

1997 Ford Pickup F150

INSTRUMENT PANEL - STANDARD 1997 ACCESSORIES & EQUIPMENT Ford Motor Co. - Analog Instrument Panels

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DESCRIPTION & OPERATION

Analog instrument cluster is equipped with electronic speedometer, fuel, oil pressure, temperature and voltage gauges. Some models are equipped with a tachometer.

ADJUSTMENTS

SPEEDOMETER CALIBRATION

1. Remove VSS. See **VEHICLE SPEED SENSOR & GEAR** under REMOVAL & INSTALLATION.
2. To calculate proper VSS driven gear, use the following formula: Indicated vehicle speed x No. of teeth on original VSS driven gear / actual vehicle speed = new driven gear size.
3. Round of number to nearest gear size (No. of teeth). Reinstall VSS with correct driven gear.

TROUBLE SHOOTING

INSPECTION

1. Verify customer concern by observing indicators and gauges to determine correct operation with ignition switch in RUN position, with engine off, in START before ignition switch is released and in RUN with engine running.
2. Visually inspect mechanical components of instrument cluster.
 - Low Brake Fluid Level
 - Damaged Engine Oil Filter
 - Damaged Vehicle Speed Sensor Gear
 - Damaged Washer Fluid Reservoir
 - Low Washer Fluid
 - Door Adjustment
 - Low Coolant Level
 - Low Engine Oil
 - Stuck Gauge Needle
 - Worn Or Damaged Generator Drive Belt
3. Visually inspect electrical components of instrument cluster.
 - Blown Fuse
 - Damaged Miniature Bulbs
 - Damaged Wiring Harness
 - Loose Or Corroded Connections

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- Damaged Harness
 - Damaged Switches and Sensors
 - Damaged Instrument Cluster.
4. Verify that charging system, safety belt warning chime, turn signals, headlights and cruise control are working properly. Diagnose and repair those systems before performing instrument cluster diagnostics.

SYSTEM TESTING

SPEEDOMETER INOPERATIVE/ODOMETER OKAY

Replace instrument cluster.

TRIP ODOMETER INOPERATIVE/SPEEDOMETER OKAY

Replace instrument cluster.

SINGLE GAUGE DOES NOT RETURN TO ZERO WITH KEY OFF

1. Check Fuse

Turn ignition off. Check fuse No. 2 in junction box fuse relay panel (under instrument panel). If fuse is okay, go to next step. If fuse fails repeatedly, go to step 3).

2. Check Power To Cluster

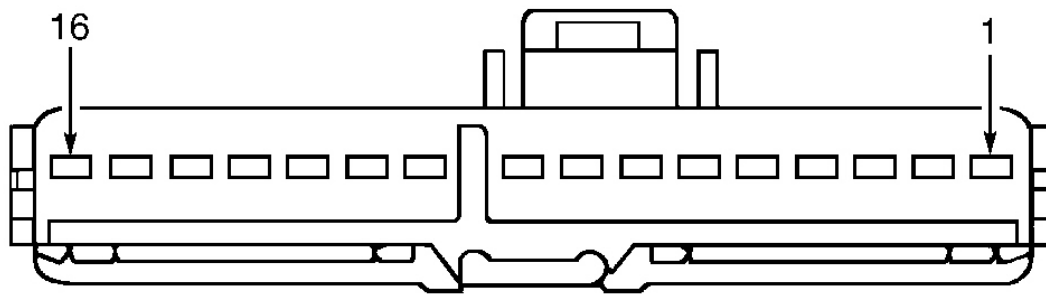
Disconnect negative battery cable. Disconnect instrument cluster harness connector C237. See **Fig. 1** . Measure voltage between C237 pin No. 3 (Red/White wire) and ground. If battery voltage exists, repair or replace instrument cluster. If battery voltage does not exist, go to next step.

3. Check Red/White Wire For Short To Ground

Measure resistance between C237 pin No. 3 (Red/White wire) and ground. If resistance is less than 10 k/ohms, repair short to ground in Red/White wire. If resistance is greater than 10 k/ohms, check for intermittent short to ground.

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Fig. 1: Identifying Instrument Panel Harness Connector C237
Courtesy of FORD MOTOR CO.

HARNESS CONNECTOR C237 PIN IDENTIFICATION

Pin No. (Wire Color)	Description
1 (Black)	Ground
2 (Light Blue/Red)	Illumination Power
3 (Red/White)	Hot At All Times
4 (Not Used)	Not Used
5 (Pink/Orange)	Ground
6 (White/Red)	Oil Pressure Warning Light
7 (Gray/Black)	Vehicle Speed Sensor Signal
8 (Black/White)	Tachometer Select
9 (Red/White)	Engine Coolant Temperature
10 (Yellow/White)	Fuel Level Signal
11 (Dark Blue/Light Green)	Anti Theft Indicator
12 (White/Pink)	Tachometer Signal
13 (Not Used)	Not Used
14 (White/Light Blue)	Right Turn Indicator
15 (Black)	Ground
16 (Light Green/White)	Left Turn Indicator

FUEL GAUGE INACCURATE

1. Disconnect negative battery cable, wait one minute then reconnect. Check gauge operation. If gauge indication is okay, problem intermittent. If fuel tank is full, go to next step. If fuel tank is empty, go to step 3).
2. Check Resistance Of Fuel tank Sender With Full Tank Ensure fuel tank is full. Disconnect negative battery cable. Disconnect instrument cluster harness connector C237. See **Fig. 1** . Measure resistance between C237, pins No. 5 (Pink/Orange wire) and No. 10 (Yellow/White wire). If resistance is greater

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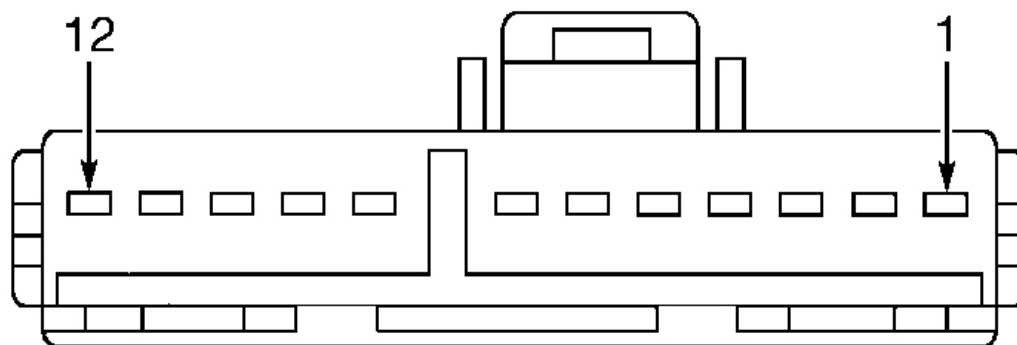
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than 140 ohms, repair open Yellow/White wire or Pink/Orange wire or replace fuel tank sender. If resistance is less than 140 ohms, repair/replace instrument cluster and printed circuit. Test system operation.

3. Check Resistance Of Fuel Tank Sender With Empty Tank -Ensure fuel tank is empty. Disconnect negative battery cable. Disconnect instrument cluster harness connector C237. See **Fig. 1** . Measure resistance between C237, pins No. 5 (Pink/Orange wire) and No. 10 (Yellow/White wire). If resistance is greater than 20 ohms, repair open Yellow/White wire or Pink/Orange wire or replace fuel tank sender. If resistance is less than 20 ohms, repair/replace instrument cluster and printed circuit. Test system operation.

LOW FUEL INDICATOR INOPERATIVE

1. **Perform Indicator Prove Out** - If low fuel indicator momentarily illuminates when ignition is initially turned on (bulb prove out), go to next step. If low fuel indicator does not illuminate when ignition is initially turned on, go to step 3).
2. If low fuel indicator passes bulb prove out and will not illuminate when fuel level is less than 1/16 of a tank, and fuel gauge is okay, replace instrument cluster and printed circuit.
3. **Check Power To Low Fuel Indicator** - Turn ignition off. Disconnect instrument cluster harness connector C238. See **Fig. 2** . Measure voltage between C238 pin No. 12 (Red/Yellow wire) and chassis ground. If battery voltage does not exist, replace low fuel warning bulb. If problem still exists, replace printed circuit and instrument cluster.



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Fig. 2: Identifying Instrument Panel Harness Connector C238

Courtesy of FORD MOTOR CO.

HARNESS CONNECTOR C238 PIN IDENTIFICATION

Pin No. (Wire Color)	Description
1 (Not Used)	Not Used

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2 (Not Used)	Not Used
3 (Not Used)	Not Used
4 (Not Used)	Not Used
5 (Not Used)	Not Used
6 (Black/Yellow)	Air Bag Indicator
7 (White/Yellow)	Hot In Start And Run
8 (Light Green/Red)	Charge Indicator
9 (Dark Green/Light Green)	Fasten Belt Indicator
10 (Purple/White)	Brake Warning Indicator
11 (Dark Green/Orange)	Door Ajar Indicator
12 (Red/Yellow)	Hot In Start And Run

VOLTMETER INACCURATE

1. **Check Gauge Operation** - Verify charging system is functioning properly. Repair if necessary. If charging system is okay, and voltmeter indication is low, go to next step.
2. **Check Cluster Harness Connectors** - Check instrument panel harness connectors for proper connection, corrosion, bent pins etc. Correct as necessary. If okay, go to next step.
3. **Check Printed Circuit Connections** - Verify printed circuit connections. Correct as necessary. If circuit connections are okay, go to next step.
4. **Check Fuses** - Check fuse No. 2 (5-amp) and fuse No. 29 in fuse junction panel. If fuses are okay, go to step 7). If fuse(s) is blown, replace fuse(s). If fuse No. 2 blows again, go to next step. If fuse No. 29 blows again, go to step 6).
5. **Check Red/White Wire** - Disconnect instrument cluster harness connector C237. See **Fig. 1** . Ensure fuse No. 2 is removed. Measure resistance between C237 p in No. 3 (Red/White wire) and ground. If resistance is greater than 10 k/ohms, repair/replace instrument cluster. If resistance is less than 10 k/ohms, repair short to ground in Red/White wire.
6. **Check Red/Yellow Wire** - Disconnect instrument cluster harness connector C237. See **Fig. 1** . Ensure fuse No. 29 is removed. Measure resistance between C237 pin No. 11 (Red/Yellow wire) and ground. If resistance is greater than 10 k/ohms, repair/replace instrument cluster. If resistance is less than 10 k/ohms, repair short to ground in Red/Yellow wire.
7. **Check Red/White Wire For Open** - Install new fuse No. 2 (5-amp). Disconnect instrument panel harness connector C237. See **Fig. 1** . Measure voltage between instrument cluster harness connector C237 pin No. 3 (Red/White wire) and ground. If battery voltage exists, go to next step. If battery voltage does not exist, repair open Red/White wire.
8. **Check Red/Yellow Wire For Open** - Install new fuse No. 29 (5-amp). Disconnect instrument panel harness connector C237 and C238. See **Fig. 1** and **Fig. 2** . Measure voltage between instrument cluster harness connector C237 pin No. 11 (Red/Yellow wire) and ground. Also measure voltage between instrument cluster harness connector C238 pin No. 12 (Red/Yellow wire) and ground. If battery voltage exists for both measurements, go to next step. If battery voltage does not exist for both measurements, repair open Red/Yellow wire.

OIL PRESSURE GAUGE INACCURATE

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1. **Monitor Gauge With Engine Off** - Turn ignition on, engine off. If oil pressure gauge reads low, go to next step. If oil pressure gauge reads high, repair short to ground in White/Red wire or replace shorted oil pressure switch.
2. **Check Oil Pressure With Engine Running** - Start engine. If oil pressure gauge reads high (normal oil pressure), system is okay at this time. If oil pressure reads low go to next step.
3. **Check White/Red Wire For Short To Ground** - Turn ignition off. Disconnect instrument cluster harness connector C237. Measure resistance between C237 pin No. 6 (White/Red wire) and ground. If resistance is less than 10 k/ohms, go to next step. If resistance is greater than 10 k/ohms, repair/replace instrument cluster. Check gauge operation.
4. **Check Red/White Wire For Open** - Disconnect oil pressure switch. Measure resistance of Red/White wire between instrument panel harness connector C237 and oil pressure switch. If resistance is less than 5 ohms, replace oil pressure switch. If resistance is greater than 5 ohms, repair open Red/White wire.

TEMPERATURE GAUGE INACCURATE

1. **Disconnect Sensor** - Ensure temperature sensor connector is in good condition. Turn ignition off. Disconnect coolant temperature sensor. Turn ignition off. If temperature gauge indicates cold, go to next step. If temperature gauge does not indicate cold, go to step 3).
2. **Bypass Temperature Sensor** - Connect a jumper wire between the 2 pins of temperature sensor harness connector. If temperature gauge indicates hot, replace coolant temperature sensor. If temperature gauge does not indicate hot, go to next step.
3. **Check Red/White Wire For Short To Ground** - Turn ignition off. Disconnect instrument cluster harness connector C237. Measure resistance between instrument cluster harness connector C237 pin No. 9 (Red/White wire) and ground. If resistance is greater than 10 k/ohms, repair/replace instrument cluster. If resistance is less than 10 k/ohms, repair short to ground in Red/White wire. Check gauge operation.
4. **Check Red/White Wire & Pink/Orange Wire For Open** - Turn ignition off. Disconnect instrument cluster harness connector C237. Measure resistance between C237 pin No. 9 (Red/White wire) and pin No. 5 (Pink/Orange wire). If resistance is less than 5 ohms, repair/replace instrument cluster. If resistance is greater than 5 ohms, repair open Red/White or Pink/Orange wire.

SPEEDOMETER & ODOMETER INOPERATIVE

1. **Verify Cruise Control Operation** - Drive vehicle and check cruise control operation. If cruise control operates properly, go to next step. If cruise control does not operate, see appropriate **CRUISE CONTROL SYSTEM** article. Repair as necessary.
2. **Check VSS PID** - Using New Generation Star (NGS) scan tester, access GEM. Select VSS PID. Monitor VSS PID while driving vehicle. If VSS PID seems to indicate actual vehicle speed, go to next step. If VSS PID does not indicate actual vehicle speed, go to step 4).
3. **Check Gray/Black Wire For Open** - Turn ignition off. Disconnect NGS scan tester. Disconnect instrument cluster harness connector C237 and VSS harness connector. Measure resistance of Gray/Black wire between C237 pin No. 7 and VSS harness connector. If resistance is less than 5 ohms, repair/replace instrument cluster. If resistance is greater than 5 ohms, repair open Gray/Black wire. Check speedometer operation.
4. **Check VSS** - Turn ignition off. Disconnect NGS tester. Disconnect VSS harness connector. Measure resistance between VSS terminals. If resistance is 200-300 ohms, go to next step. If resistance is not 200-

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300 ohms, replace VSS. Check speedometer operation.

5. **Check Pink/Orange Wire For Open** - Measure resistance of Pink/Orange wire between VSS harness connector and ground. If resistance is less than 5 ohms, repair open Gray/Black wire. If resistance is greater than 5 ohms, repair open Pink/Orange wire. Check speedometer operation.

SPEEDOMETER FLUCTUATES

1. **Verify Connector Seating** - Check instrument cluster connectors for good clean connection. Repair as necessary. If connections are okay, go to next step.
2. **Check For DTCs** - Using New Generation Star (NGS) scan tester, check PCM for any continuous DTCs. If no DTCs are retrieved, go to next step. If any DTCs are retrieved from PCM, see appropriate TESTS W/CODES article in ENGINE PERFORMANCE section.
3. **Check Gray/Black Wire For Open** - Turn ignition off. Disconnect NGS scan tester. Disconnect instrument cluster harness connector C237 and VSS harness connector. Measure resistance of Gray/Black wire between C237 pin No. 7 and VSS harness connector. If resistance is less than 5 ohms, repair/replace instrument cluster. If resistance is greater than 5 ohms, repair open Gray/Black wire. Check speedometer operation.
4. **Check VSS** - Turn ignition off. Disconnect NGS tester. Disconnect VSS harness connector. Measure resistance between VSS terminals. If resistance is 200-300 ohms, go to next step. If resistance is not 200-300 ohms, replace VSS. Check speedometer operation.
5. **Check Pink/Orange Wire For Open** - Measure resistance of Pink/Orange wire between VSS harness connector and ground. If resistance is less than 5 ohms, check VSS drive gears. Repair as necessary. If resistance is greater than 5 ohms, repair open Pink/Orange wire. Check speedometer operation.

REMOVAL & INSTALLATION

INSTRUMENT CLUSTER

1. **Removal & Installation** - Disconnect negative battery cable. Remove headlight switch. See **HEADLIGHT SWITCH** . Pry to release four retaining clips and remove steering column opening cover. See **Fig. 3** .
2. Remove seven instrument panel finish panel screws. Remove instrument panel finish panel. See **Fig. 4** . Remove four instrument cluster screws and instrument cluster. To install, reverse removal procedure.

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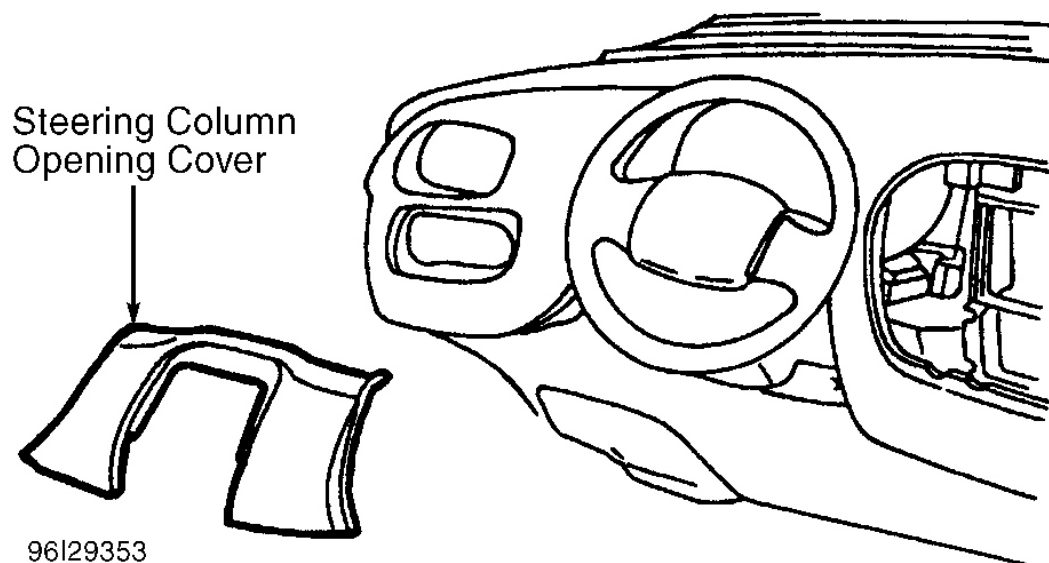


Fig. 3: Removing Steering Column Hole Cover
Courtesy of FORD MOTOR CO.

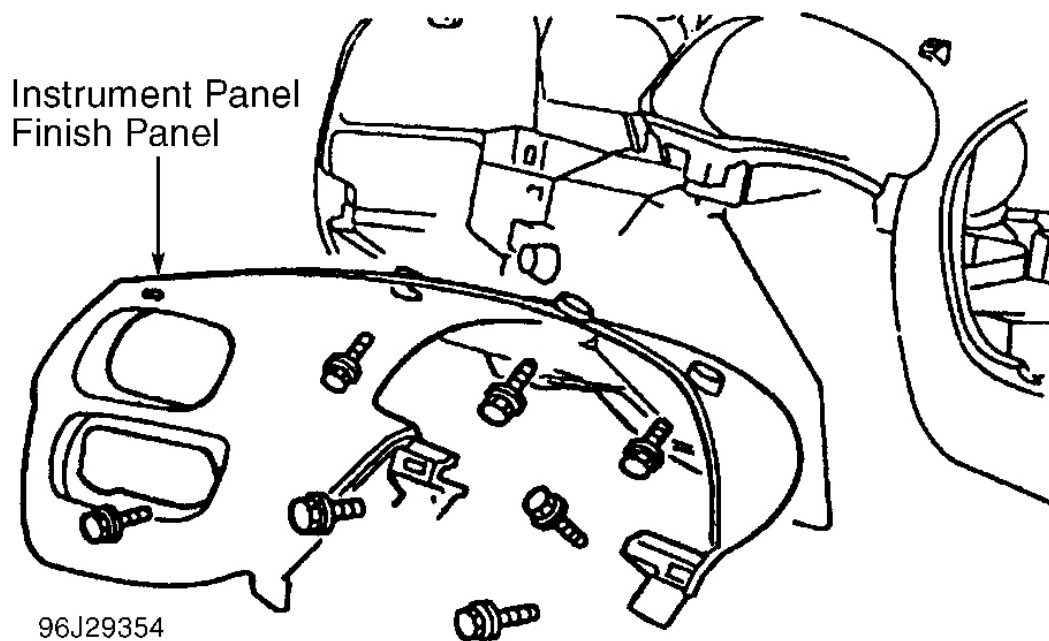


Fig. 4: Removing Instrument Panel Finish Panel

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Courtesy of FORD MOTOR CO.

VEHICLE SPEED SENSOR & GEAR

Removal & Installation

Remove Vehicle Speed Sensor (VSS) retaining bolt and VSS. Remove clip and VSS driven gear. To install, reverse removal procedure.

HEADLIGHT SWITCH

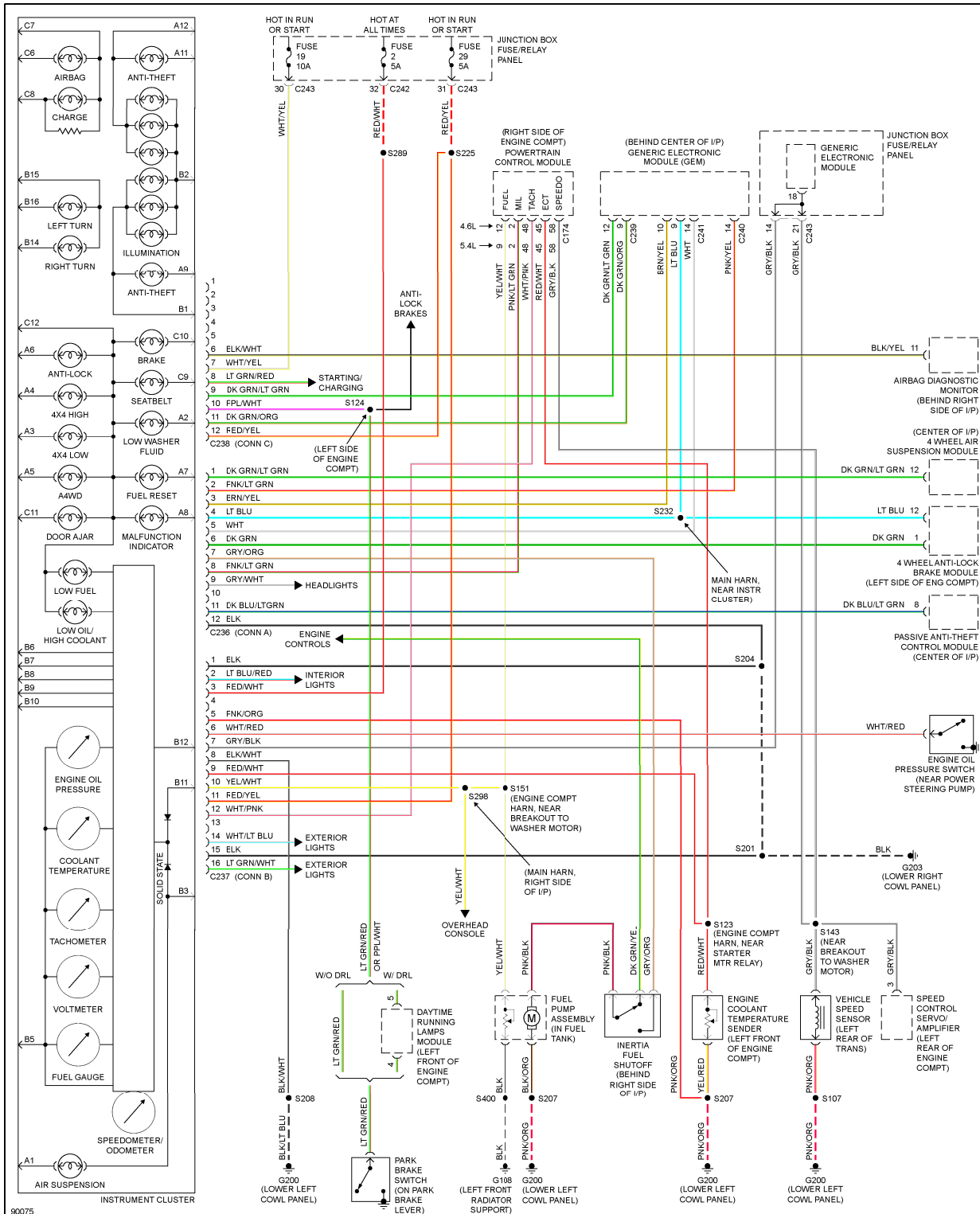
Removal & Installation

1. Disconnect negative battery cable. Turn headlight switch to headlights on position. Pull headlight switch knob. Insert a thin tool into back of headlight switch knob to release, remove knob.
2. Reinstall headlight switch knob 180° from original position. Turn knob fully counterclockwise. Turn knob fully clockwise. Remove headlight switch from instrument panel. To install, reverse removal procedure.

WIRING DIAGRAMS

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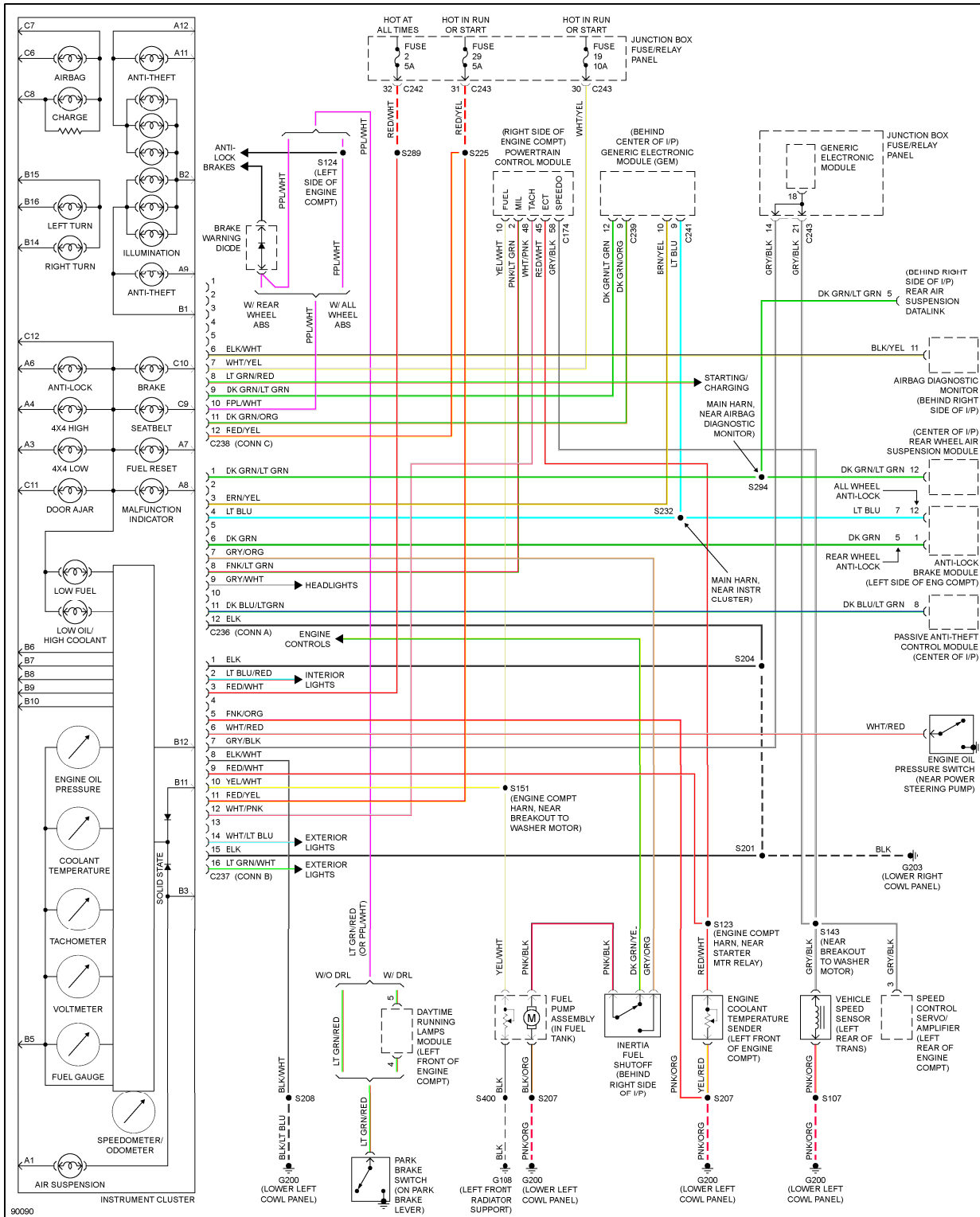


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Fig. 5: Analog Instrument Panel Wiring Diagram (Expedition)

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Fig. 6: Analog Instrument Panel Wiring Diagram (F150 & F250 Light Duty)