

## GENERAL

### Throttle Position Sensor

See [Figure 4-30](#). The throttle position sensor (TP sensor) is supplied 5.0 volts from the ECM (5v REF) and sends a signal back to the ECM (TP sensor signal) which varies according to throttle position. The output signal from the TP sensor varies from:

- 0.5-1.5 volts at idle (closed throttle).
- 3.9-4.9 volts at wide open throttle.

A Code 11 will set if the TP sensor signal voltage does not fall within the acceptable range.

#### NOTE

*If the TP sensor is removed and/or replaced, the sensor must be calibrated using Digital Technician (Part No. HD-44750). For replacement of TP sensor see [4.37 THROTTLE POSITION SENSOR](#).*

## DIAGNOSTICS

### Diagnostic Tips

TP sensor voltage should increase at a steady rate as throttle is moved from idle to wide open throttle. An open or short to ground in R/W or BK/W wires will also result in a Code 11.

Check for the following conditions:

- **Poor connection.** Inspect ECM harness connector for backed out terminals, improper mating, broken locks improperly formed or damaged terminals, poor terminal-to-wire connection and damaged harness.
- **Perform [4.7 WIGGLE TEST](#) to locate intermittents.** If connections and harness check out OK, monitor TP sensor voltage using DVOM while moving related connectors and wiring harness. If the failure is induced, the DVOM display will change.
- **TP sensor scaling.** Observe the TP sensor voltage display while opening the throttle with engine stopped and ignition switch ON. Display should vary from closed throttle TP sensor voltage (when throttle is closed) to greater than 4.0 volts (when throttle is held wide open). As the throttle is **slowly** moved, the voltage should change gradually without spikes or low voltages being observed.

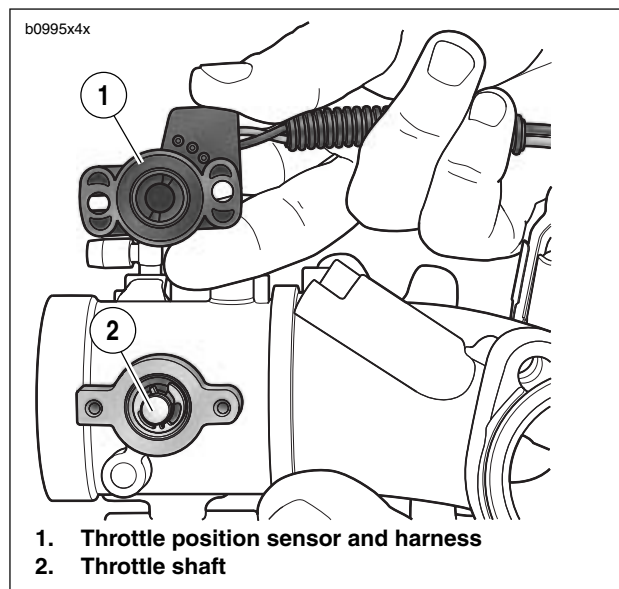


Figure 4-30. TP Sensor Assembly

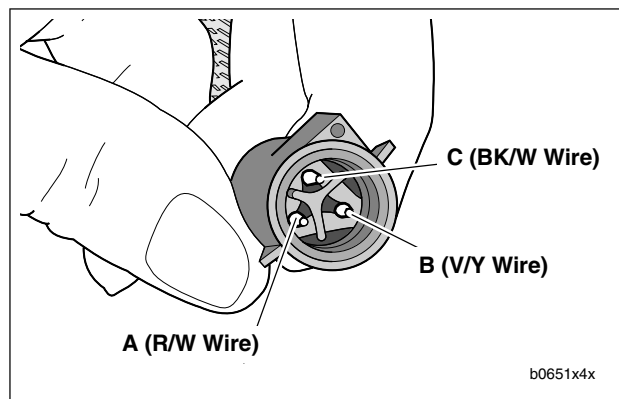


Figure 4-31. TP Sensor Terminals [88A]

### Diagnostic Notes

The reference numbers below correlate with the circled numbers on the Code 11 flow charts.

1. Connect BREAKOUT BOX (Part No. HD-42682) to ECM. See [4.6 BREAKOUT BOX](#).
2. Use HARNESS CONNECTOR TEST KIT (Part No. HD-41404), black socket probe and patch cord.

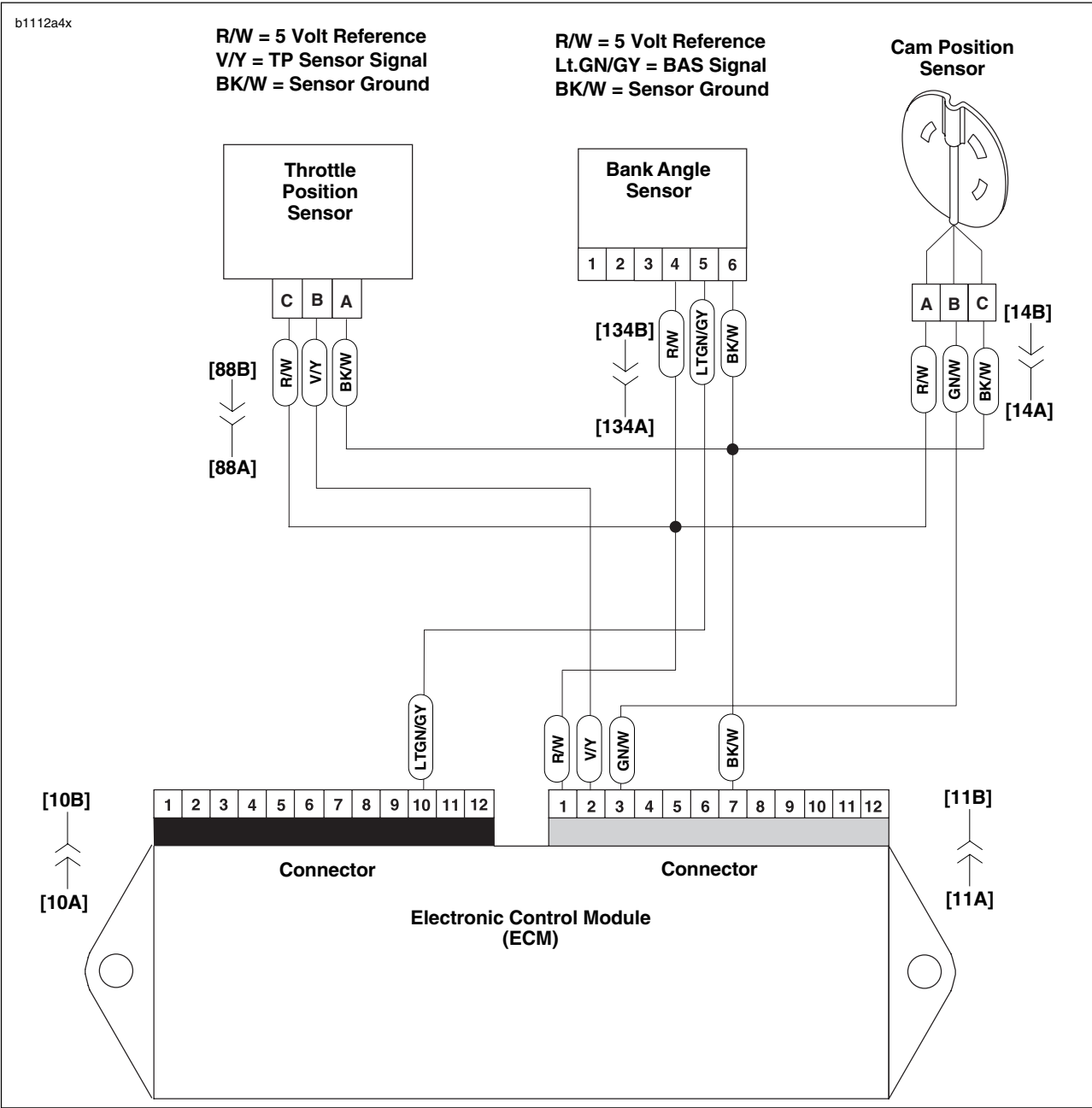
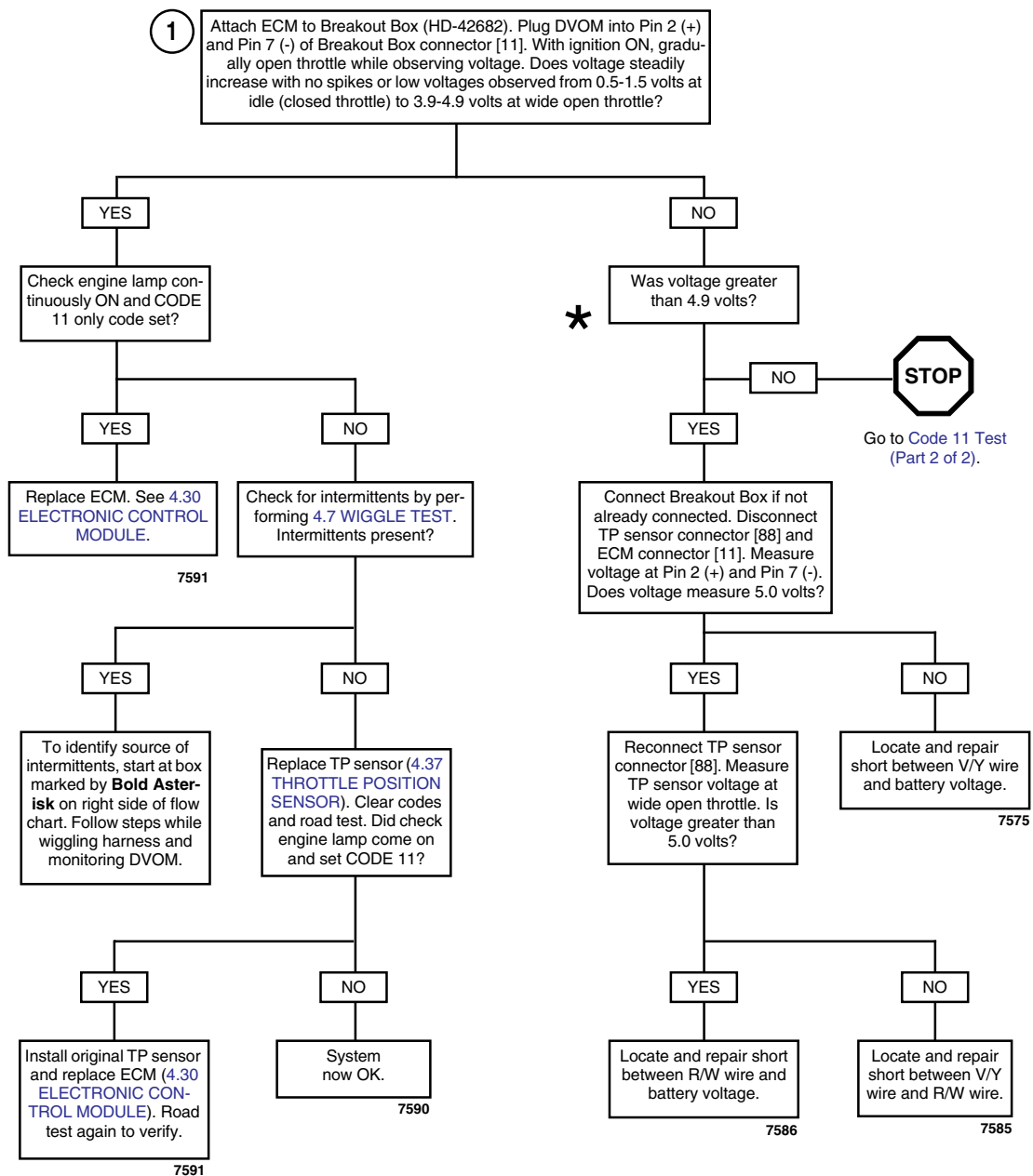


Figure 4-32. Throttle Position Sensor Circuit

Table 4-18. Wire Harness Connectors in [Figure 4-32](#).

NO.	DESCRIPTION	TYPE	LOCATION
[10]	ECM (black)	12-place Deutsch	under seat
[11]	ECM (gray)	12-place Deutsch	under seat
[14]	cam position sensor	3-place Deutsch	under sprocket cover
[88]	throttle position sensor	3-place Packard	right side of engine between cylinders
[134]	bank angle sensor	6-place Sumitomo	under seat

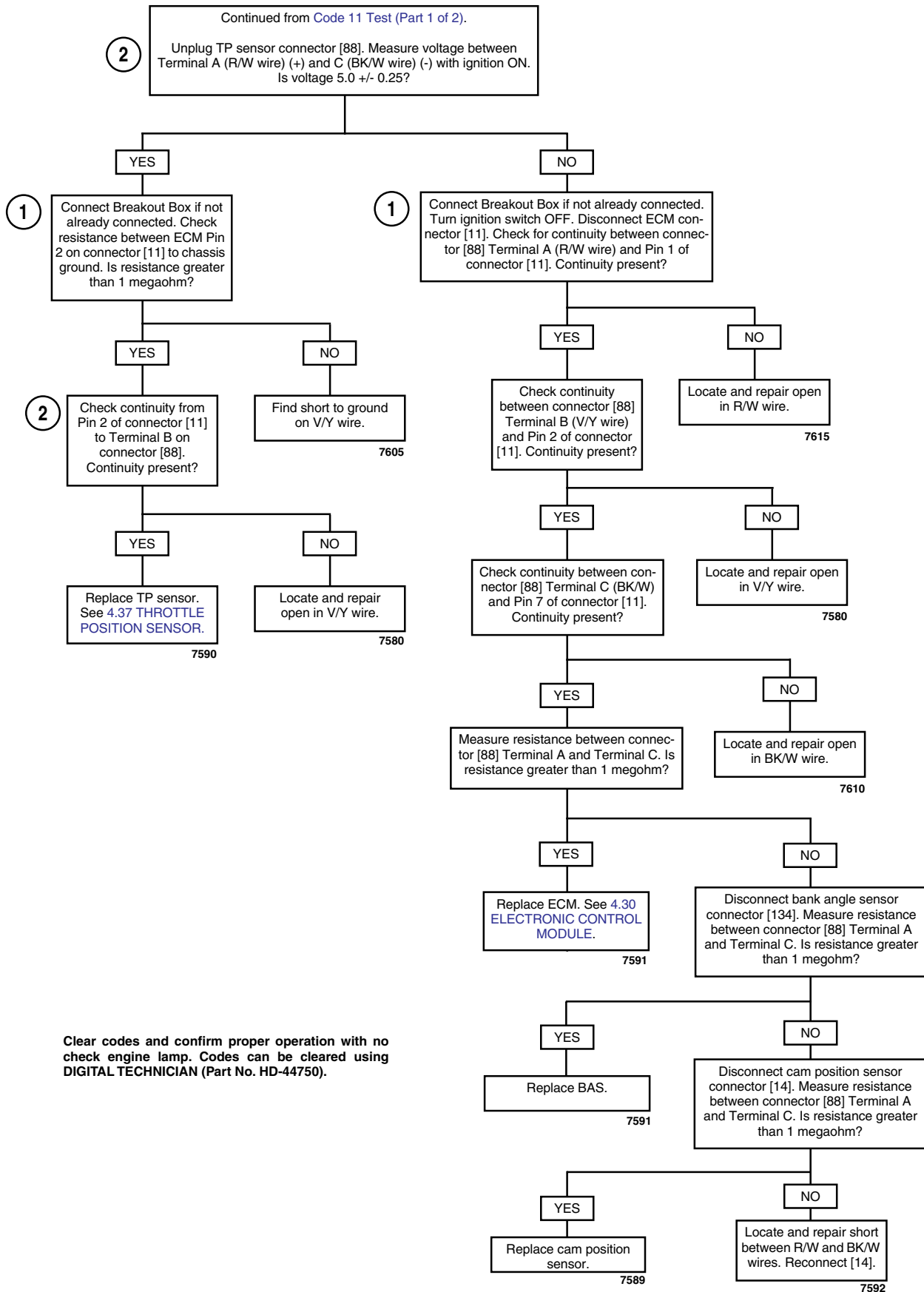
## Code 11 Test (Part 1 of 2)



At some point in the flow chart you may be instructed to jump directly to a the box with the bold asterisk. Disregard the asterisk (but not the instruction box) if your normal progression through the chart brings you to this location.

Clear codes and confirm proper operation with no check engine lamp. Codes can be cleared using DIGITAL TECHNICIAN (Part No. HD-44750).

## Code 11 Test (Part 2 of 2)



## GENERAL

### Oxygen Sensor

See [Figure 4-33](#). The oxygen sensor provides a signal to the ECM which indicates whether the engine is running rich or lean.

- A low voltage signal ( $<0.41$  V) indicates the engine is running lean.
- A high voltage signal ( $>0.56$  V) indicates the engine is running rich.

When the air/fuel mixture is ideal, approximately 14.7 parts air to 1 part fuel, the voltage will be approximately 0.48 V.

## DIAGNOSTICS

### Diagnostic Tips

The DVOM displays the signal from the O<sub>2</sub> sensor in volts. This voltage will have an average value tending towards lean, rich or ideal value depending on operating temperature of the engine, engine speed and throttle position. An open/short to voltage or short to ground in the V/GY wire will cause the engine to run rich (short to ground) or lean (short to voltage) until fault is detected. Once fault is detected, vehicle will run in open loop. The engine must be running below 5000 RPM for the ECM to detect an O<sub>2</sub> sensor failure.

Check for the following conditions:

- **Poor connection.** Inspect the ECM harness connector [11], fuel injector connectors [84, 85] and O<sub>2</sub> sensor connector wiring for backed out terminals, improper mating, broken locks, improperly formed or damaged terminals, poor terminal-to-wire connection and damaged harness.
- **Dirty/stuck open injectors.** The motorcycle may run lean (dirty/clogged injectors) or rich (stuck open injectors) if there is an injector problem. This could also cause poor fuel economy and performance.
- **Loose O<sub>2</sub> sensor.** See [Figure 4-34](#). If the O<sub>2</sub> sensor is loose engine performance may be affected. This could also show up as a slow changing O<sub>2</sub> sensor voltage.
- **Loose/leaking exhaust.** This can cause a poor ground connection for sensor or allow fresh air into the exhaust system. If fresh air enters exhaust system, the O<sub>2</sub> sensor will read a lean condition, causing the system to go rich.

### Diagnostic Notes

1. Connect BREAKOUT BOX (Part No. HD-42682) to ECM. See [4.6 BREAKOUT BOX](#).

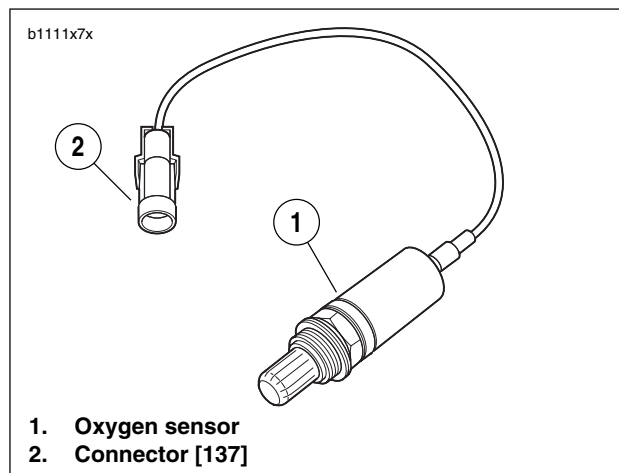


Figure 4-33. Oxygen Sensor

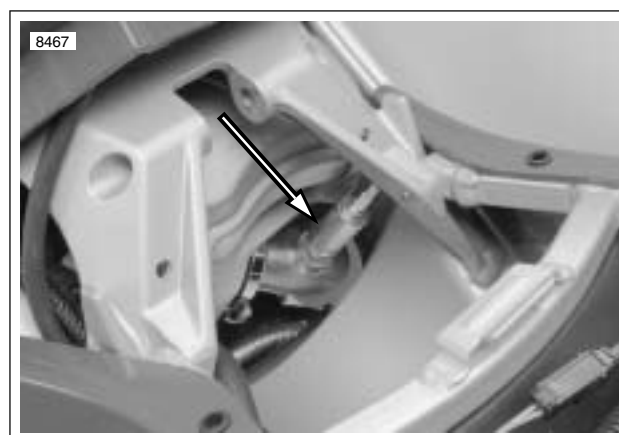


Figure 4-34. Oxygen Sensor (shock absorber removed)

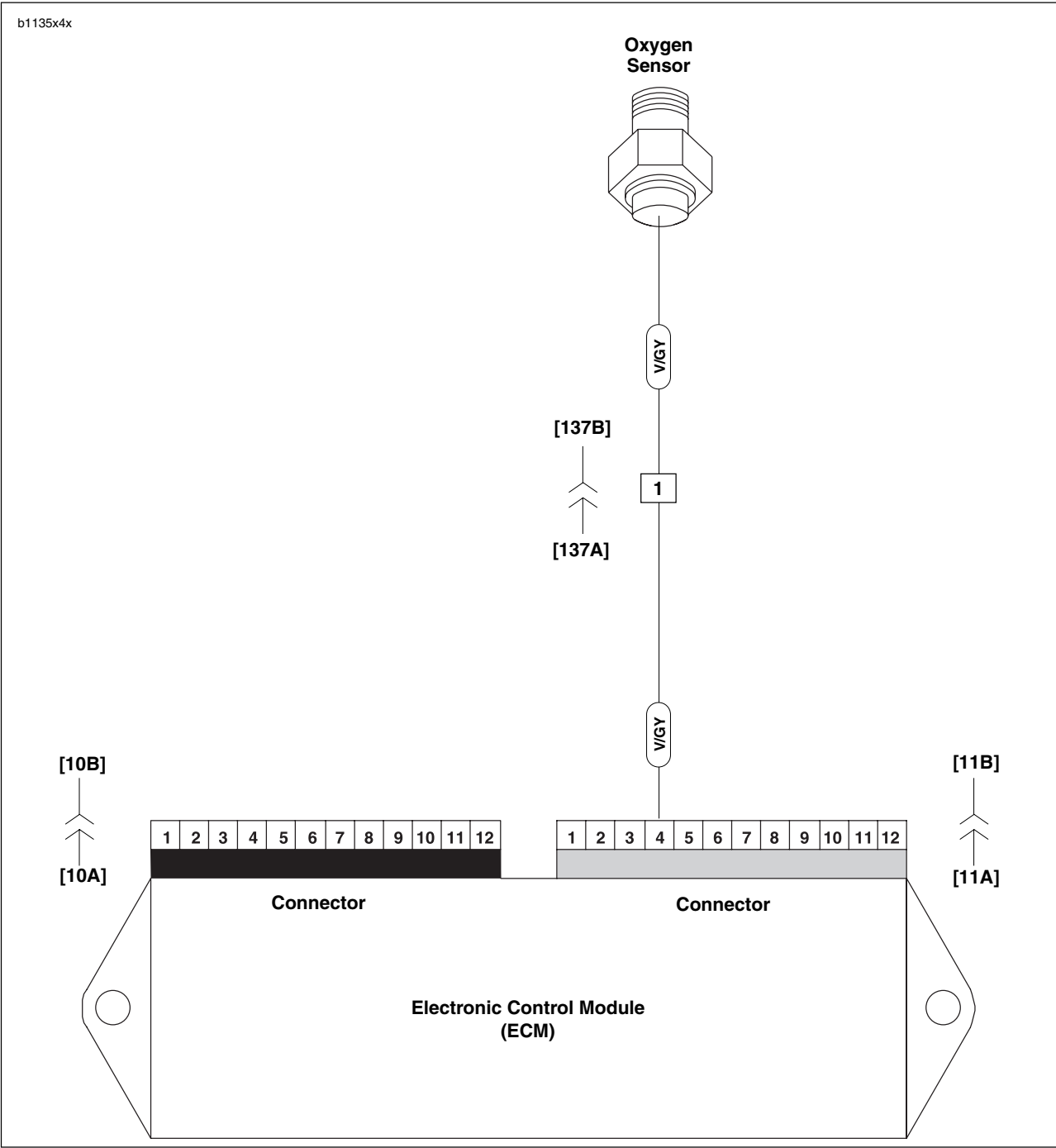
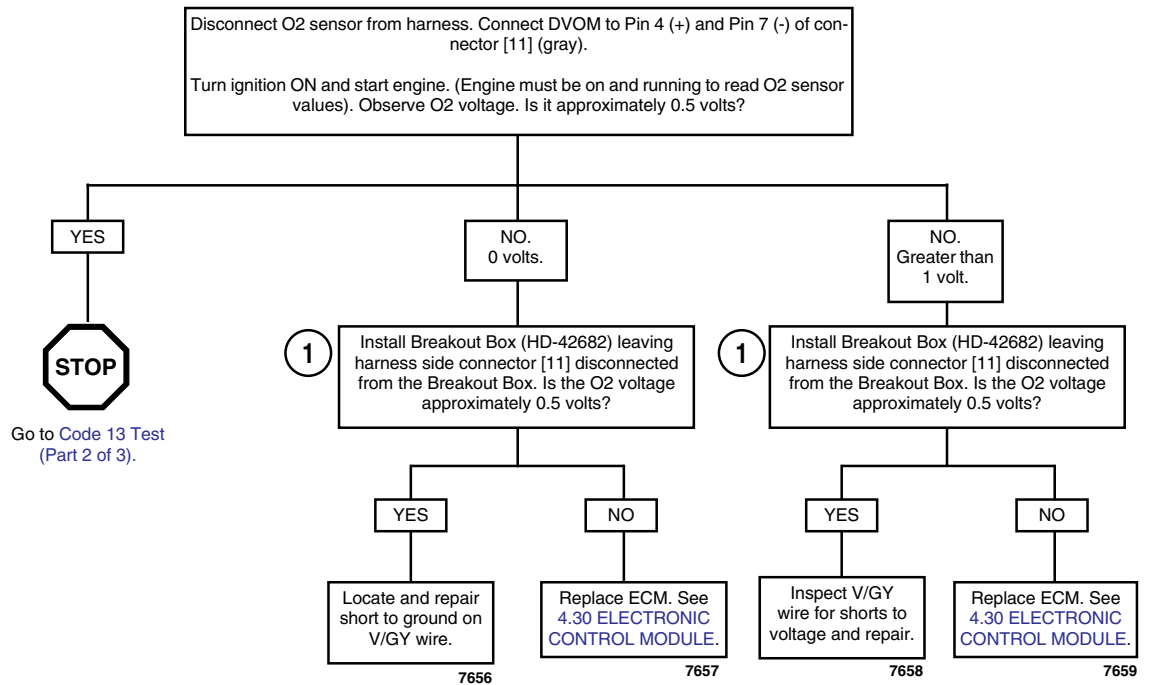


Figure 4-35. Oxygen Sensor Circuit

Table 4-19. Wire Harness Connectors in [Figure 4-35](#).

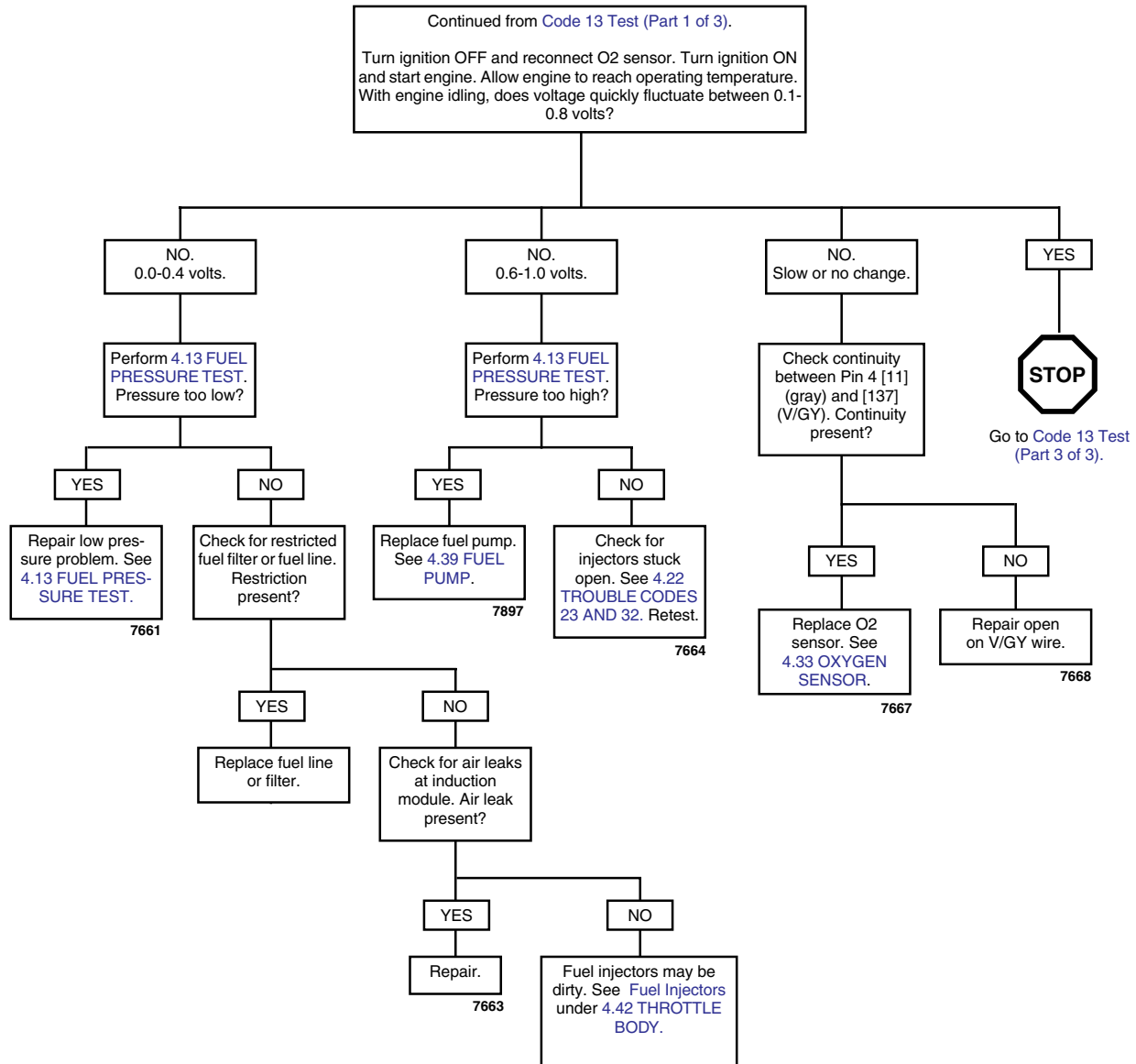
NO.	DESCRIPTION	TYPE	LOCATION
[11]	ECM (gray)	12-place Deutsch	under seat
[137]	oxygen sensor	1-place Packard	behind rear cylinder head

## Code 13 Test (Part 1 of 3)



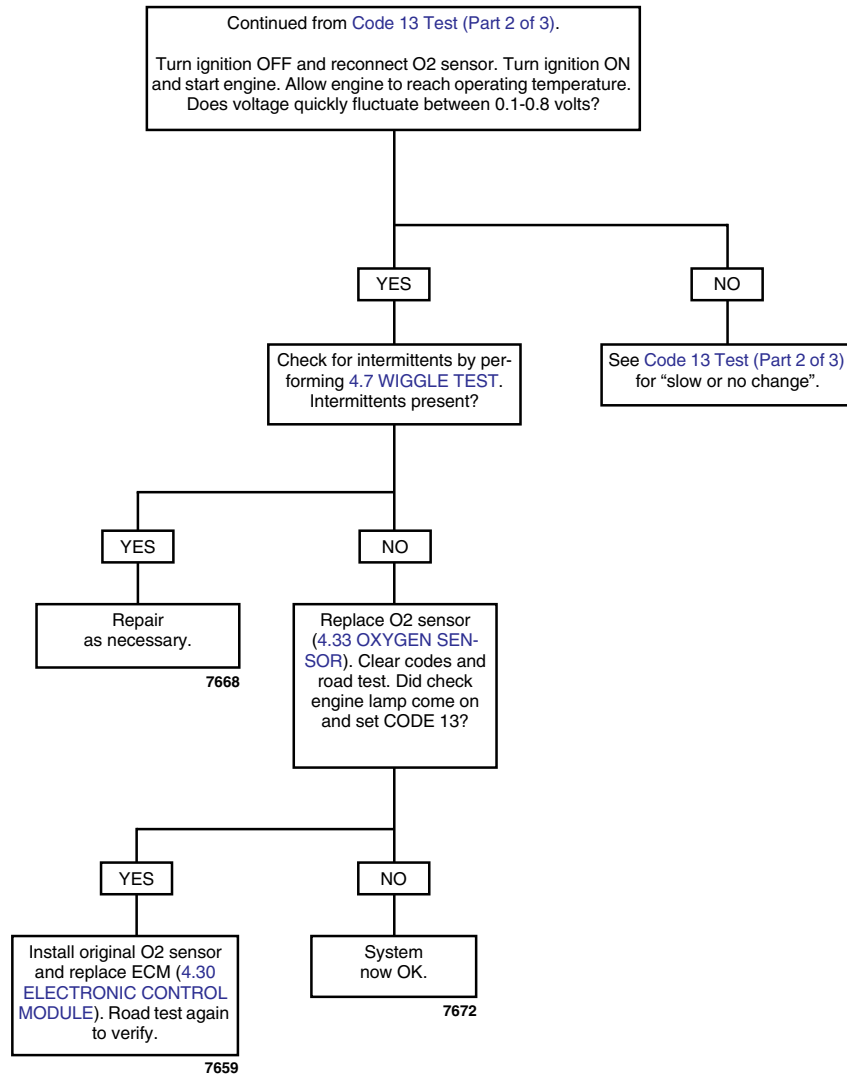
Clear codes and confirm proper operation with no check engine lamp. Codes can be cleared using DIGITAL TECHNICIAN (Part No. HD-44750).

## Code 13 Test (Part 2 of 3)



Clear codes and confirm proper operation with no check engine lamp. Codes can be cleared using DIGITAL TECHNICIAN (Part No. HD-44750).



**Code 13 Test (Part 3 of 3)**

Clear codes and confirm proper operation with no check engine lamp. Codes can be cleared using DIGITAL TECHNICIAN (Part No. HD-44750).

## GENERAL

### Engine Temperature Sensor

#### CAUTION

**Do not pull on engine temperature sensor wiring. Excess strain to sensor wiring will cause sensor damage.**

See [Figure 4-36](#). The ECM supplies and monitors a 0-5 volt signal to one side of the engine temperature sensor (ET sensor). The other side of the ET sensor is connected to ground through the engine.

See [Table 4-20](#). The ET sensor is a thermistor device which means that at a specific temperature it will have a specific resistance across its terminals. As this resistance varies, so does the supplied voltage.

- At high temperatures, the resistance of the sensor is very low. This effectively lowers the signal voltage.
- At low temperatures, the resistance is very high, allowing the voltage to rise close to the supplied voltage of 5 volts.

The ECM monitors this voltage to compensate for various operating conditions.

## DIAGNOSTICS

### Diagnostic Tips

An intermittent may be caused by poor connection, rubbed through wire insulation or a wire broken inside the insulation.

Check the following conditions:

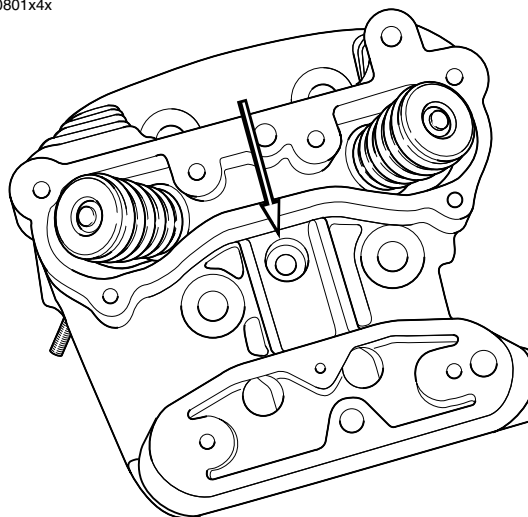
- Poor connection.** Inspect ECM harness connector [11] for backed out terminals, improper mating, broken locks, improperly formed or damaged terminals, poor terminal-to-wire connection and damaged harness.
- Shifted sensor.** The temperature-to-resistance values table may be used to test the ET sensor at various temperature levels in order to evaluate the possibility of a shifted (out-of-calibration) sensor which may result in driveability problems.

### Diagnostic Notes

The reference numbers below correlate with the circled numbers on the Code 14 flow charts.

- Connect BREAKOUT BOX (Part No. HD-42682) to ECM. See [4.6 BREAKOUT BOX](#).
- Use HARNESS CONNECTOR TEST KIT (Part No. HD-41404), gray pin probes and patch cord.

b0801x4x



**Figure 4-36. Location of Engine Temperature Sensor in Rear Cylinder Head**

**Table 4-20. Engine Temperature Sensor Specifications**

VOLTS	RESISTANCE	TEMP °C	TEMP °F
0.00	0	300	572
0.21	145	255	491
0.42	303	210	410
0.62	463	190	374
0.81	638	170	338
1.20	1042	150	302
1.59	1539	130	266
3.01	4991	85	185
4.43	25,647	40	104
4.63	41,295	25	77
4.83	93,759	10	50
4.88	134,200	0	32
4.93	232,414	-10	14

#### NOTE

*All voltage and resistance values are approximate (+/- 20%). Engine temperature sensor is measured between Terminal 9 of connector [11] and system ground (Terminals 2 and 11 of connector [10]).*

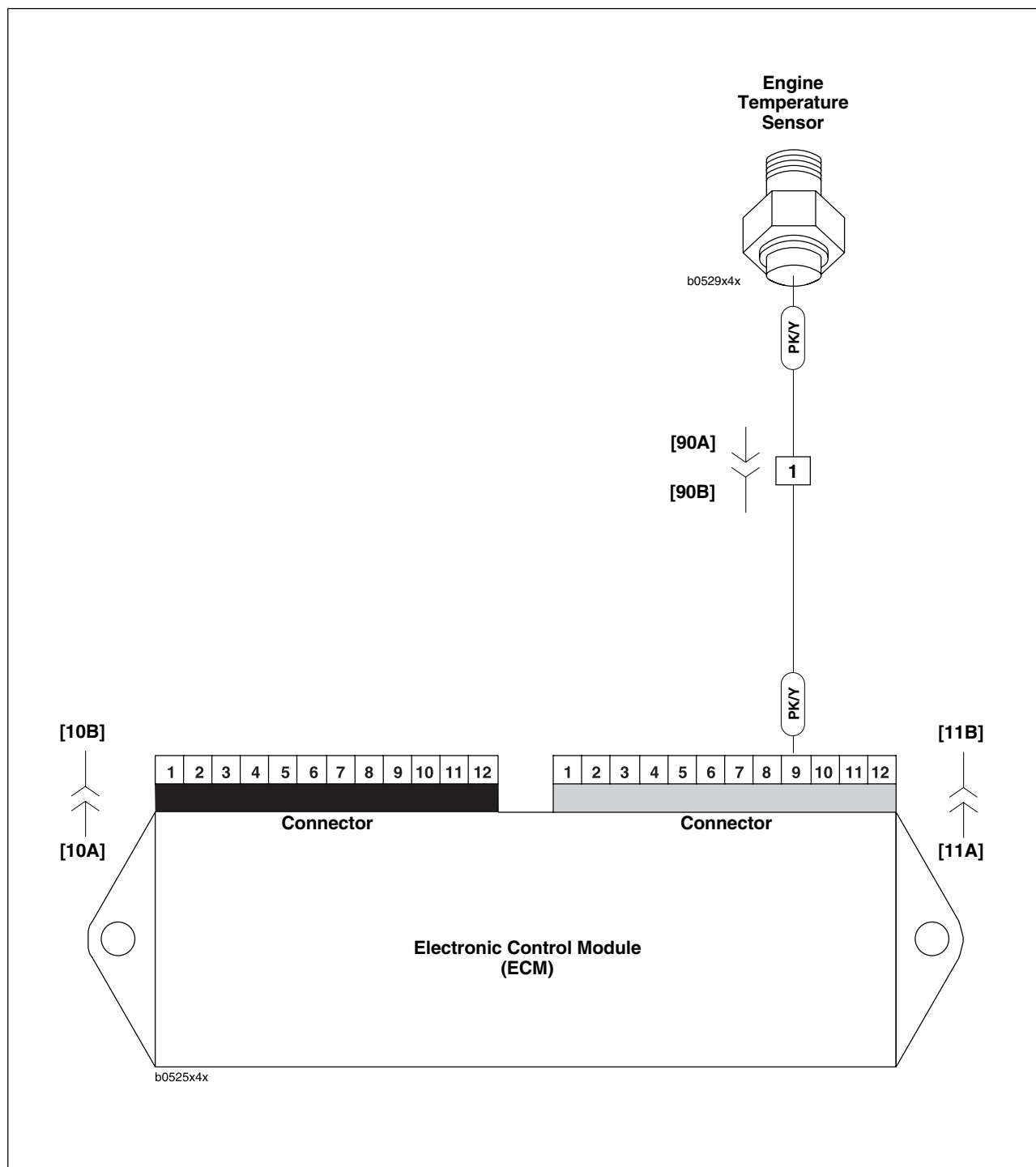
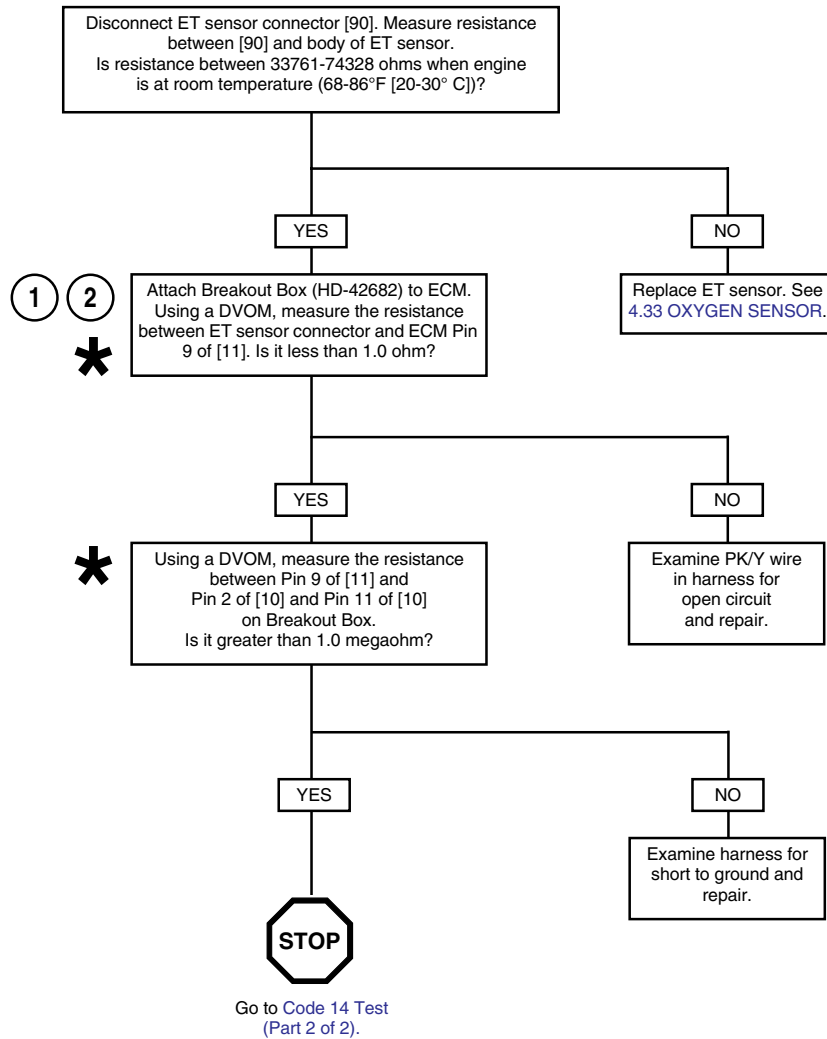


Figure 4-37. Engine Temperature Sensor Circuit

Table 4-21. Wire Harness Connectors in Figure 4-37.

NO.	DESCRIPTION	TYPE	LOCATION
[11]	ECM (gray)	12-place Deutsch	under seat
[90]	engine temperature sensor	1-place bullet	beneath airbox base

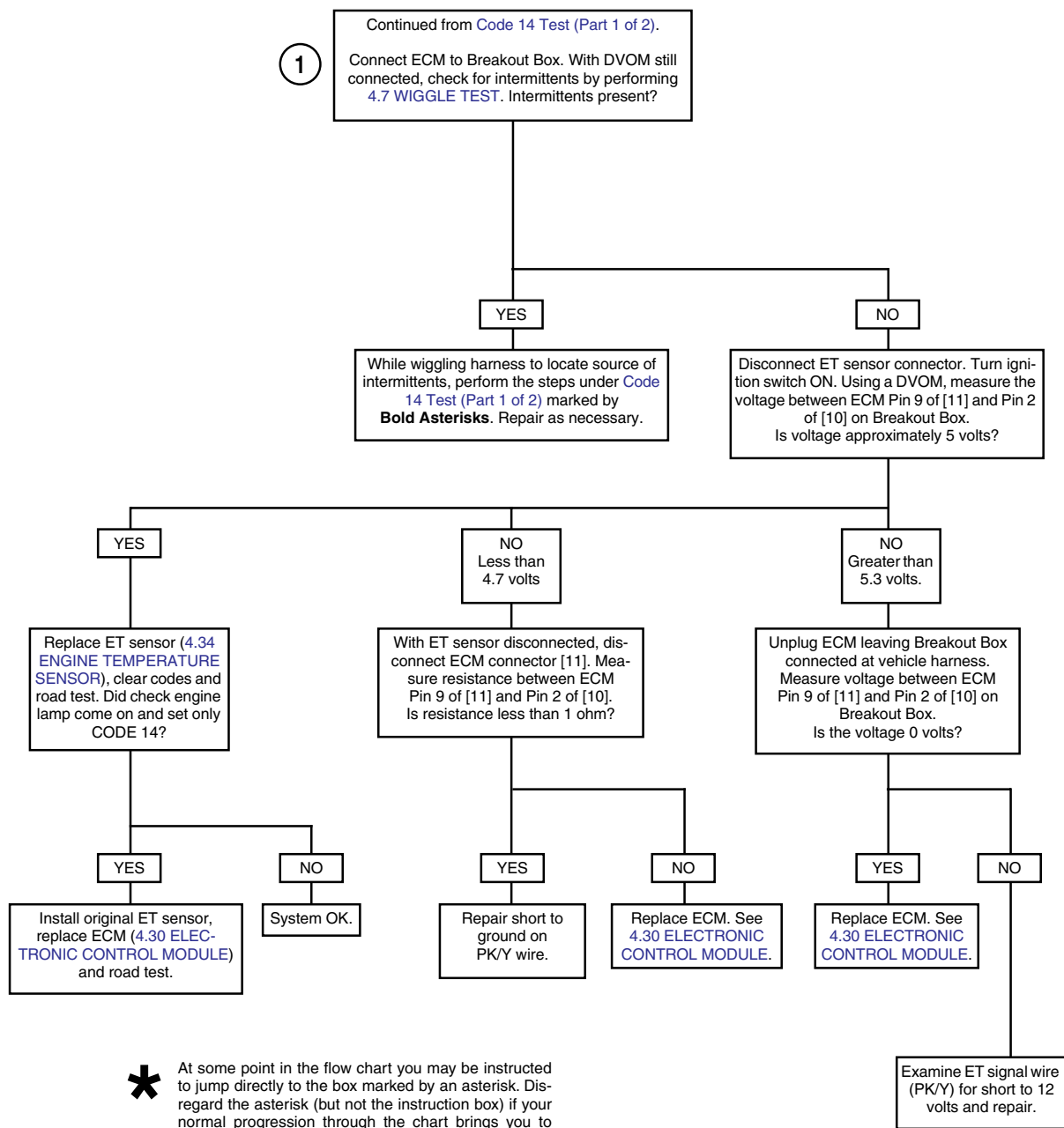
## Code 14 Test (Part 1 of 2)



At some point in the flow chart you may be instructed to jump directly to the box marked by an asterisk. Disregard the asterisk (but not the instruction box) if your normal progression through the chart brings you to this location.

Clear codes and confirm proper operation with no check engine lamp. Codes can be cleared using DIGITAL TECHNICIAN (Part No. HD-44750).

## Code 14 Test (Part 2 of 2)



At some point in the flow chart you may be instructed to jump directly to the box marked by an asterisk. Disregard the asterisk (but not the instruction box) if your normal progression through the chart brings you to this location.

Clear codes and confirm proper operation with no check engine lamp. Codes can be cleared using DIGITAL TECHNICIAN (Part No. HD-44750).

## GENERAL

### Intake Air Temperature Sensor

See Figure 4-38. The ECM supplies and monitors a signal at Pin 10 of [11] to one side of the intake air temperature sensor (IAT sensor). The other side of the IAT sensor is connected to a common sensor ground, which is also connected to the ECM (Pin 7 of [11]).

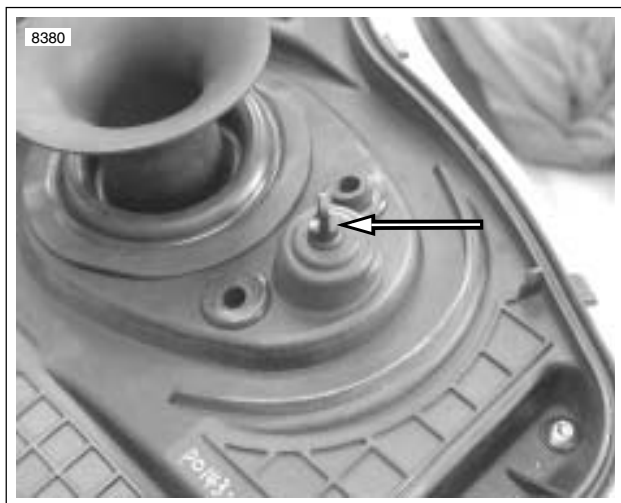


Figure 4-38. IAT Sensor

Refer to Table 4-22. The IAT sensor is a thermistor device, meaning that at a specific temperature, it will have a specific resistance across its terminals. As this resistance varies, so does the supplied voltage (Pin 10).

- At high temperatures, the resistance of the sensor is very low. This effectively lowers the signal voltage on Pin 10.
- At low temperatures, the resistance is very high, allowing the voltage to rise close to the supplied voltage of 5 volts.

The ECM monitors this voltage to compensate for various operating conditions.

## DIAGNOSTICS

### Diagnostic Tips

An intermittent may be caused by a poor connection, rubbed through wire insulation or a wire broken inside the insulation.

Check for the following conditions:

- **Poor connection.** Inspect ECM harness connector for backed out terminals, improper mating, broken locks improperly formed or damaged terminals, poor terminal-to-wire connection and damaged harness.
- **Perform 4.7 WIGGLE TEST to locate intermittents.** If connections and harness check out OK, check intake air temperature reading while moving related connectors and wiring harness. If the failure is induced, the IAT sensor display will change.

- **Shifted sensor.** The temperature-to-resistance values table may be used to test the IAT sensor at various temperature levels in order to evaluate the possibility of a shifted (out-of-calibration) sensor which may result in driveability problems.

### Diagnostic Notes

The reference numbers below correlate with the circled numbers on the Code 15 flow charts.

1. Connect BREAKOUT BOX (Part No. HD-42682) to EFI harness **only** (leave ECM disconnected). See 4.6 BREAKOUT BOX.
2. Use HARNESS CONNECTOR TEST KIT (Part No. HD-41404), gray socket probes and patch cord.
3. Use HARNESS CONNECTOR TEST KIT (Part No. HD-41404), gray pin probe and patch cord.

Table 4-22. Intake Air Temperature Sensor Specifications

VOLTS	RESISTANCE	TEMP °C	TEMP °F
0.49	1086	125	257
0.68	1561	113	235
0.86	2077	100	212
1.13	2920	90	194
1.40	3889	80	176
2.25	8149	60	140
3.09	16,178	40	104
3.52	23,670	30	86
3.94	37,170	20	68
4.24	55,359	10	50
4.53	96,383	0	32
4.68	146,250	-10	14
4.83	284,118	-20	-4

#### NOTE

All voltage and resistance values are approximate (+/- 20%). Intake air temperature sensor is measured between Terminal 10 of [11] and system ground (Terminals 2 and 11 of [10]).

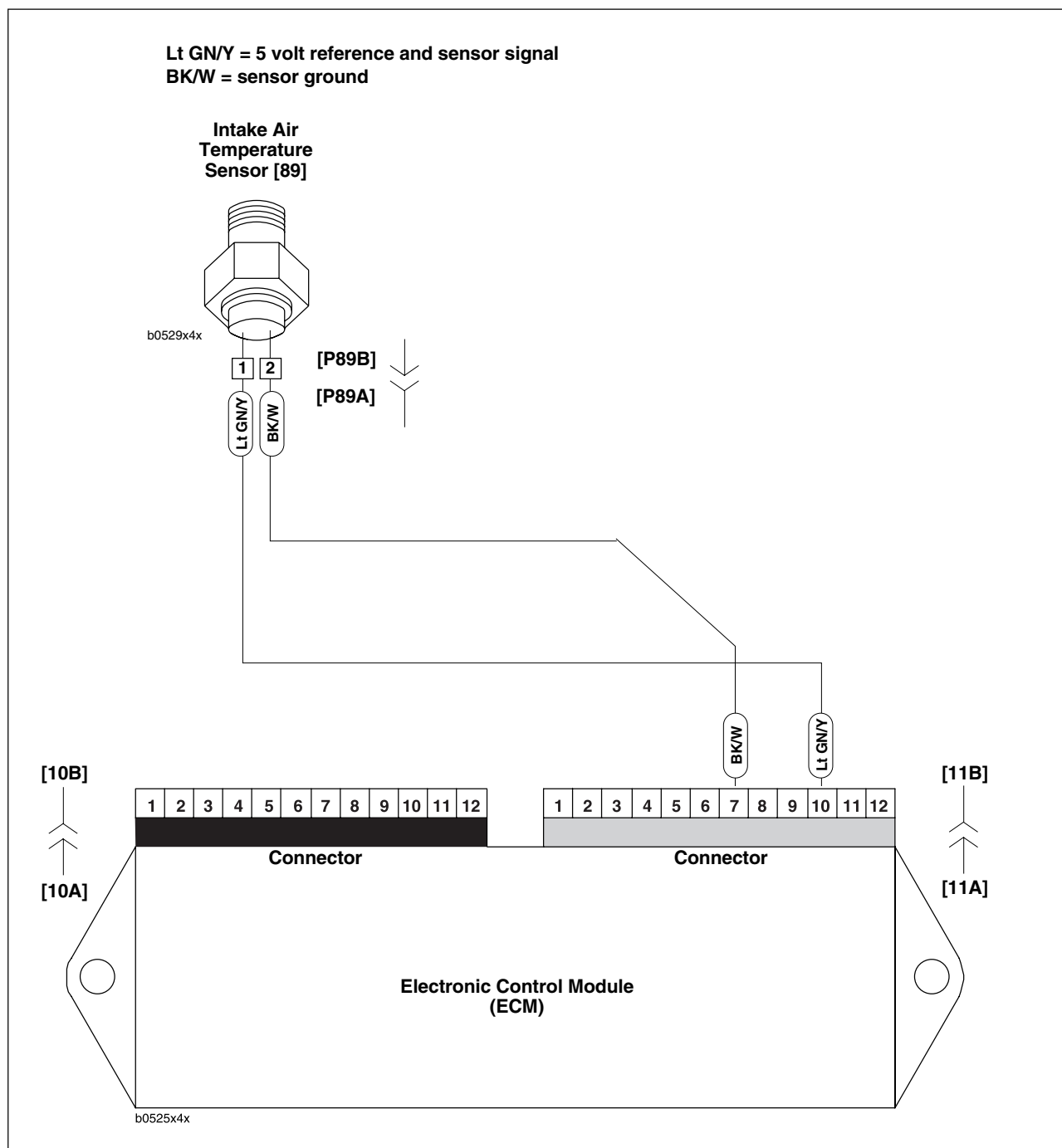
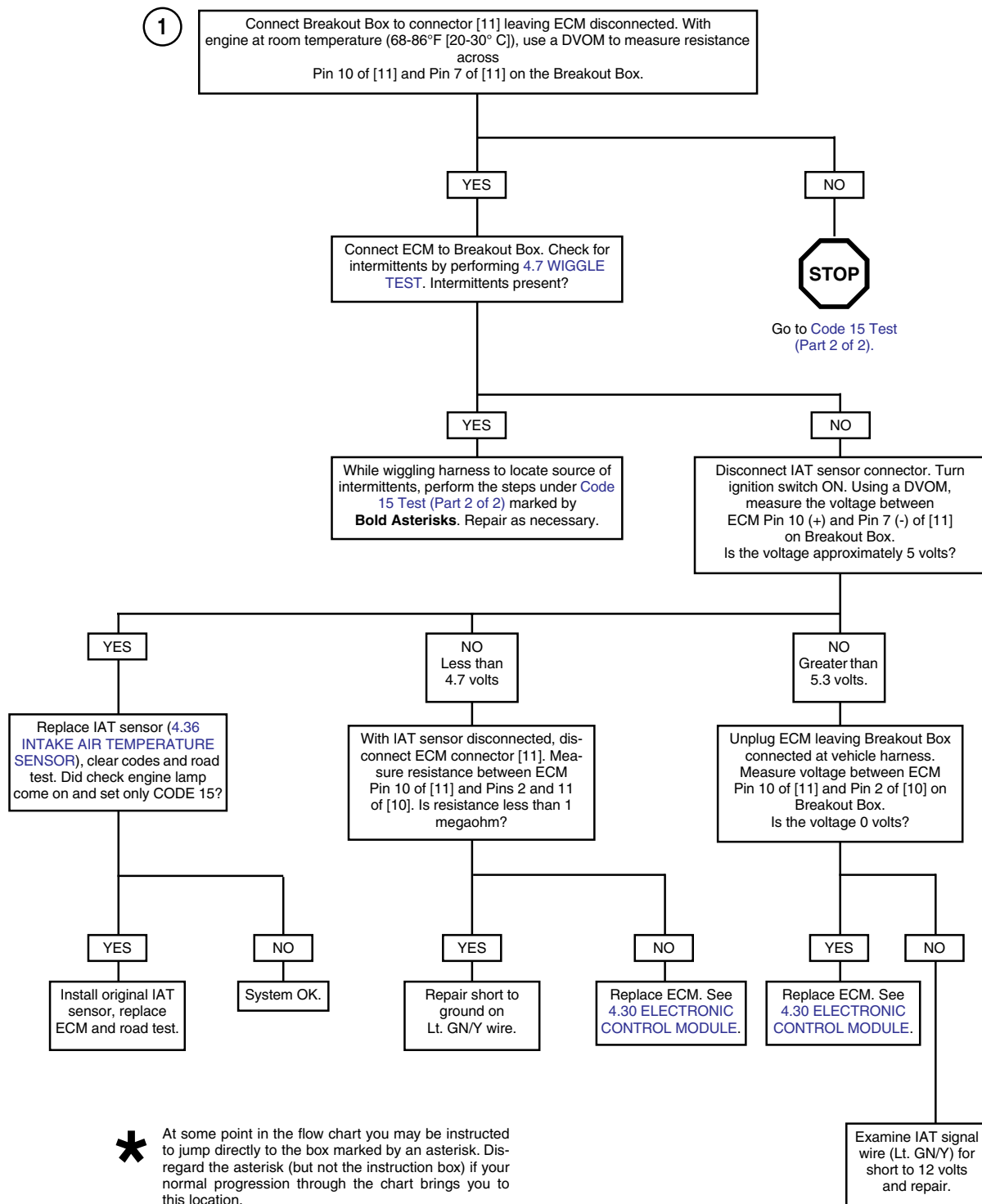


Figure 4-39. Intake Air Temperature Sensor Circuit

Table 4-23. Wire Harness Connectors in Figure 4-39.

NO.	DESCRIPTION	TYPE	LOCATION
[11]	ECM (gray)	12-place Deutsch	under seat
[89]	intake air temperature sensor	2-place Amp	in airbox base

## Code 15 Test (Part 1 of 2)

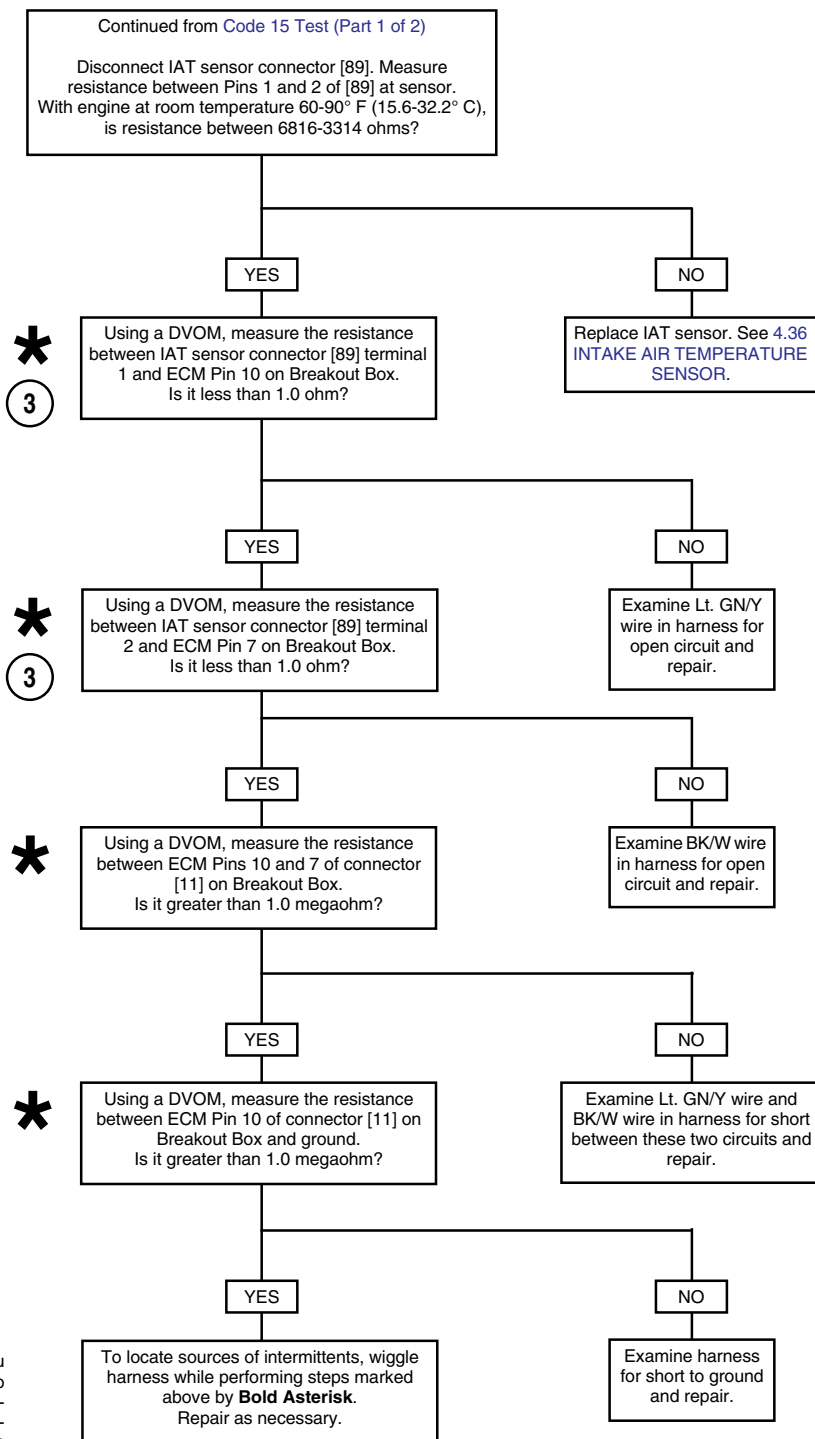


Clear codes and confirm proper operation with no check engine lamp. Codes can be cleared using DIGITAL TECHNICIAN (Part No. HD-44750).



## Code 15 Test (Part 2 of 2)

2



At some point in the flow chart you may be instructed to jump directly to the box marked by an asterisk. Disregard the asterisk (but not the instruction box) if your normal progression through the chart brings you to this location.

Clear codes and confirm proper operation with no check engine lamp. Codes can be cleared using DIGITAL TECHNICIAN (Part No. HD-44750).

## GENERAL

### Battery Voltage

A Code 16 will set if the ECM detects battery positive voltage less than 6 volts or greater than 20 volts.

- A low voltage condition typically occurs during activation of the starter or generally indicates loose wire connections.
- A high voltage condition is usually caused by a faulty voltage regulator.

## DIAGNOSTICS

### Diagnostic Notes

The reference numbers below correlate with the circled numbers on the Code 16 flow charts.

1. The ECM is monitoring voltage at ECM connector [10] (black) Terminal 1. Connect BREAKOUT BOX (Part No. HD-42682) to ECM. See [4.6 BREAKOUT BOX](#).
2. This checks for voltage drops in the ECM power circuit. If a significant voltage drop is not present, condition may be caused by excessive starter current draw.

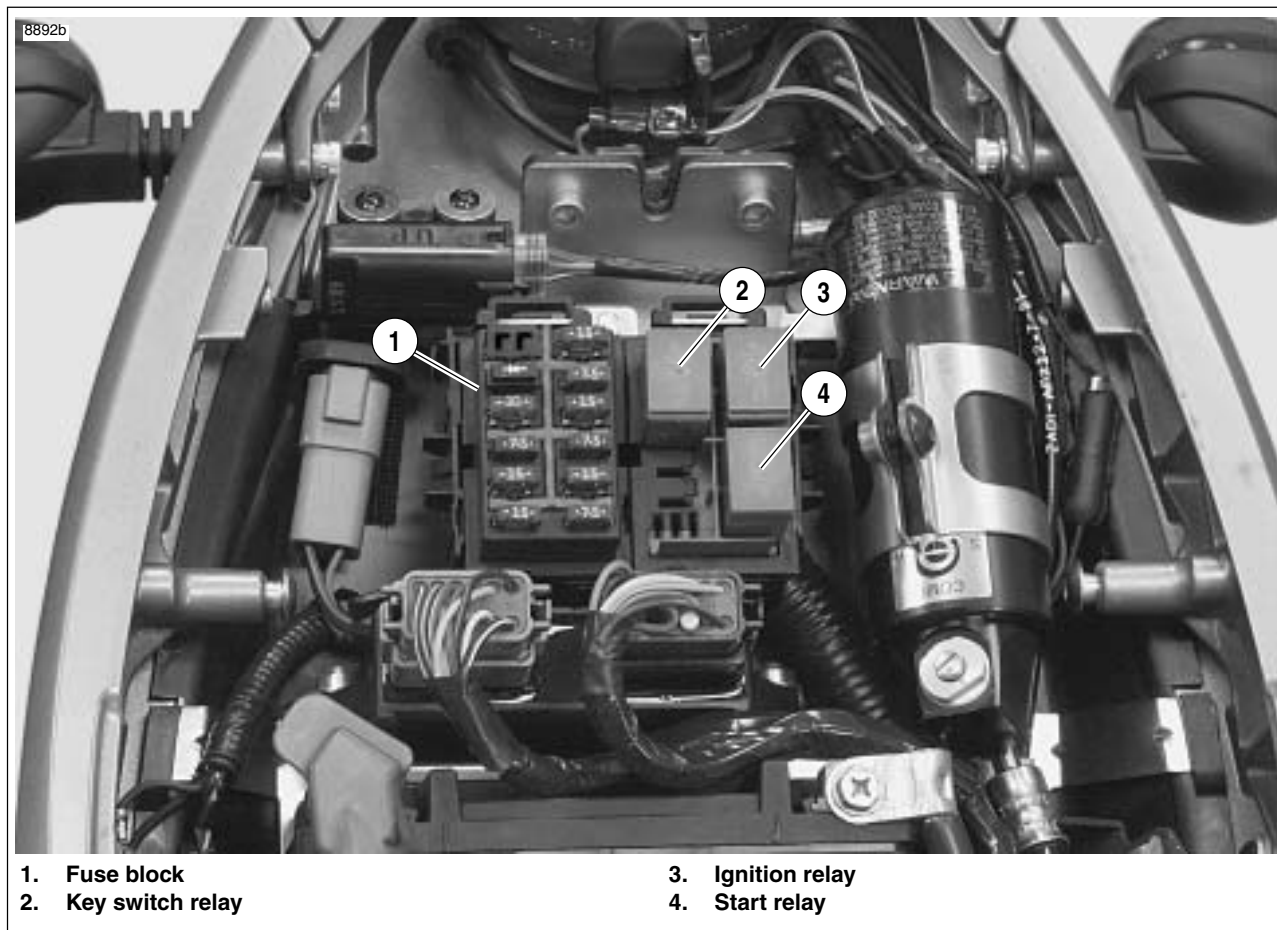
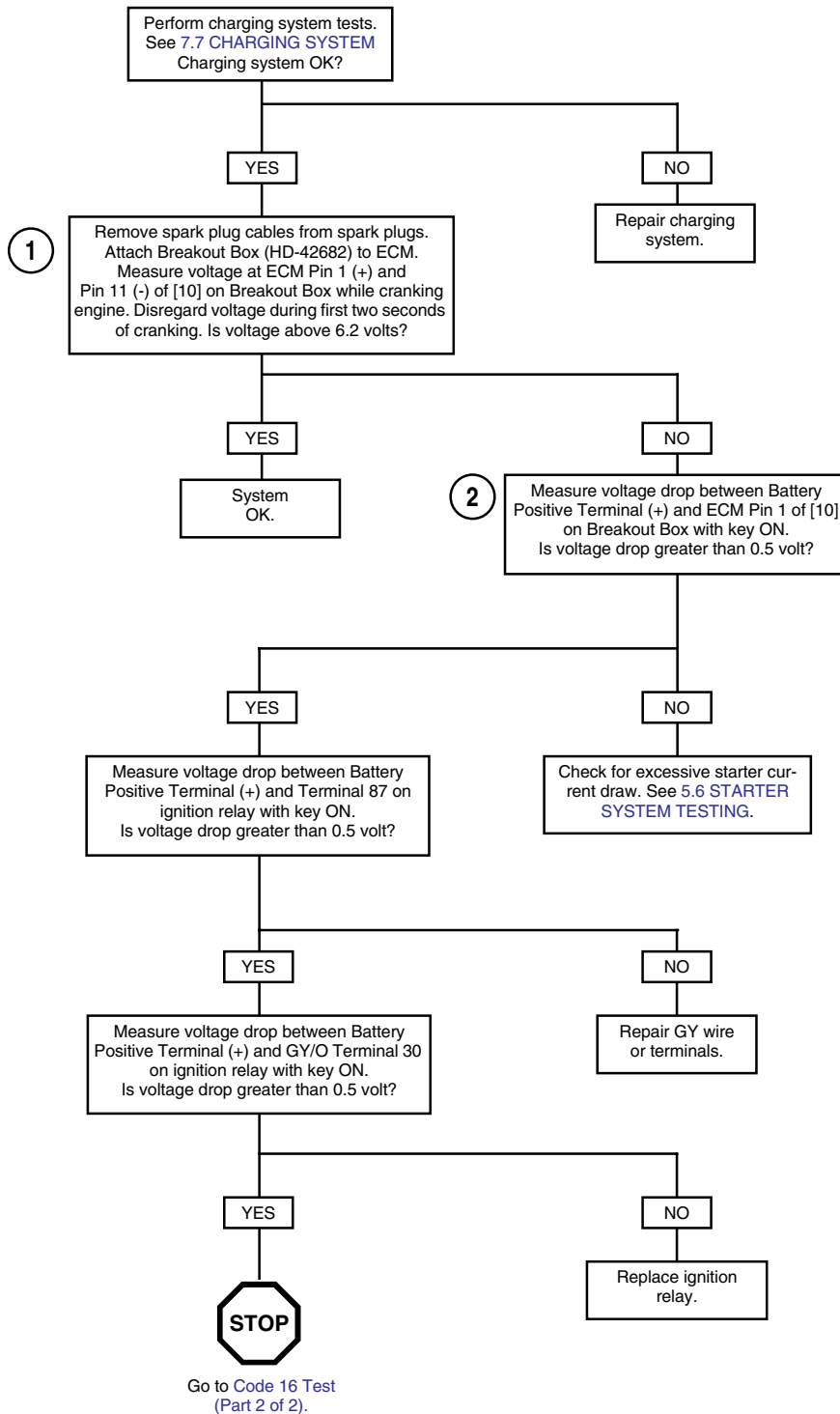


Figure 4-40. Fuse Block and Electrical Relays



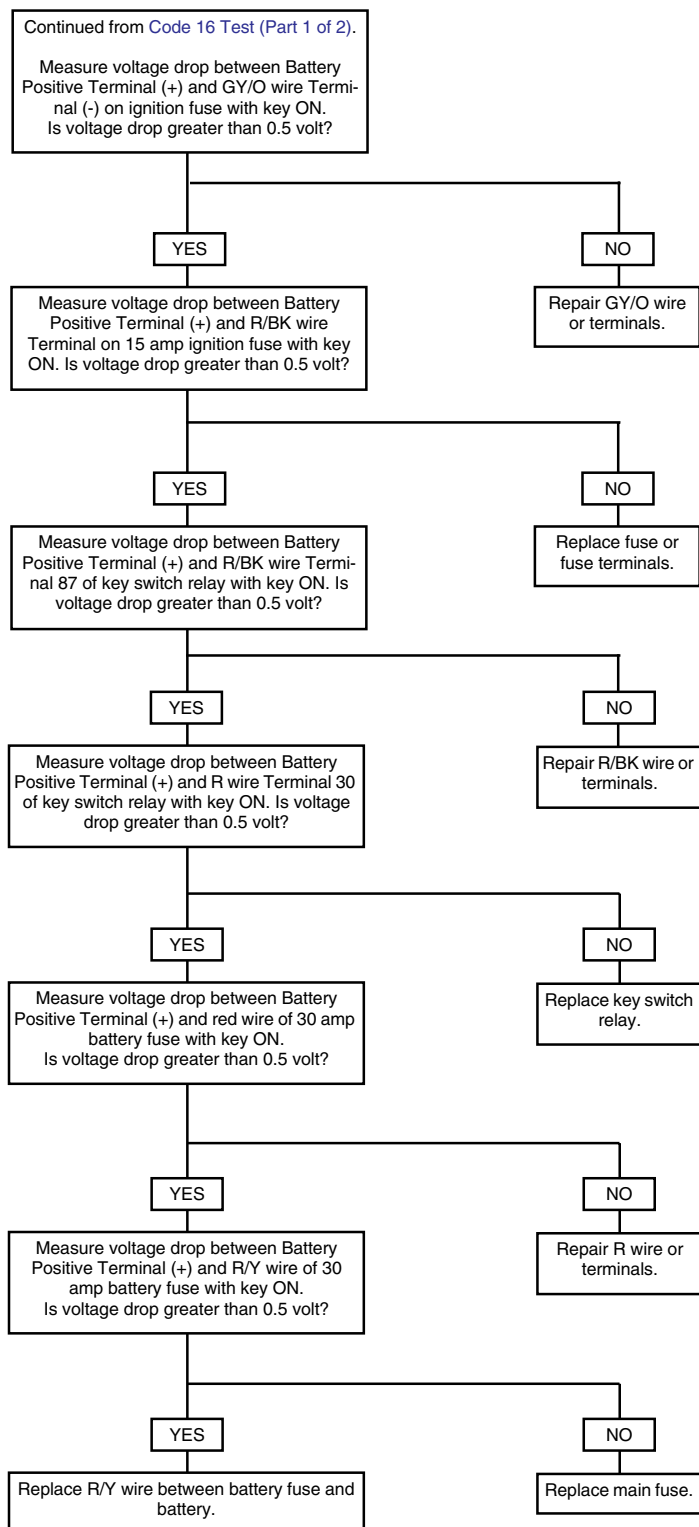
NO.	DESCRIPTION	TYPE	LOCATION
[10]	ECM (black)	12-place Deutsch	under seat

## Code 16 Test (Part 1 of 2)



Clear codes and confirm proper operation with no check engine lamp. Codes can be cleared using DIGITAL TECHNICIAN (Part No. HD-44750).

## Code 16 Test (Part 2 of 2)



Clear codes and confirm proper operation with no check engine lamp. Codes can be cleared using DIGITAL TECHNICIAN (Part No. HD-44750).

## GENERAL

### Interactive Muffler Control (XB12R Models Only)

The interactive exhaust system utilizes an actuator valve in the muffler which is connected to an actuator motor via a cable. The valve position automatically adjusts to enhance engine performance.

A Code 21 will set if the ECM detects that the output for the Interactive Muffler Control Actuator is not in agreement with the feedback circuit.

- Mechanical fault in the actuator, valve or cable.
- Electrical fault in the actuator circuit.
- Electrical fault in the actuator feedback circuit.

### Diagnostic Notes

The reference numbers below correlate with the circled numbers on the Code 21 flow charts.

1. Using TEST CONNECTOR KIT (Part No. HD-41404), attach red probe and patch cord to [164B] (1, 2).
2. Using TEST CONNECTOR KIT (Part No. HD-41404), use gray male pin probe and patch cord.

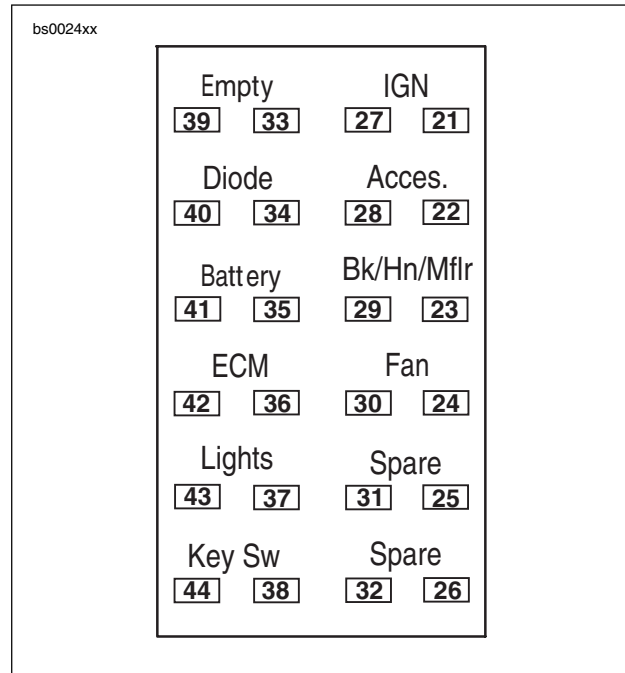
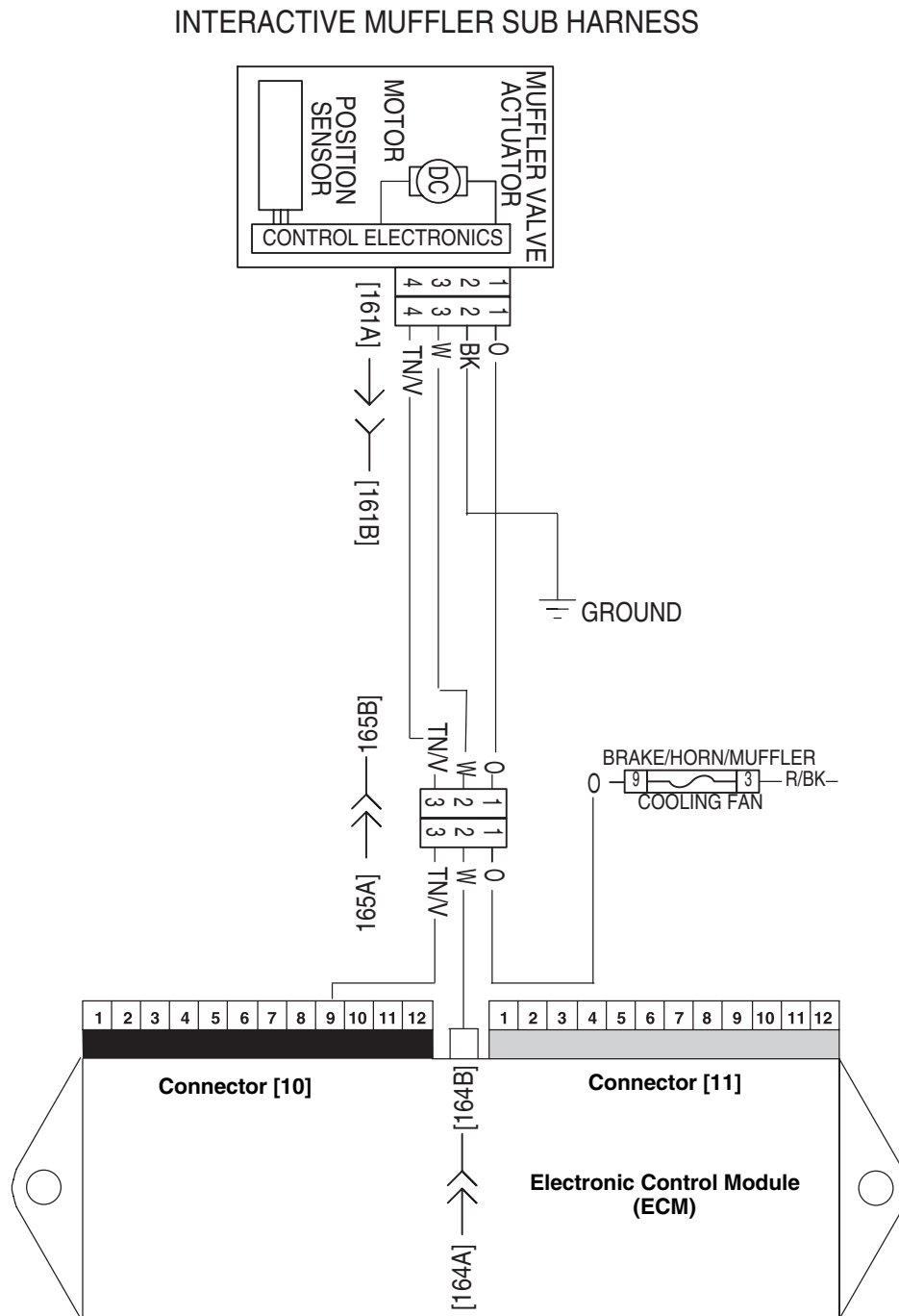


Figure 4-42. Fuses and Diodes

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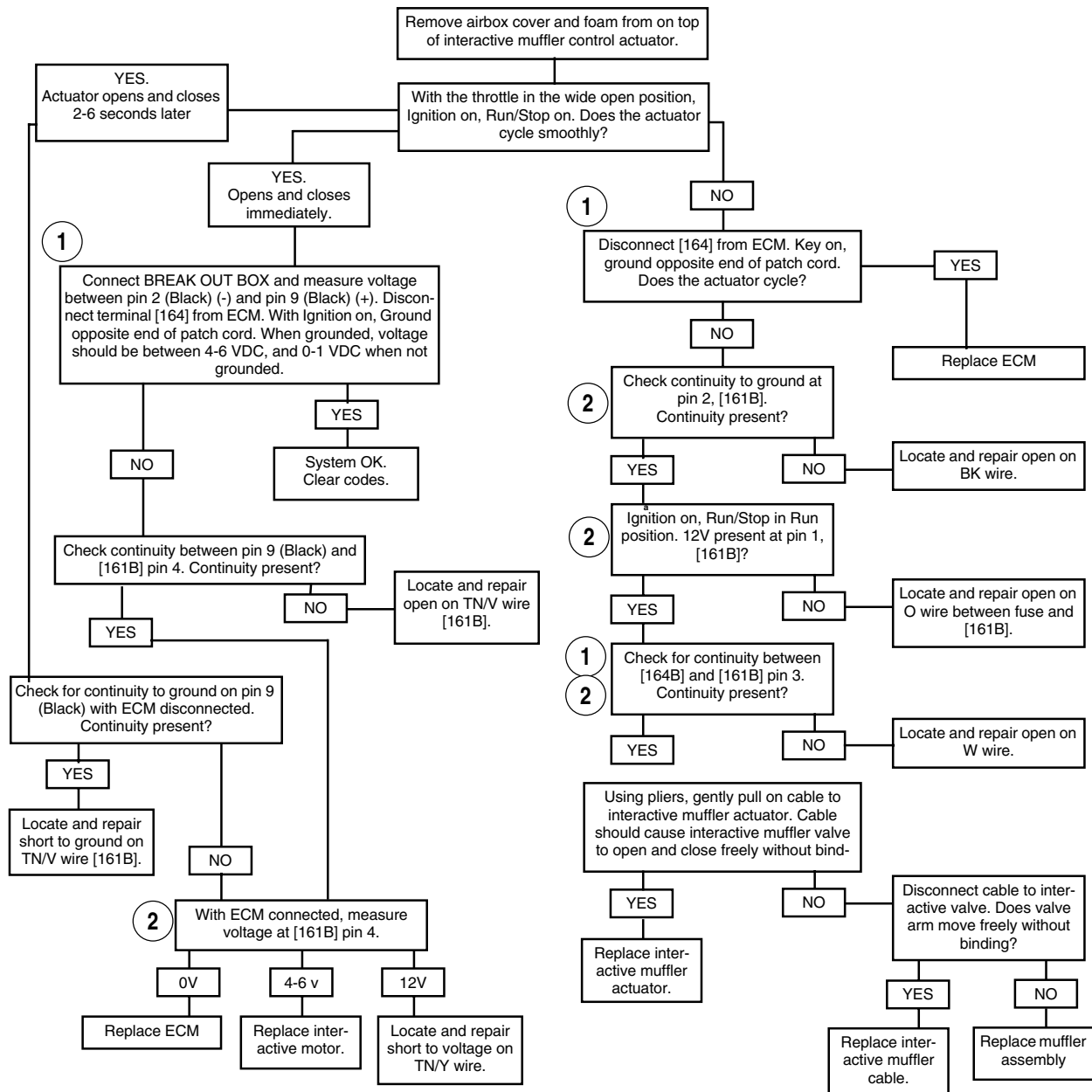


**Figure 4-43. Interactive Muffler Circuit**

**Table 4-25. Wire Harness Connectors in Figure 4-43.**

NO.	DESCRIPTION	TYPE	LOCATION
[10]	ECM (black)	12-place Deutsch	under seat
[161]	Interactive muffler actuator	4-place Deutsch	under air cleaner
[164]	ECM	1-place Amp	under seat
[165]	sub-harness	3-place Packard	beneath airbox base

## Code 21 Test





## GENERAL

### Front Fuel Injector (Code 23) And Rear Fuel Injector (Code 32)

See [Figure 4-44](#). The fuel injectors (1, 4) are solenoids that allow pressurized fuel into the engine intake tract. The injectors are timed to the engine cycle and are triggered sequentially.

#### NOTE

*The injectors on the 984 are interchangeable whereas the injectors on the 1200 are not due to specific spray patterns designed for the 1200 engine.*

The power for the injectors comes from the ignition relay. The ignition relay also provides power for fuel pump, ECM and the ignition coils. The ECM provides the path to ground to trigger the injectors.

#### NOTE

*Ignition relay failures or wiring harness problems will cause 12 volt power to be lost to both injectors, ignition coils, ECM and fuel pump.*

## DIAGNOSTICS

### Diagnostic Notes

The reference numbers below correlate with the circled numbers on the Code 23/32 flow charts.

#### WARNING

The gasoline in the fuel supply line downstream of the fuel pump is under high pressure (49 psi [338 kPa]). To avoid an uncontrolled discharge or spray of gasoline, always purge the system of high pressure gas before servicing the fuel system. Gasoline is extremely flammable and highly explosive. Inadequate safety precautions could result in death or serious injury.

1. Purge fuel line. See [4.39 FUEL PUMP](#).
2. Use HARNESS CONNECTOR TEST KIT (Part No. HD-41404), purple pin probes and patch cord.
3. Connect BREAKOUT BOX (Part No. HD-42682) to ECM. See [4.6 BREAKOUT BOX](#).
4. Use FUEL INJECTOR TEST LAMP (Part No. HD-34730-2C).

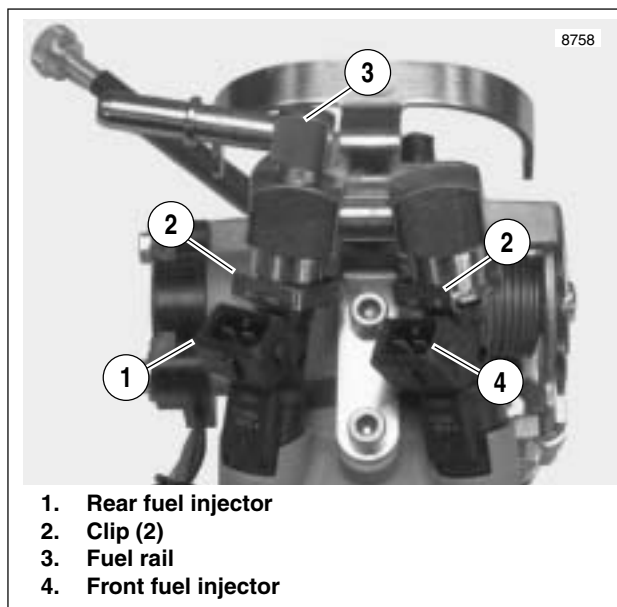


Figure 4-44. Fuel Injectors (Typical XB9S Shown)

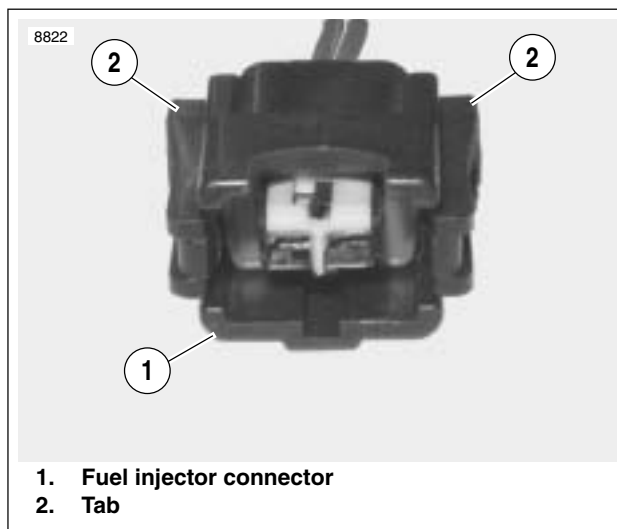


Figure 4-45. Fuel Injector Connector

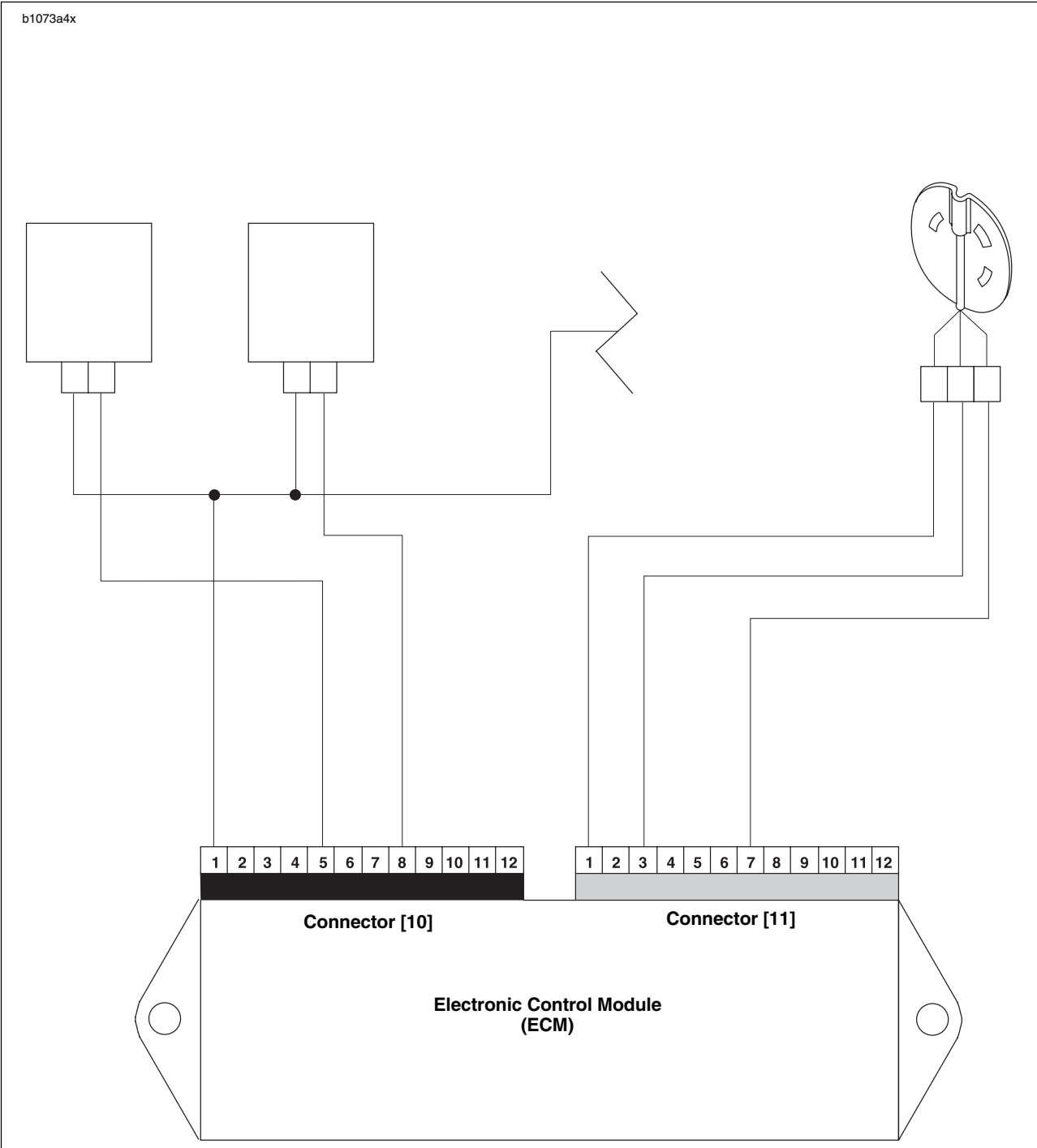
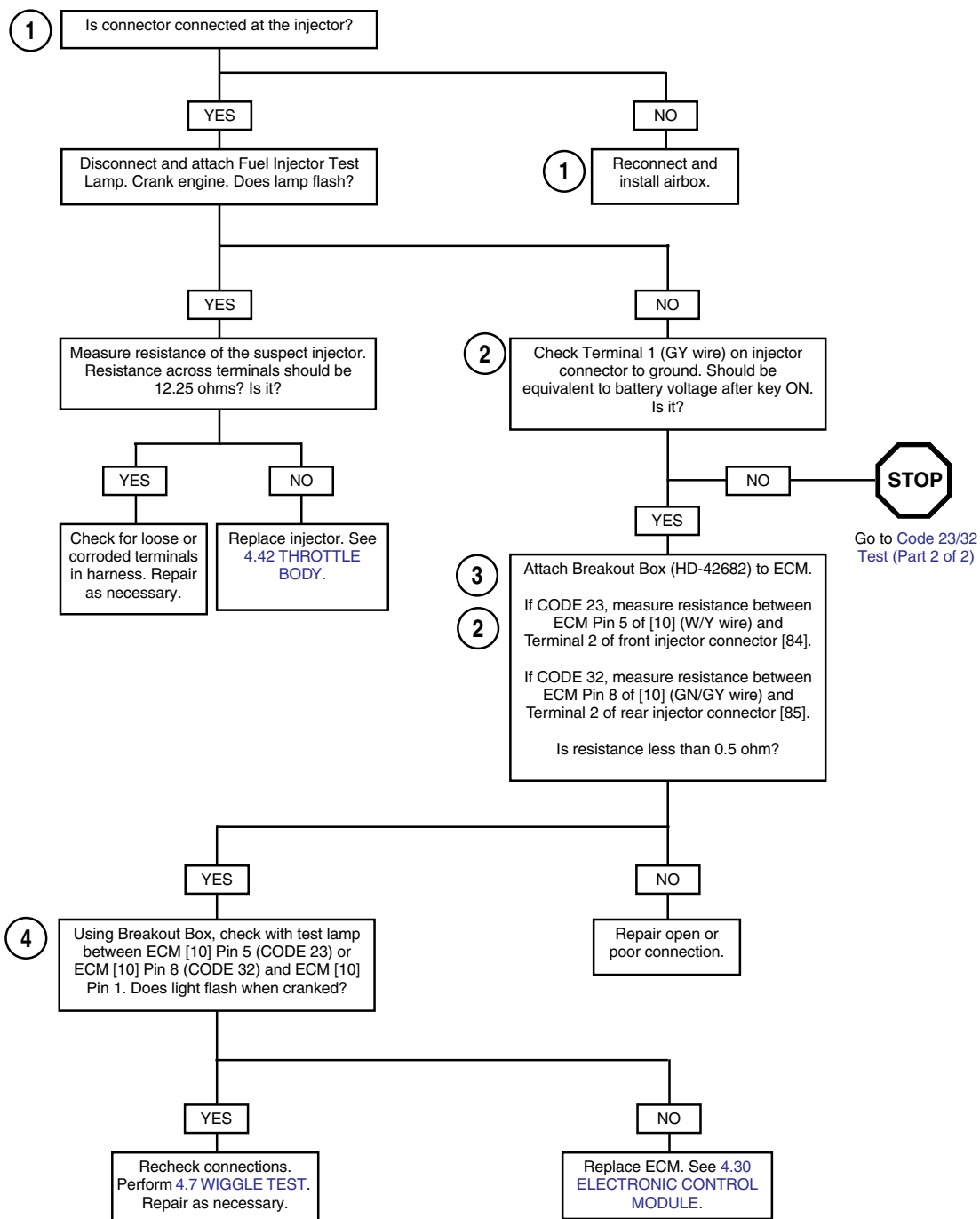


Figure 4-46. Fuel Injector Circuit

Table 4-26. Wire Harness Connectors in [Figure 4-46](#).

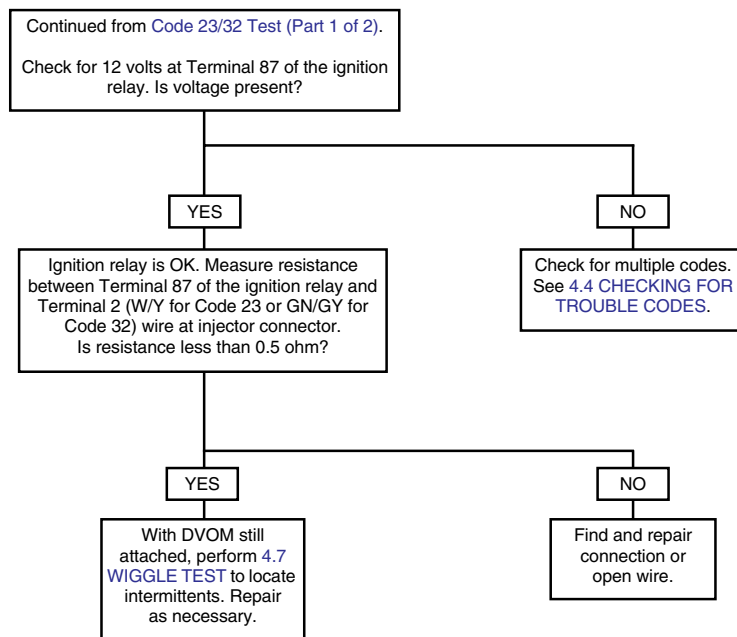
NO.	DESCRIPTION	TYPE	LOCATION
[10]	ECM (black)	12-place Deutsch	under seat
[161]	Interactive muffler actuator	4-place Deutsch	under air cleaner
[164]	ECM	1-place Amp	under seat
[165]	sub-harness	3-place Packard	beneath airbox base

## Code 23/32 Test (Part 1 of 2)



Clear codes and confirm proper operation with no check engine lamp. Codes can be cleared using DIGITAL TECHNICIAN (Part No. HD-44750).

## Code 23/32 Test (Part 2 of 2)



Clear codes and confirm proper operation with no check engine lamp. Codes can be cleared using DIGITAL TECHNICIAN (Part No. HD-44750).

## GENERAL

### Front Ignition Coil (Code 24) And Rear Ignition Coil (Code 25)

A Code 24 or 25 will set if the ignition coil rise time is out of range. This could occur if there is an open coil or loss of power to the coil. If both codes are set, it is likely a coil power failure or a coil failure.

See [Figure 4-47](#). The coil receives power from the ignition relay at coil pin B (3) at the same time that the fuel pump and injectors are activated.

## DIAGNOSTICS

### Diagnostic Notes

The reference numbers below correlate with the circled numbers on the Code 24/25 flow charts.

1. Use HARNESS CONNECTOR TEST KIT (Part No. HD-41404), purple pin probes and patch cord.
2. Connect BREAKOUT BOX (Part No. HD-42682) to ECM. See [4.6 BREAKOUT BOX](#).
3. See [Figure 4-34](#). Plug IGNITION COIL CIRCUIT TEST ADAPTER (Part No. HD-44687) and FUEL INJECTOR TEST LAMP (Part NO. 34730-2C) INTO Breakout Box. Note that cranking the engine with test lamp in place of the ignition coil can sometimes cause a code 24 or 25. This condition is normal and does not by itself indicate a malfunction. Codes must be cleared if this condition occurs.

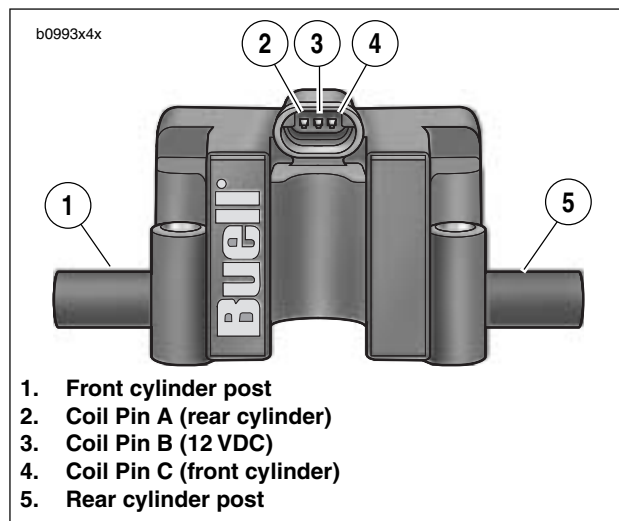


Figure 4-47. Ignition Coil

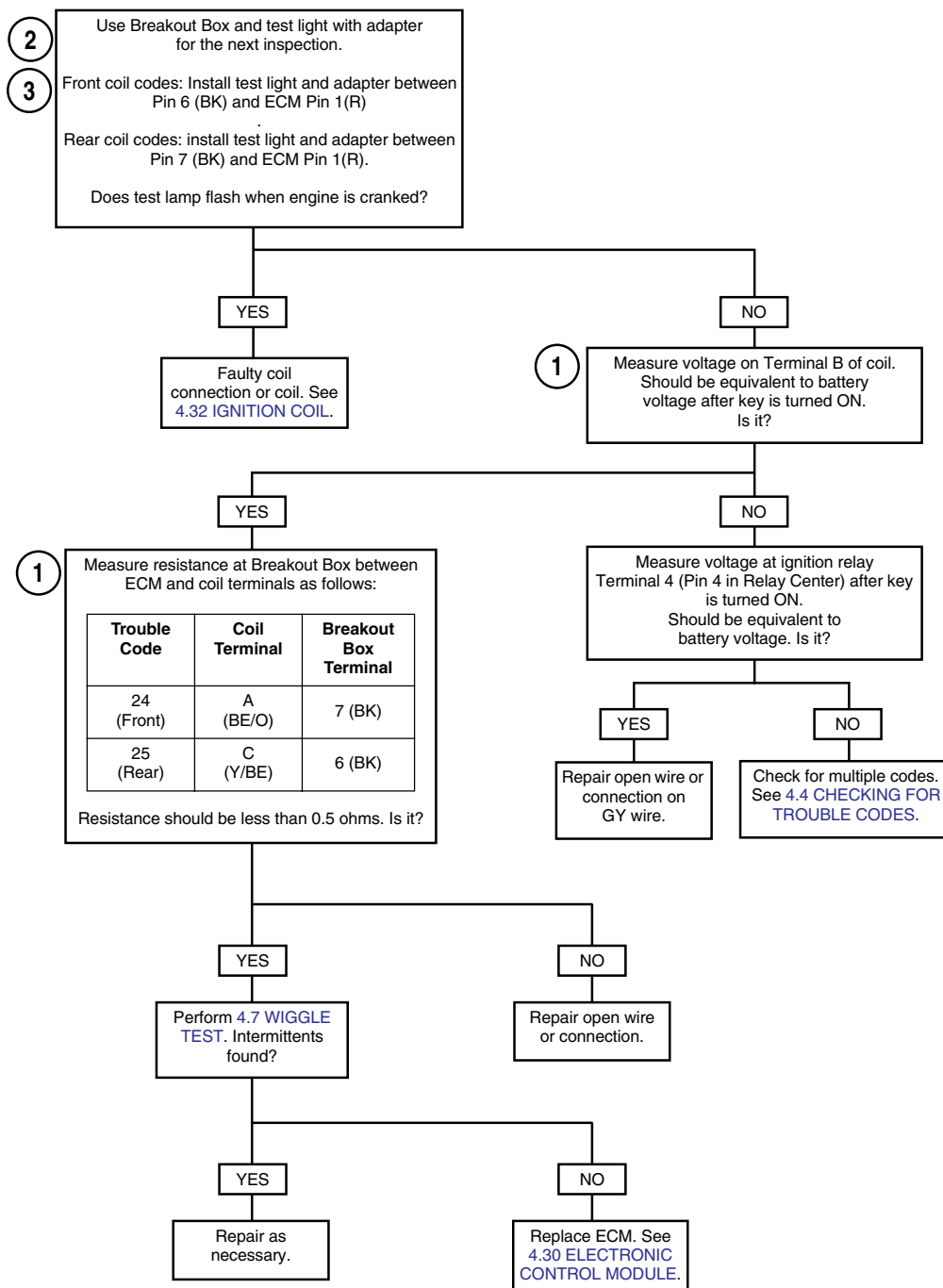


Figure 4-48. Testing Ignition Coil Connectors

**Table 4-27. Wire Harness Connectors in Figure 4-49.**

## 4-72 2004 Buell Lightning: Fuel System

## Code 24/25 Test



Clear codes and confirm proper operation with no check engine lamp. Codes can be cleared using DIGITAL TECHNICIAN (Part No. HD-44750).

## GENERAL

### Fuel Pump

The fuel pump assembly is shown in [Figure 4-50](#). ECM Pin 3 provides ground to the fuel pump. Code 33 will set if:

- See [Figure 4-51](#). BN/Y wire is shorted to 12 volts. This will also cause the ignition fuse to blow.
- BN/Y wire is shorted to ground. This will cause the fuel pump to run continuously even when the motor is not running.
- Fuel pump motor stalls or spins without providing fuel pressure.

## DIAGNOSTICS

### Diagnostic Notes

The reference numbers below correlate with the circled numbers on the Code 33 flow chart.

1. Connect BREAKOUT BOX (Part No. HD-42682) to ECM. See [4.6 BREAKOUT BOX](#).
2. Use HARNESS CONNECTOR TEST KIT (Part No. HD-41404), red pin probe and patch cord.
3. Use HARNESS CONNECTOR TEST KIT (Part No. HD-41404), gray socket probe and patch cord.

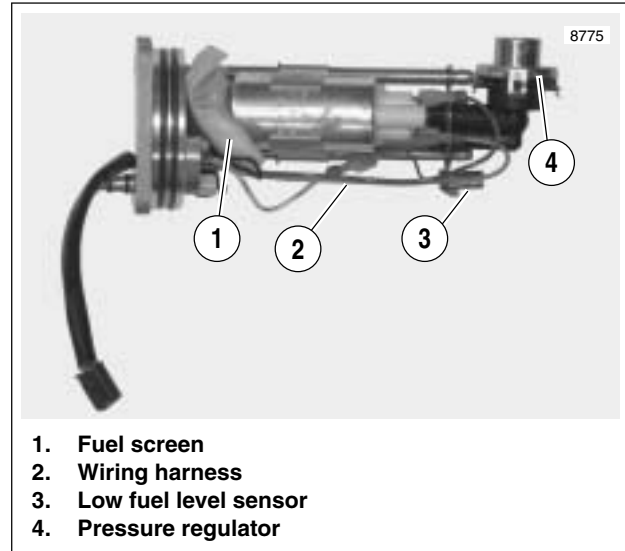


Figure 4-50. Fuel Pump Assembly



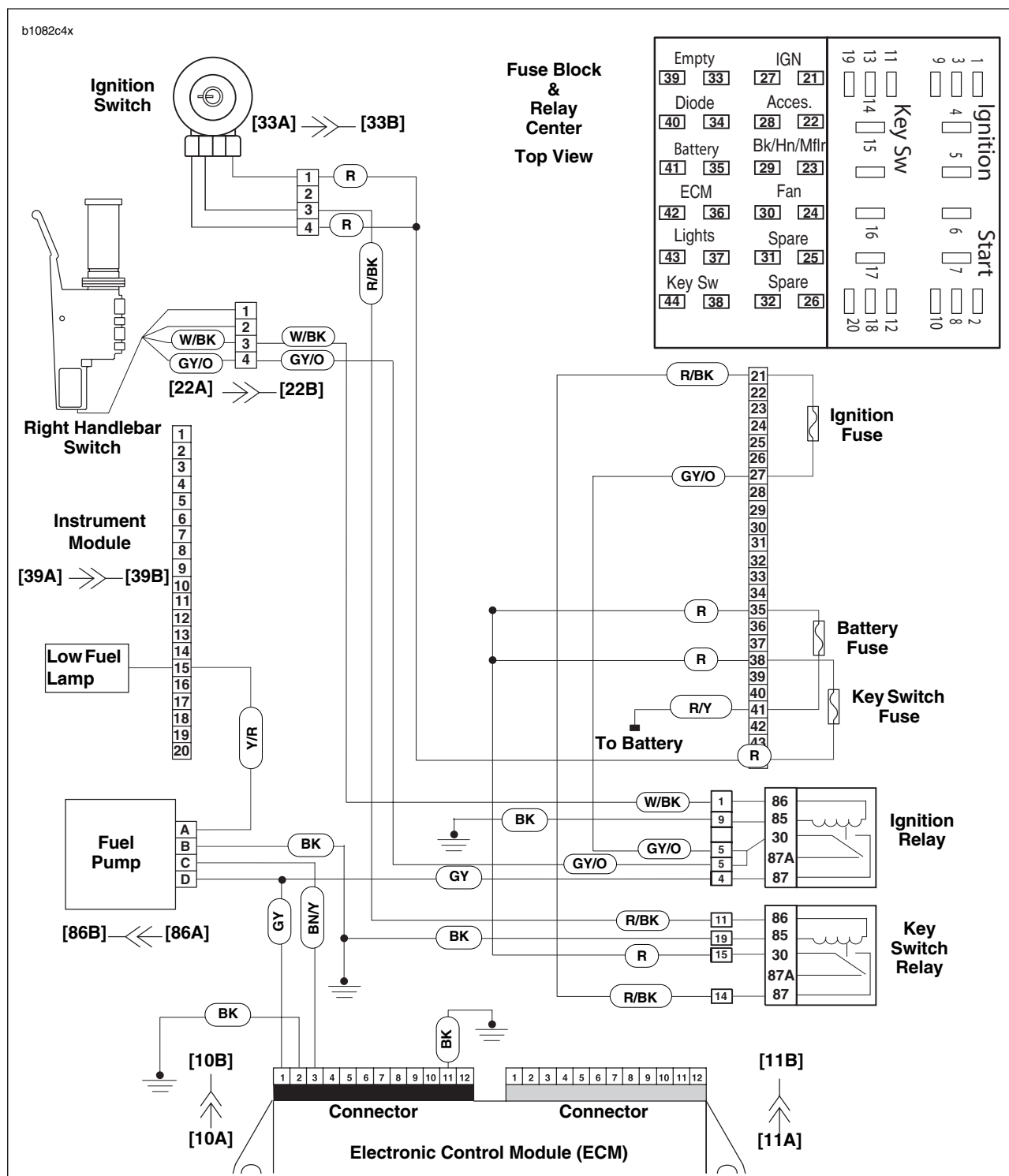
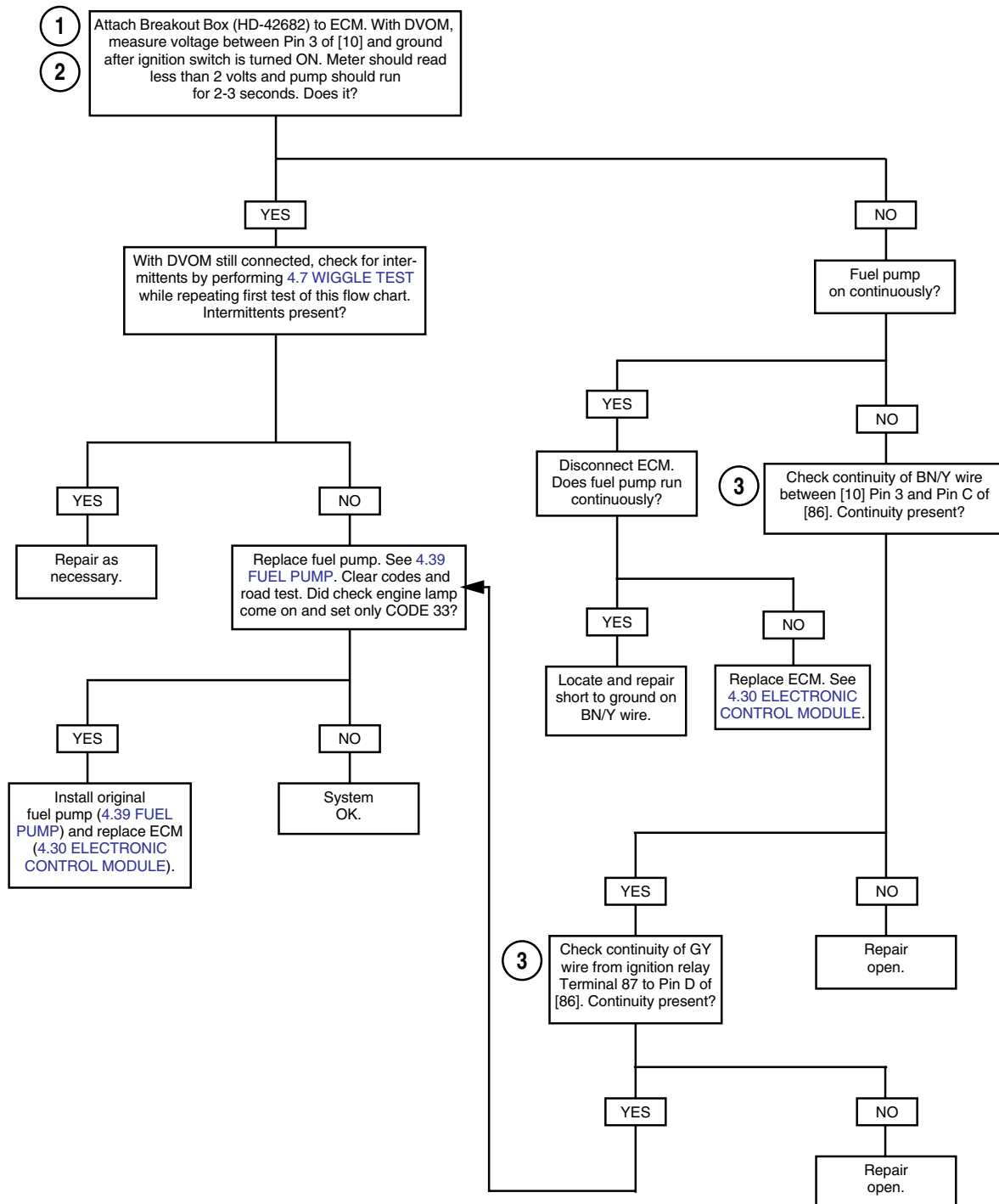


Figure 4-51. Fuel Pump Circuit

Table 4-28. Wire Harness Connectors in Figure 4-51.

NO.	DESCRIPTION	TYPE	LOCATION
[10]	ECM (black)	12-place Deutsch	under seat
[39]	instrument module	20-place Multilock	behind windscreen
[86]	fuel pump	4-place Multilock	left side of rear shock absorber

## Code 33 Test



Clear codes and confirm proper operation with no check engine lamp. Codes can be cleared using DIGITAL TECHNICIAN (Part No. HD-44750).

## GENERAL

### Tachometer

A Code 35 will set if the PK tachometer wire is shorted to power or ground.

## DIAGNOSTICS

### Diagnostic Notes

The reference numbers below correlate with the circled numbers on the Code 35 flow chart.

1. Connect BREAKOUT BOX (Part No. HD-42682) to ECM. See [4.6 BREAKOUT BOX](#).
2. Replace instrument module. See [7.19 INSTRUMENT MODULE](#).

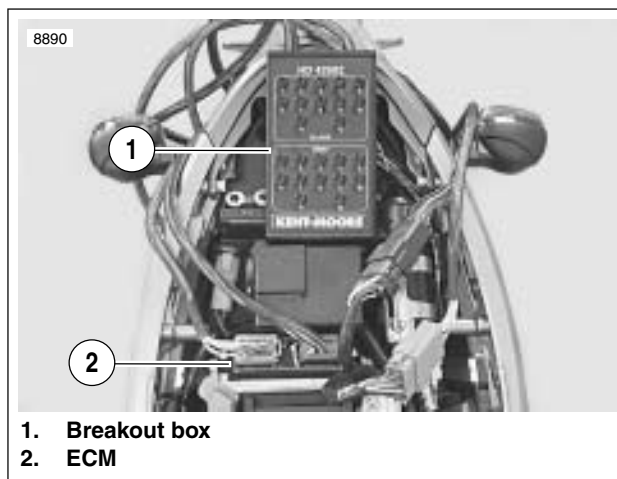


Figure 4-52. Installed Breakout Box

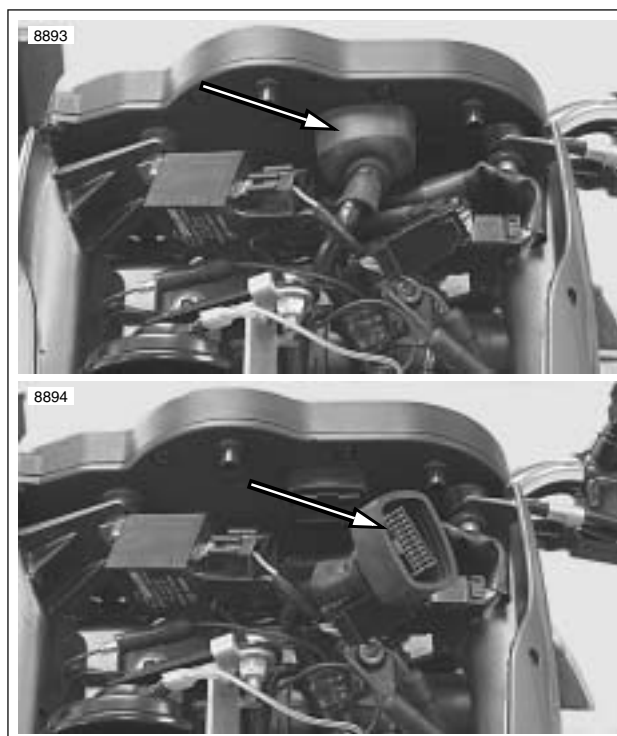


Figure 4-53. Instrument Module Connector [39]

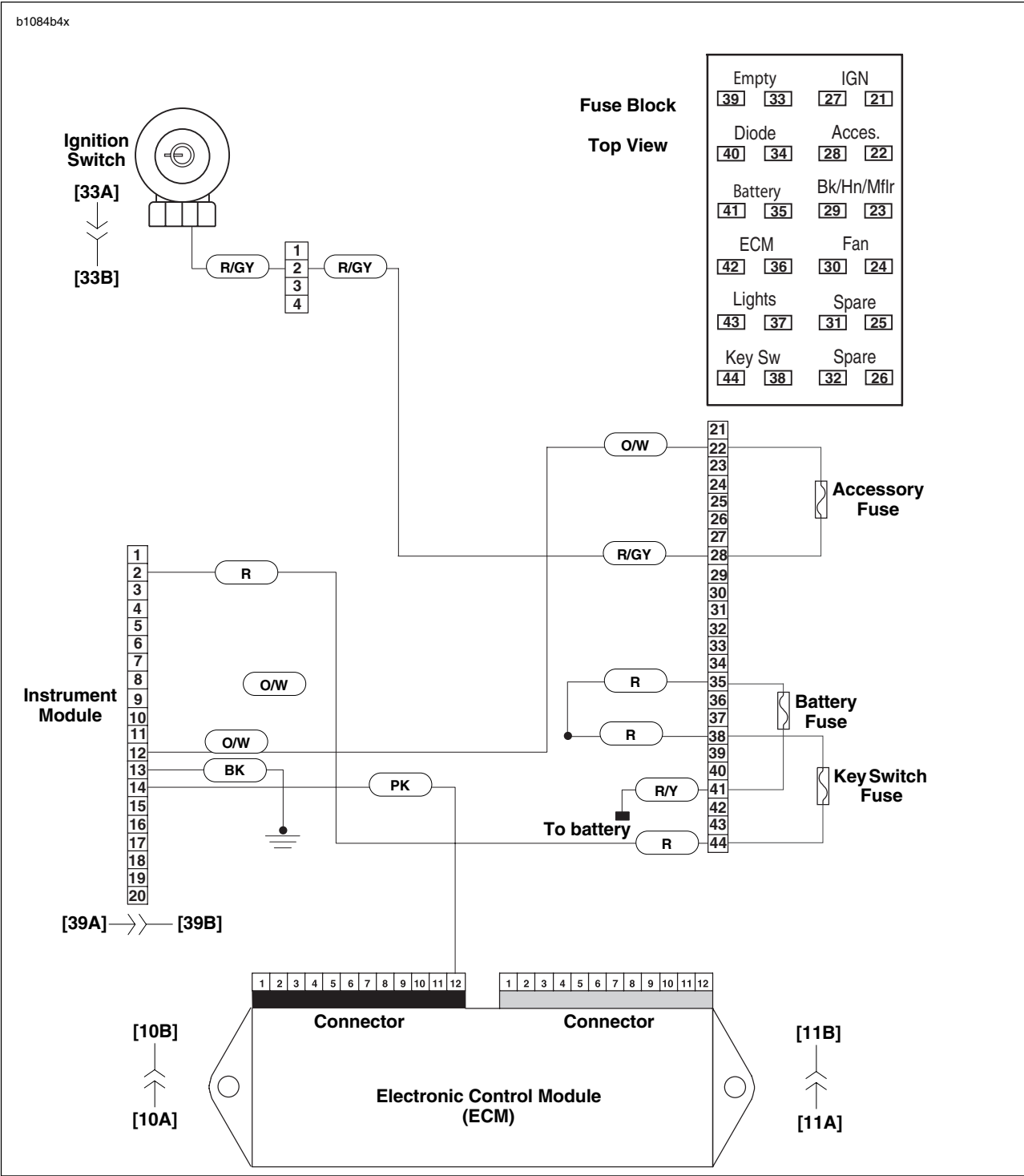
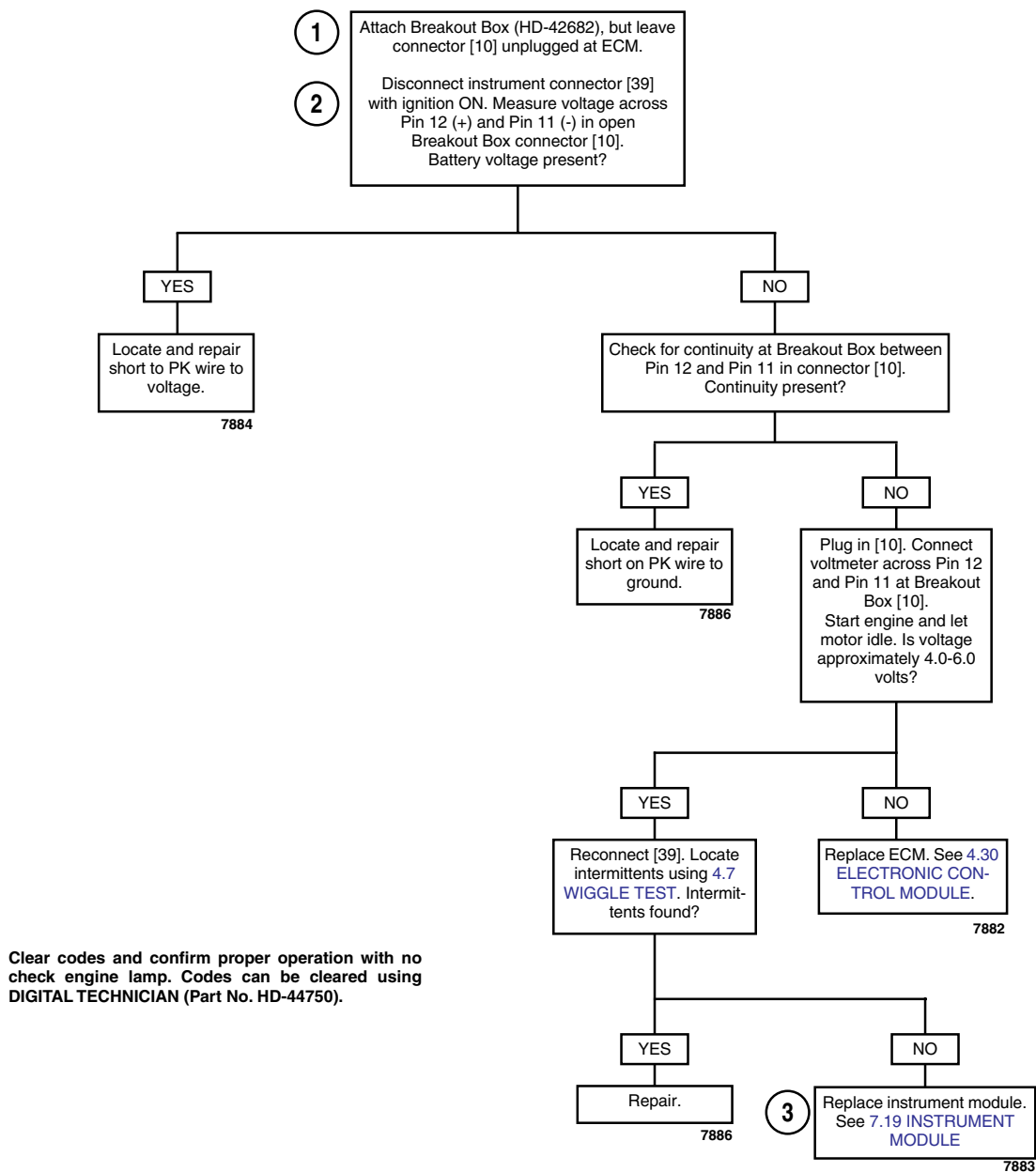


Figure 4-54. Tachometer Circuit

Table 4-29. Wire Harness Connectors in Figure 4-54.

NO.	DESCRIPTION	TYPE	LOCATION
[10]	ECM (black)	12-place Deutsch	under seat
[39]	instrument module	20-place Multilock	behind windscreen

## Code 35 Test



## GENERAL

### Cooling Fan High Voltage

This code occurs when the engine is running and the ECM has commanded the fan on, and the voltage remains high at pin 6 of ECM connector [11] (gray connector).

#### NOTE

*An engine temperature (ET) sensor signal, indicating a cylinder head temperature above 428° F (220° C), causes the ECM to command the fan on. When ignition is OFF, fan may run for approximately two and a half minutes depending on temperature of vehicle when ignition was turned off. See Table 4-30. Cooling Fan Specifications.*

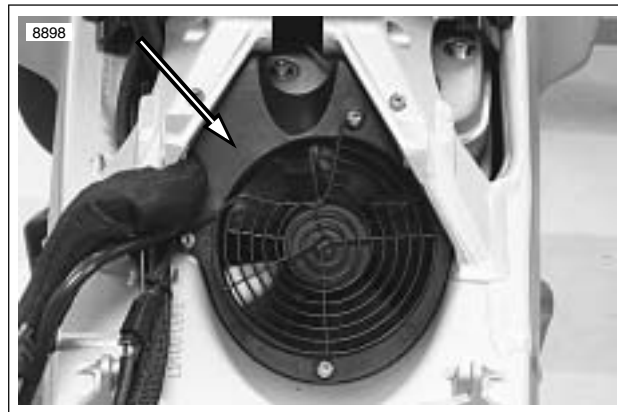


Figure 4-55. Cooling Fan

Table 4-30. Cooling Fan Specifications

	FAN ON	FAN OFF
Key ON	220° C (428° F)	180° C (356° F)
Key OFF	170° C (338° F)	150° C (302° F)

This code can also set if fan blade does not spin (blocked fan blade) when fan is commanded on and battery voltage is applied to fan.

### Cooling Fan Low Voltage

This code will set when the ignition key is ON and the ECM does not sense voltage at pin 6 of ECM terminal 11 (gray connector).

## DIAGNOSTICS

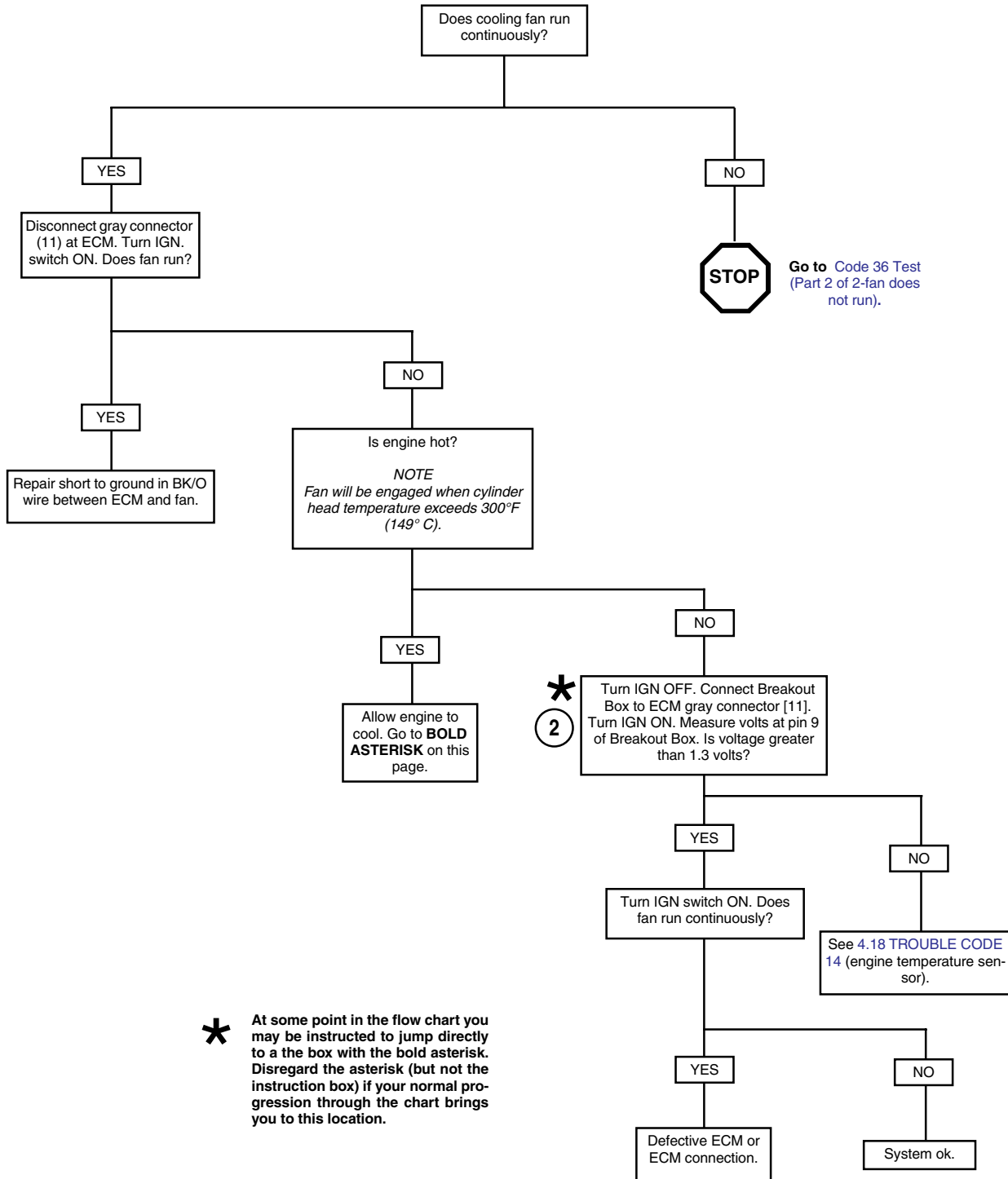
### Diagnostic Notes

The reference numbers below correlate with the circled numbers on the Code 36 flow charts.

1. Use HARNESS CONNECTOR TEST KIT (Part No. HD-41404), gray pin probes and patch cord.
2. Connect BREAKOUT BOX (Part No. HD-42682) to ECM. See 4.6 BREAKOUT BOX.

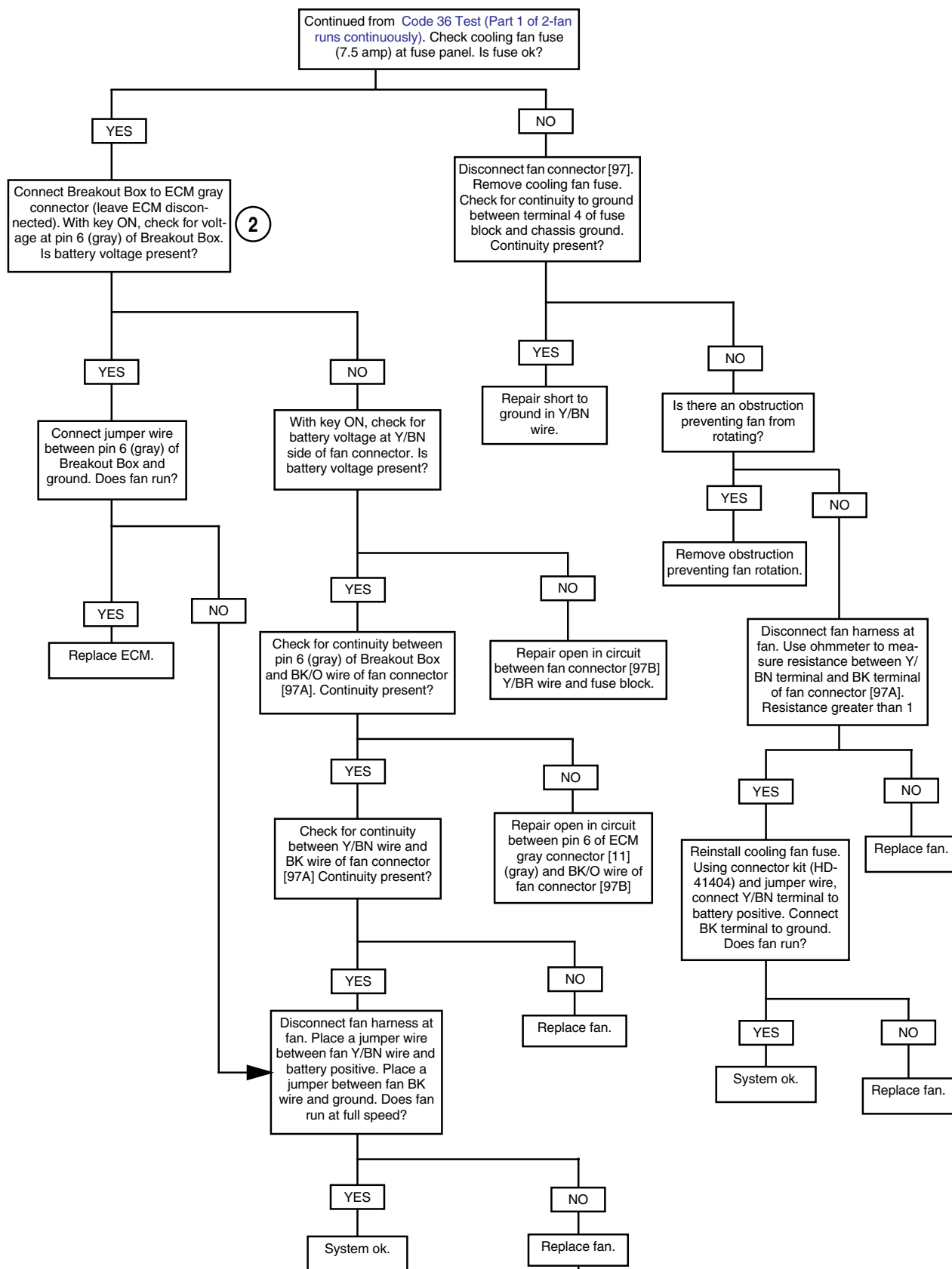


## Code 36 Test (Part 1 of 2-fan runs continuously)





## Code 36 Test (Part 2 of 2-fan does not run)



7879

## GENERAL

### NOTE

See [Figure 4-57](#). When vehicle lean angle causes weighted pendulum to enter shaded area for a period of greater than one second, ECM shuts off ignition and fuel systems.

### Bank Angle Sensor

See [Figure 4-58](#). A Code 44 occurs when the bank angle sensor voltage is outside the normal operating range of 0.25-2.7 volts. Refer to [Table 4-32](#). This may be caused by:

- Short to ground in harness between sensor and electronic control module.
- Short to voltage in harness between sensor and electronic control module.
- Failed sensor.

If this code occurs, the engine may stop running. The engine may still be restarted and ridden to the dealership for repair.

## DIAGNOSTICS

### Diagnostic Notes

The reference numbers below correlate with the circled numbers on the Code 44 flow charts.

1. Use HARNESS CONNECTOR TEST KIT (Part No. HD-41404), gray pin probes and patch cord.
2. Connect BREAKOUT BOX (Part No. HD-42682) to ECM. See [4.6 BREAKOUT BOX](#).

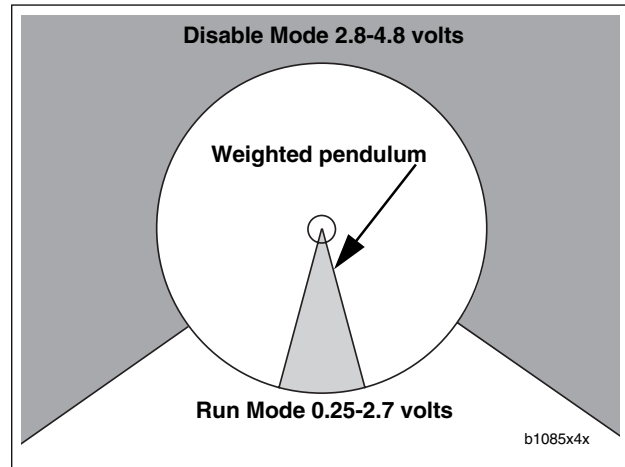


Figure 4-57. Bank Angle Sensor Operation

Table 4-32. Bank Angle Sensor Voltage

MODE	VOLTS
Run mode	0.25-2.7
Disable mode	2.8-4.8

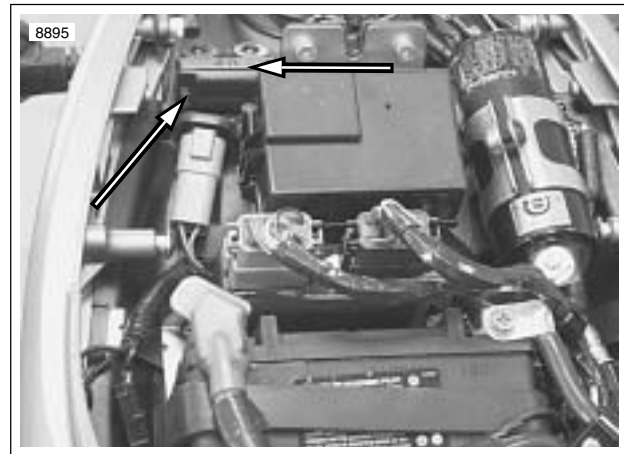


Figure 4-58. Bank Angle Sensor

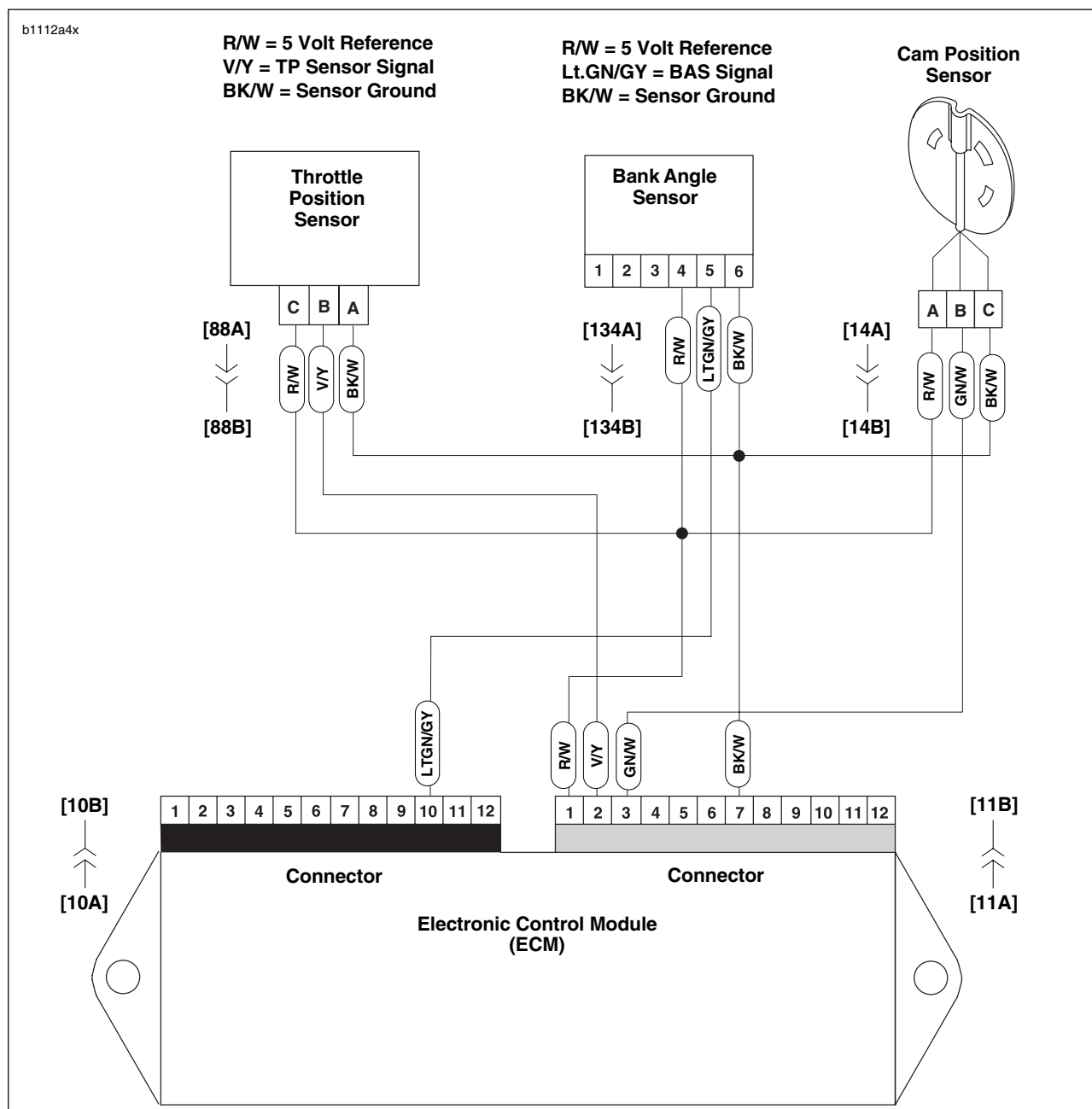
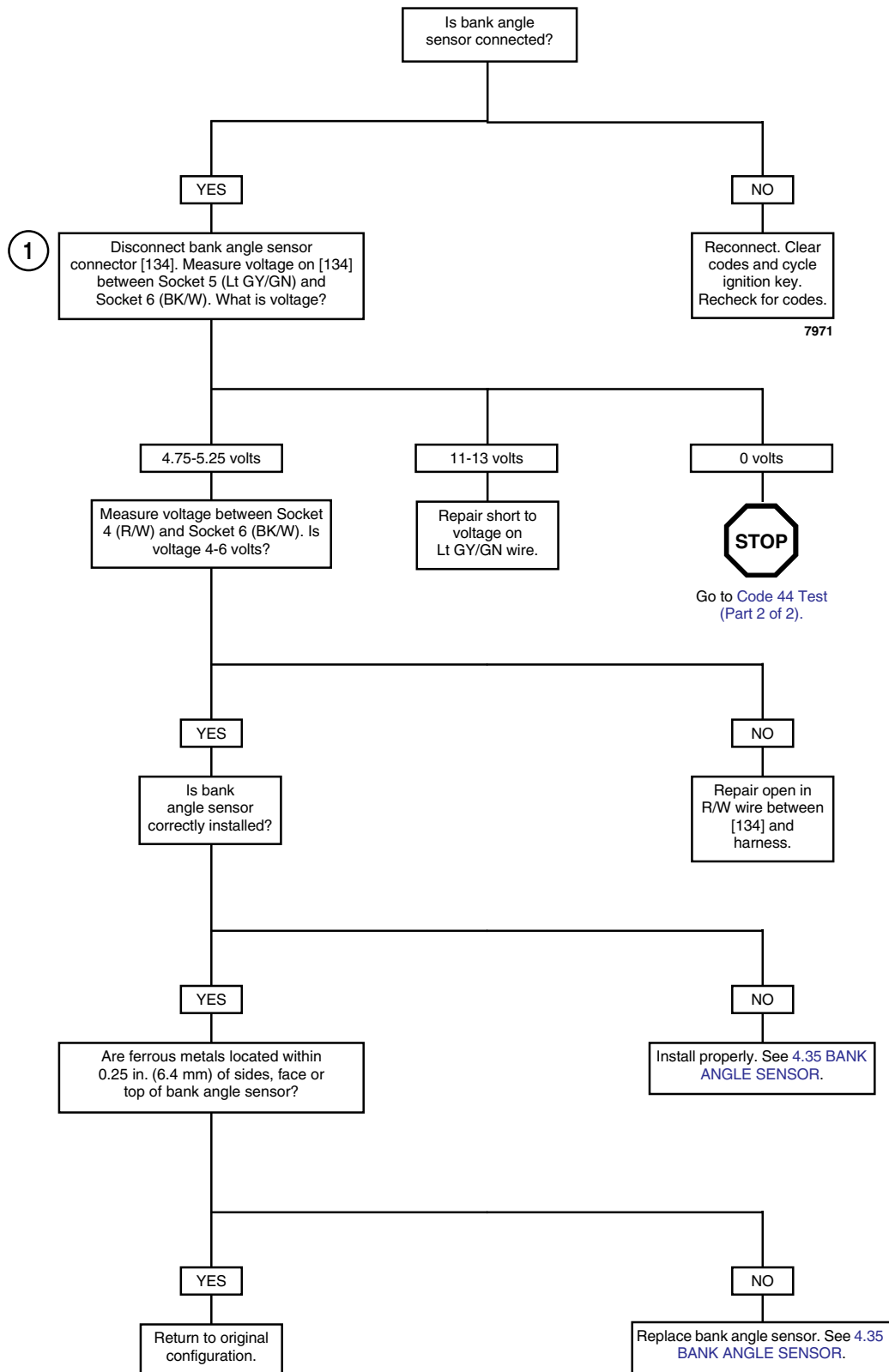


Figure 4-59. Bank Angle Sensor Circuit

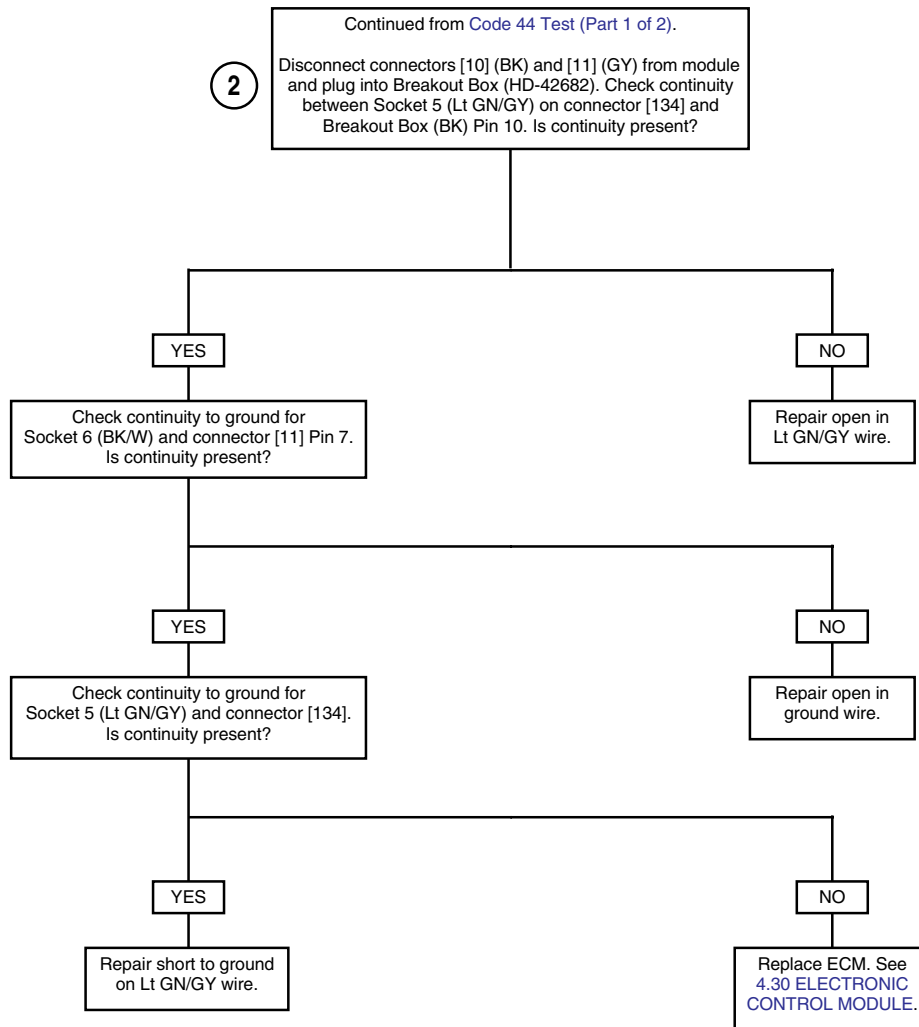
Table 4-33. Wire Harness Connectors in Figure 4-59.

NO.	DESCRIPTION	TYPE	LOCATION
[10]	ECM (black)	12-place Deutsch	under seat
[11]	ECM (gray)	12-place Deutsch	under seat
[14]	cam position sensor	3-place Deutsch	under sprocket cover
[88]	throttle position sensor	3-place Packard	right side of engine between cylinders
[134]	bank angle sensor	6-place Sumitomo	under seat

## Code 44 Test (Part 1 of 2)



## Code 44 Test (Part 2 of 2)



Clear codes and confirm proper operation with no check engine lamp. Codes can be cleared using DIGITAL TECHNICIAN (Part No. HD-44750).

## GENERAL

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### ECM Failure

All of the following codes indicate a failure which requires replacement of the ECM. See [4.30 ELECTRONIC CONTROL MODULE](#).

- Code 52 - RAM failure.
- Code 53 - ROM failure.
- Code 54 - EE PROM failure.
- Code 55 - Microprocessor failure.

## GENERAL

### Cam Sync Failure

This code occurs only when the engine is running if the electronic control module either receives an intermittent (extra or missing) signal from the cam position sensor or receives an unexpected signal. The motorcycle may continue to run, not run normally or stop running altogether.

## DIAGNOSTICS

### Diagnostic Notes

The reference numbers below correlate with the circled numbers on the Code 56 flow charts.

1. Connect BREAKOUT BOX (Part No. HD-42682) to ECM. See [4.6 BREAKOUT BOX](#).
2. Use HARNESS CONNECTOR TEST KIT (Part No. HD-41404), black pin probes and patch cord.
3. See [4.31 CAM POSITION SENSOR AND ROTOR](#).

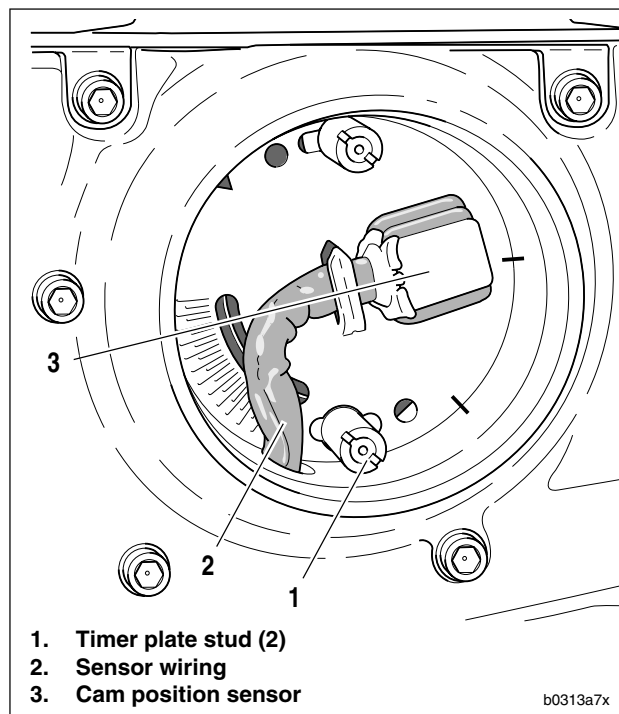


Figure 4-60. Cam Position Sensor

b1112a4x

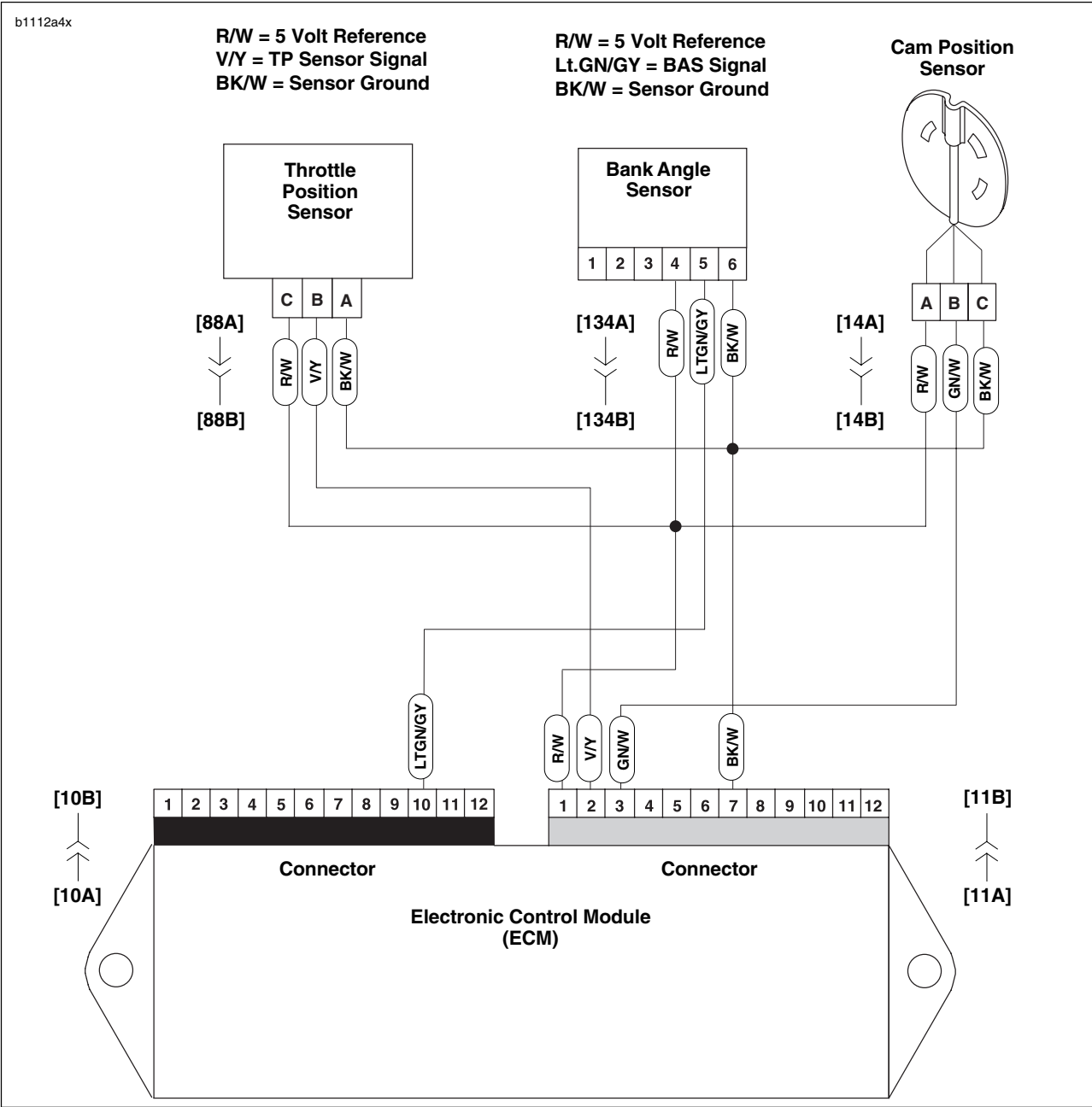


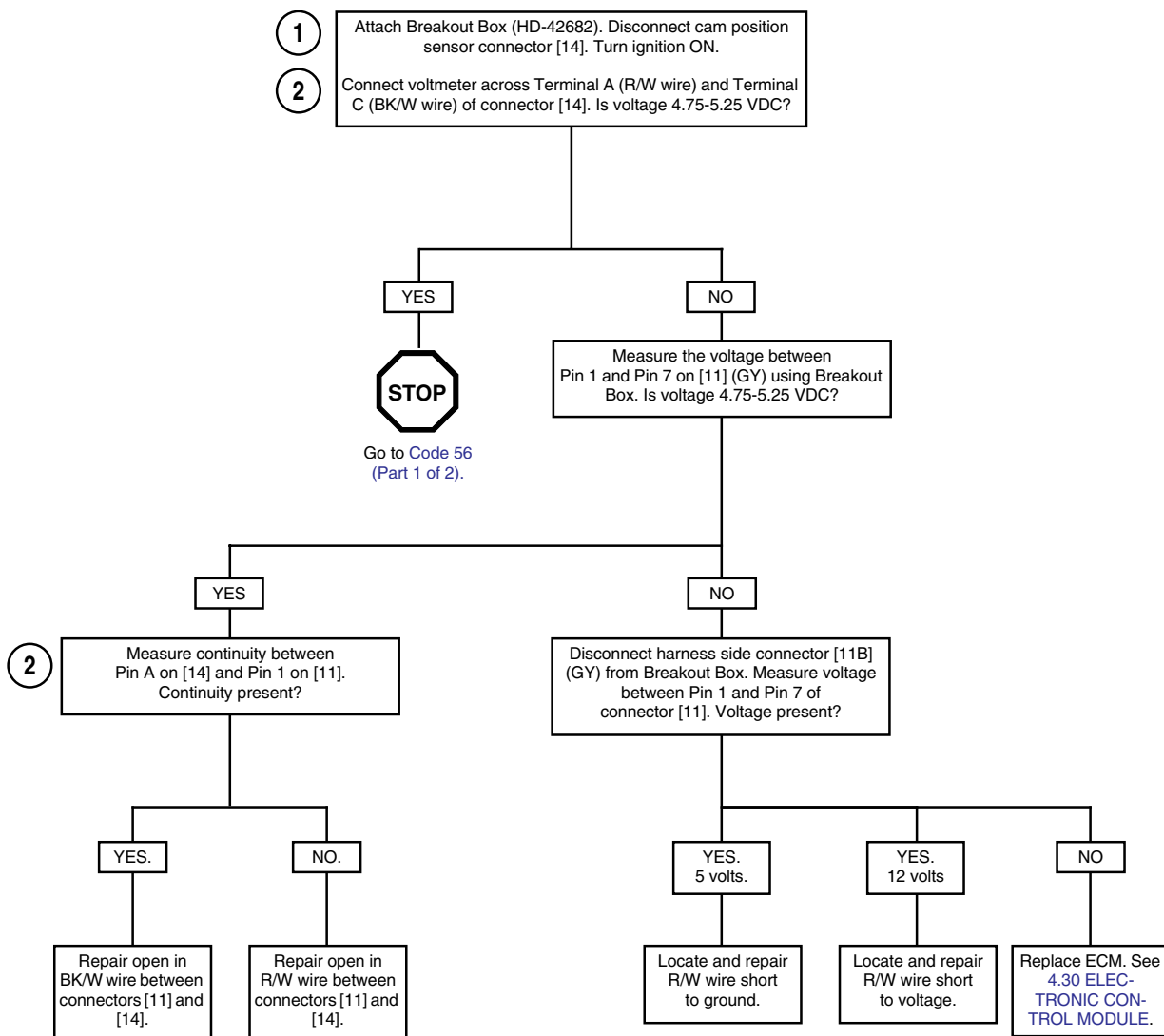
Figure 4-61. Cam Position Sensor Circuit

Table 4-34. Wire Harness Connectors in Figure 4-61.

NO.	DESCRIPTION	TYPE	LOCATION
[10]	ECM (black)	12-place Deutsch	under seat
[11]	ECM (gray)	12-place Deutsch	under seat
[14]	cam position sensor	3-place Deutsch	under sprocket cover
[88]	throttle position sensor	3-place Packard	right side of engine between cylinders
[134]	bank angle sensor	6-place Sumitomo	under seat

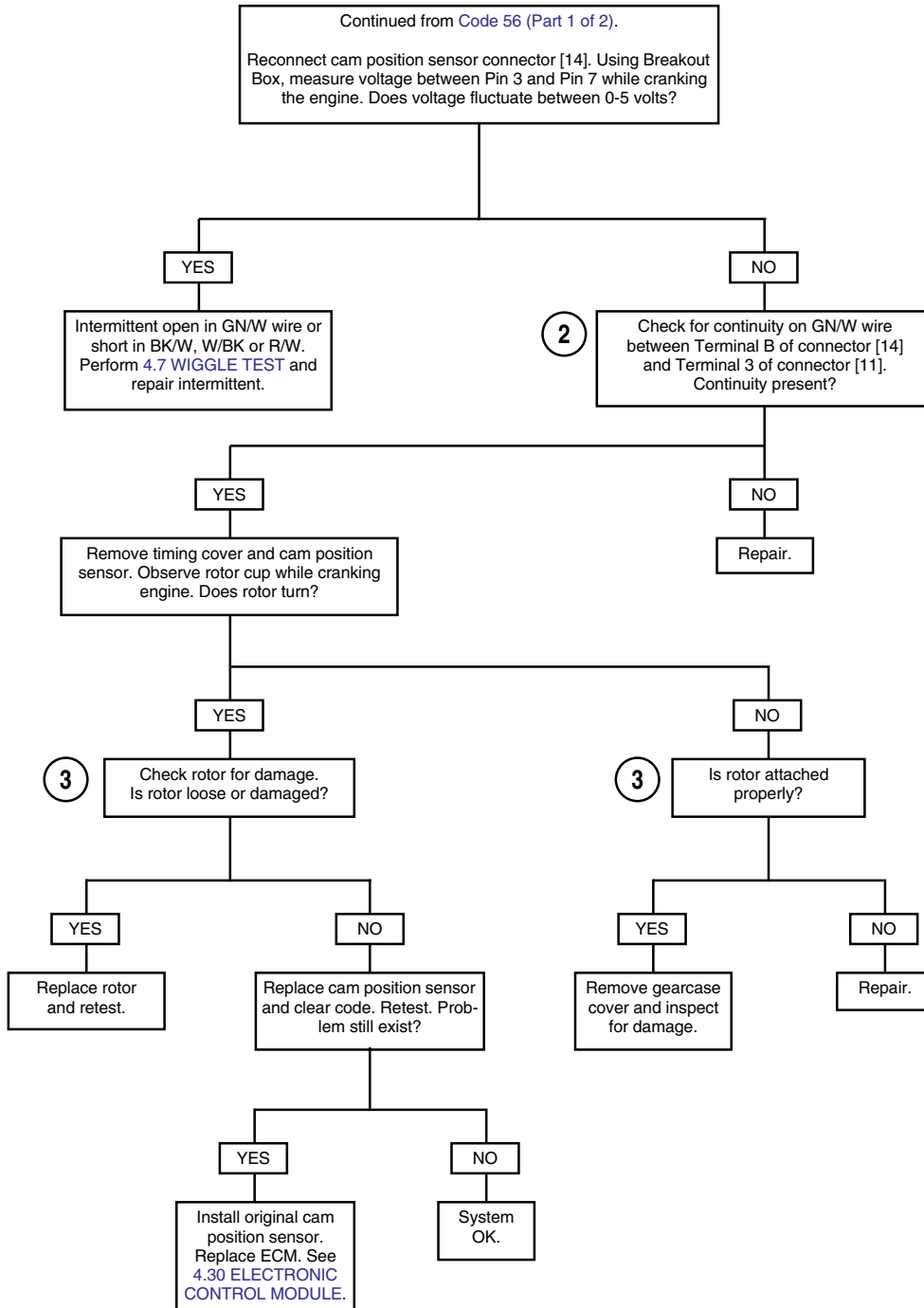


## Code 56 (Part 1 of 2)



Clear codes and confirm proper operation with no check engine lamp. Codes can be cleared using DIGITAL TECHNICIAN (Part No. HD-44750).

## Code 56 (Part 2 of 2)



Clear codes and confirm proper operation with no check engine lamp. Codes can be cleared using DIGITAL TECHNICIAN (Part No. HD-44750).