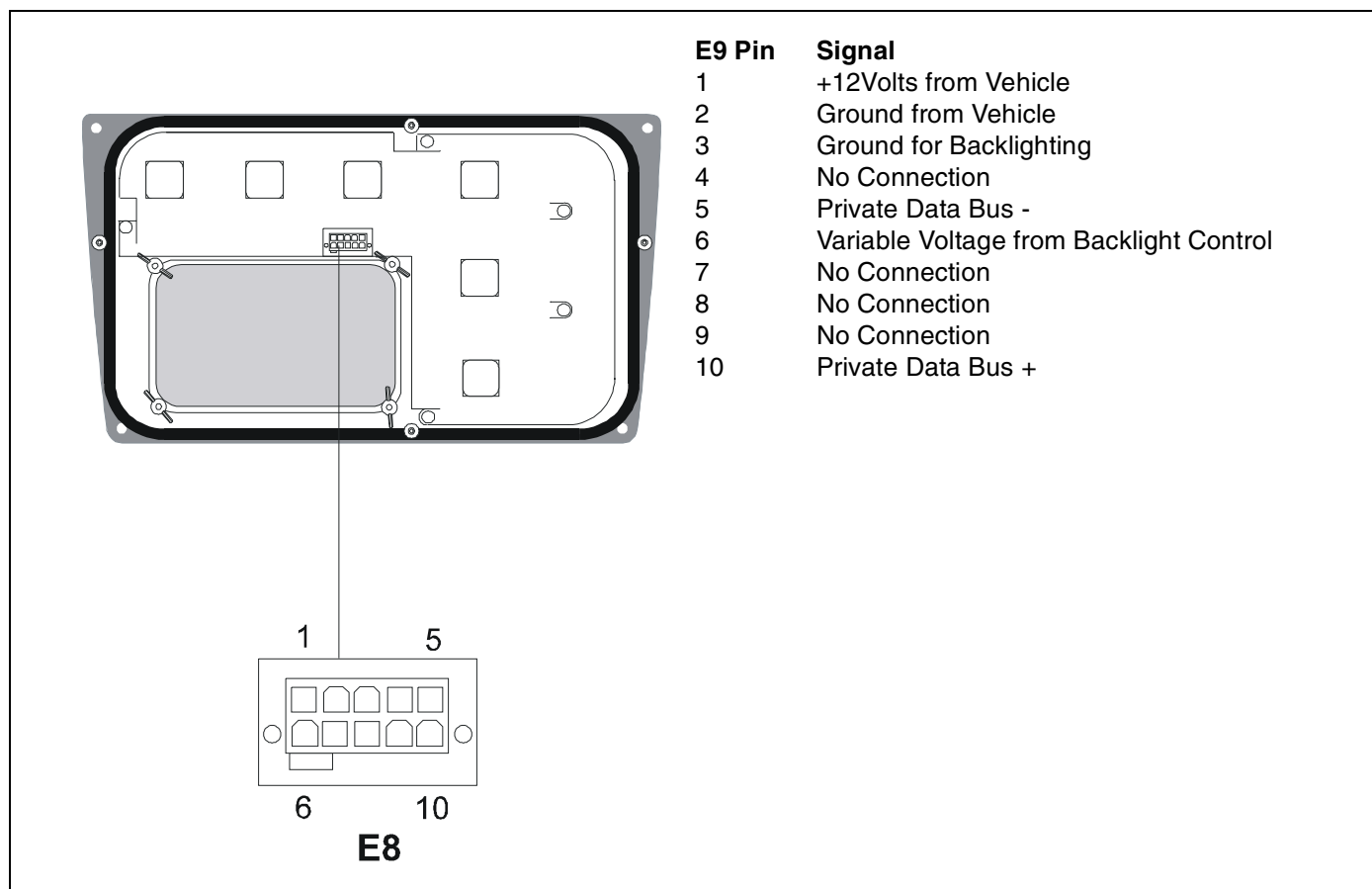


Figure 14-58 B-Cluster Connector Pin Assignments

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A/D Module Connector Pin Assignments

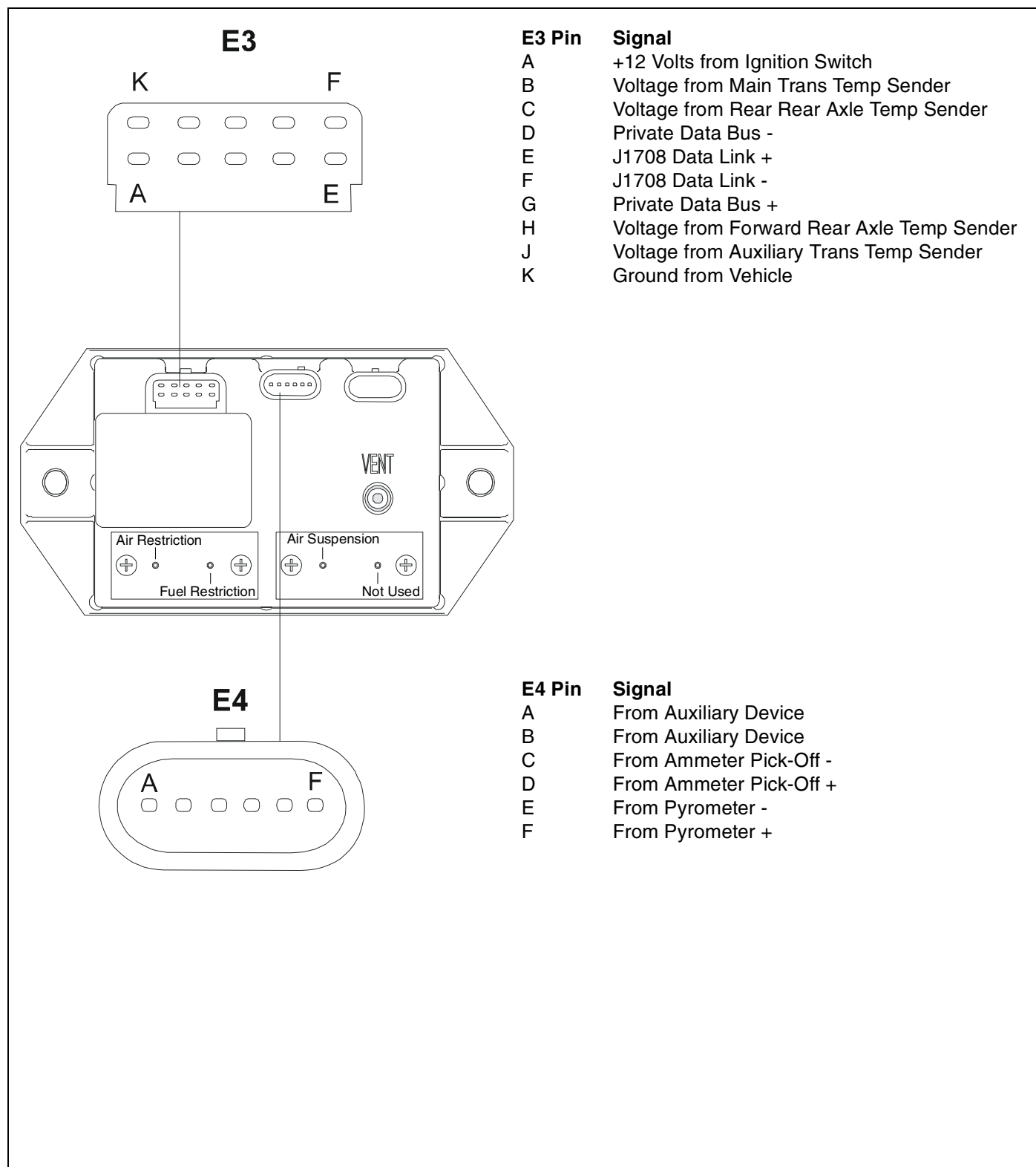


Figure 14-59