GENERAL

Throttle Position Sensor

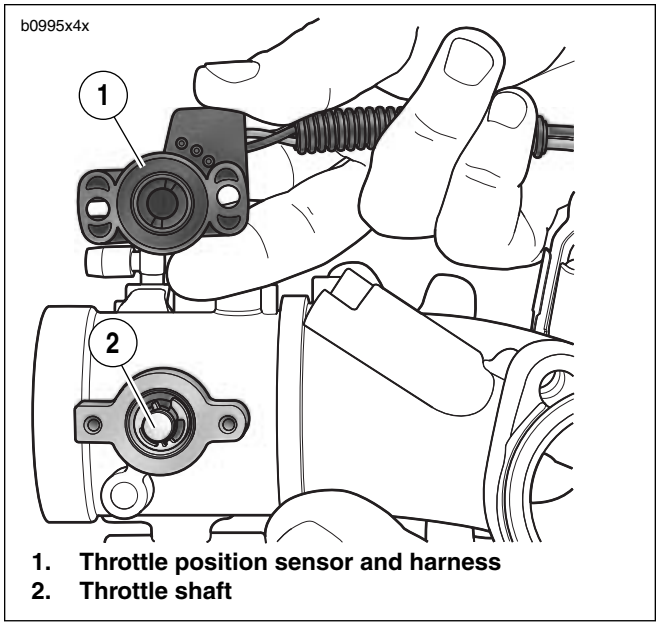
See Figure 4-31. The throttle position sensor (TP sensor) is supplied 5.0 volts from the ECM (5v REF) and sends a signal back to the ECM (TP sensor signal) which varies according to throttle position. The output signal from the TP sensor varies from:

- 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.



1. **Throttle position sensor and harness**
2. **Throttle shaft**

Figure 4-31. TP Sensor Assembly

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.

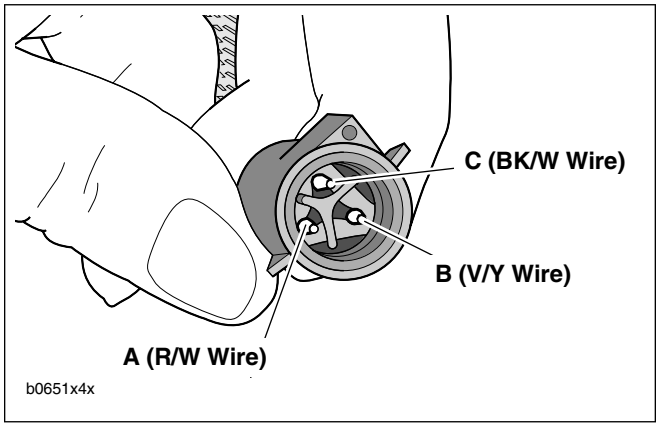


Figure 4-32. TP Sensor Terminals [88A]

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.

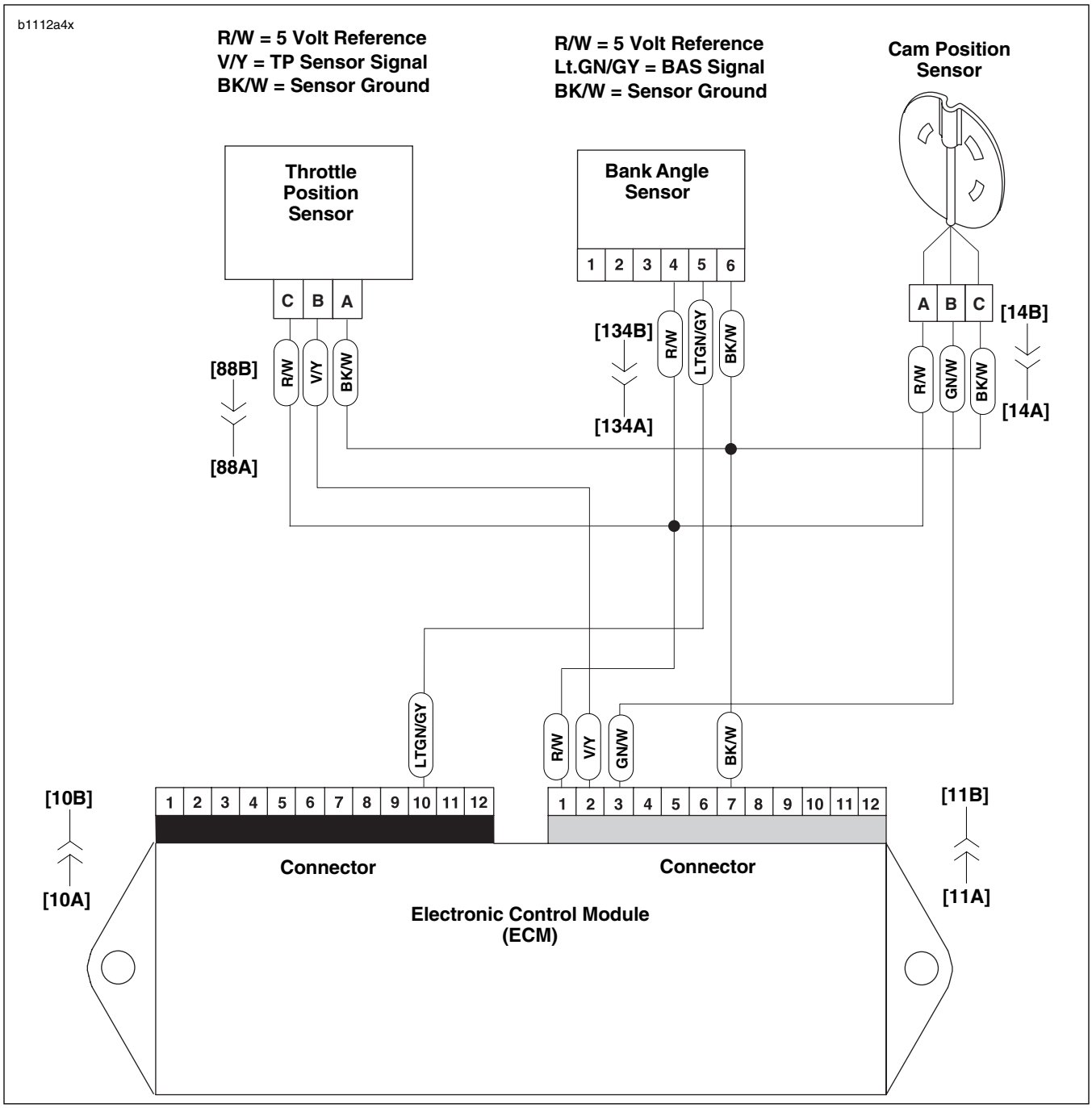
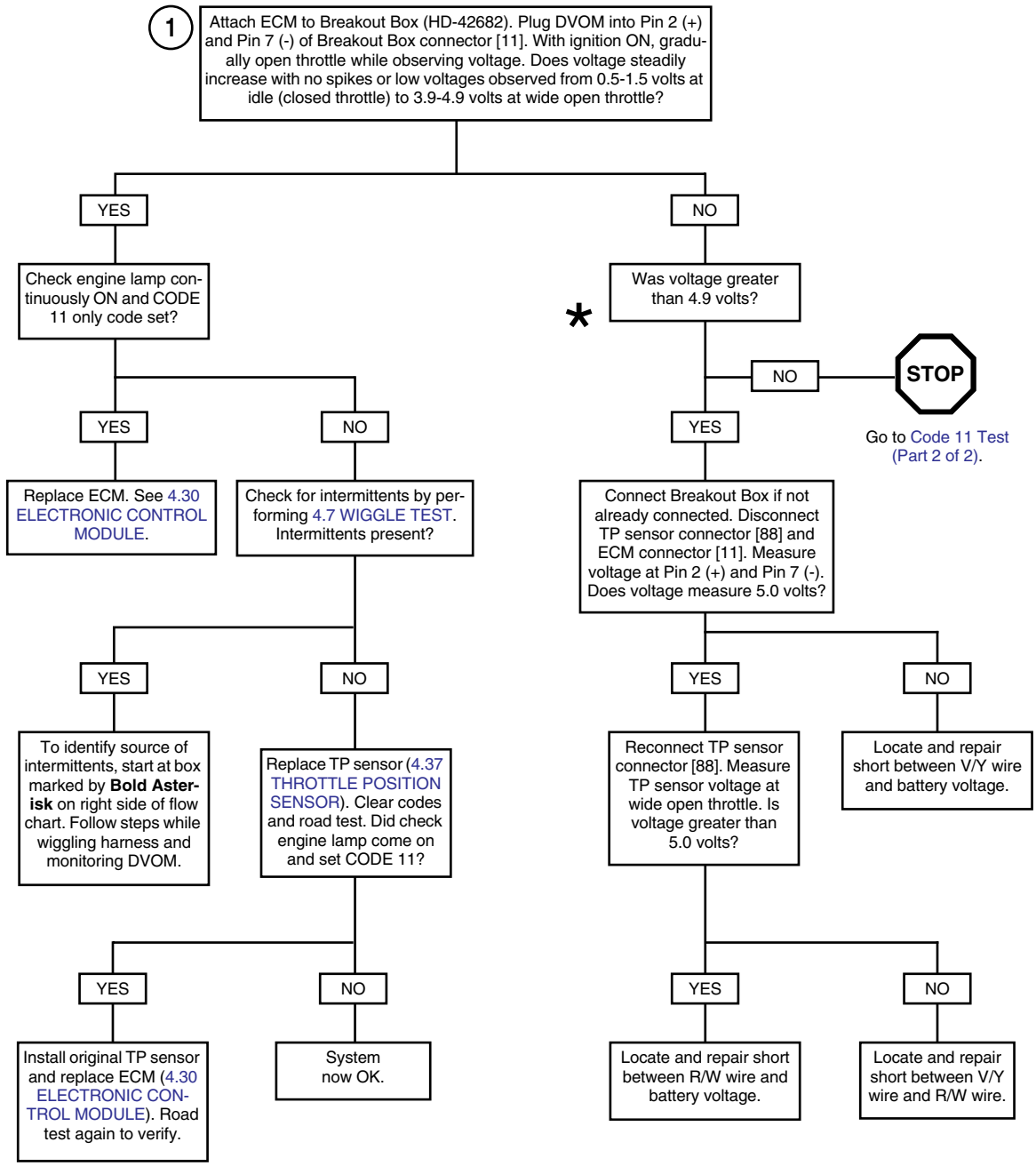


Figure 4-33. Throttle Position Sensor Circuit

Table 4-17. Wire Harness Connectors in Figure 4-33.

NO.	DESCRIPTION	TYPE	LOCATION
[10]	ECM (black)	12-place Deutsch	in fairing
[11]	ECM (gray)	12-place Deutsch	in fairing
[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	in fairing

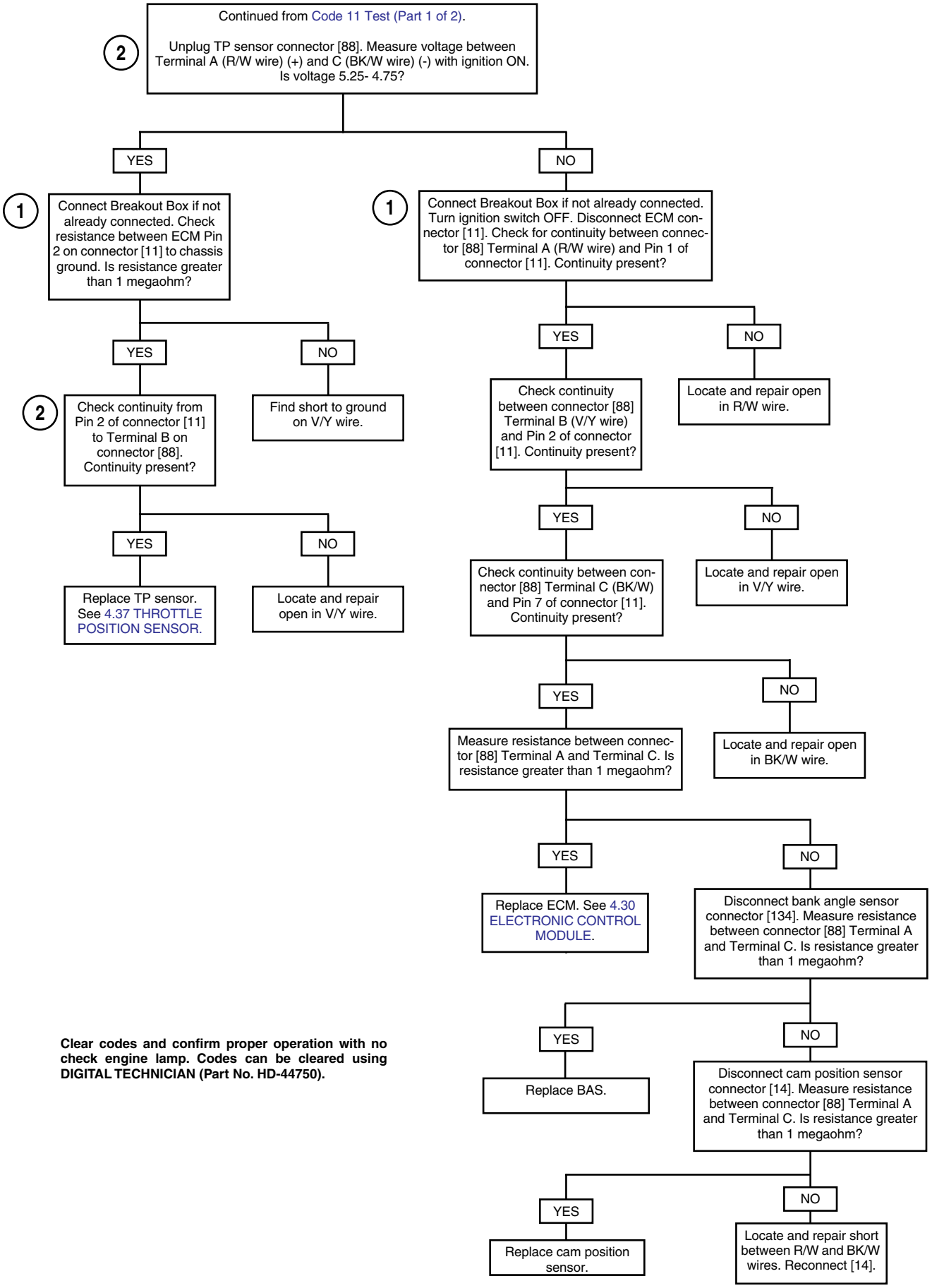
Code 11 Test (Part 1 of 2)



* **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)



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

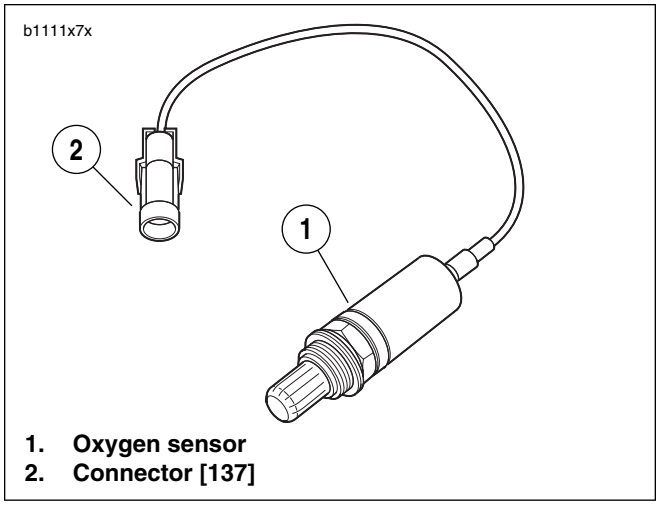
GENERAL

Oxygen Sensor

See Figure 4-34. 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.



1. Oxygen sensor
2. Connector [137]

Figure 4-34. Oxygen Sensor

DIAGNOSTICS

Diagnostic Tips

The DVOM displays the signal from the oxygen 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 oxygen sensor failure.

Check for the following conditions:

- **Poor connection.** Inspect the ECM harness connector [11], fuel injector connectors [84, 85] and oxygen 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 oxygen sensor.** See Figure 4-35. If the oxygen sensor is loose engine performance may be affected. This could also show up as a slow changing oxygen 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 oxygen sensor will read a lean condition, causing the system to go rich.

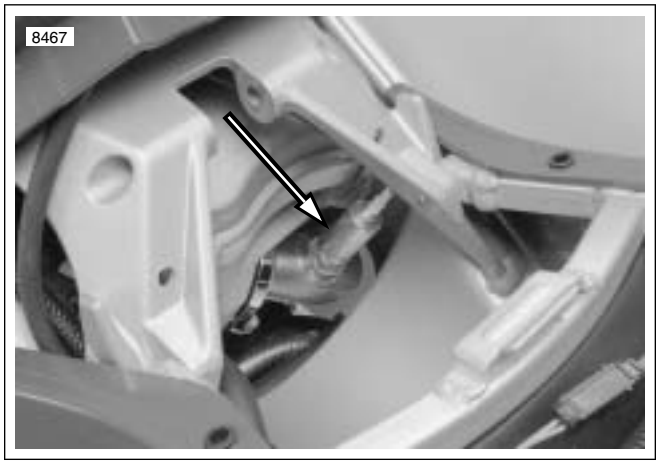


Figure 4-35. Oxygen Sensor (shock absorber removed)

Diagnostic Notes

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

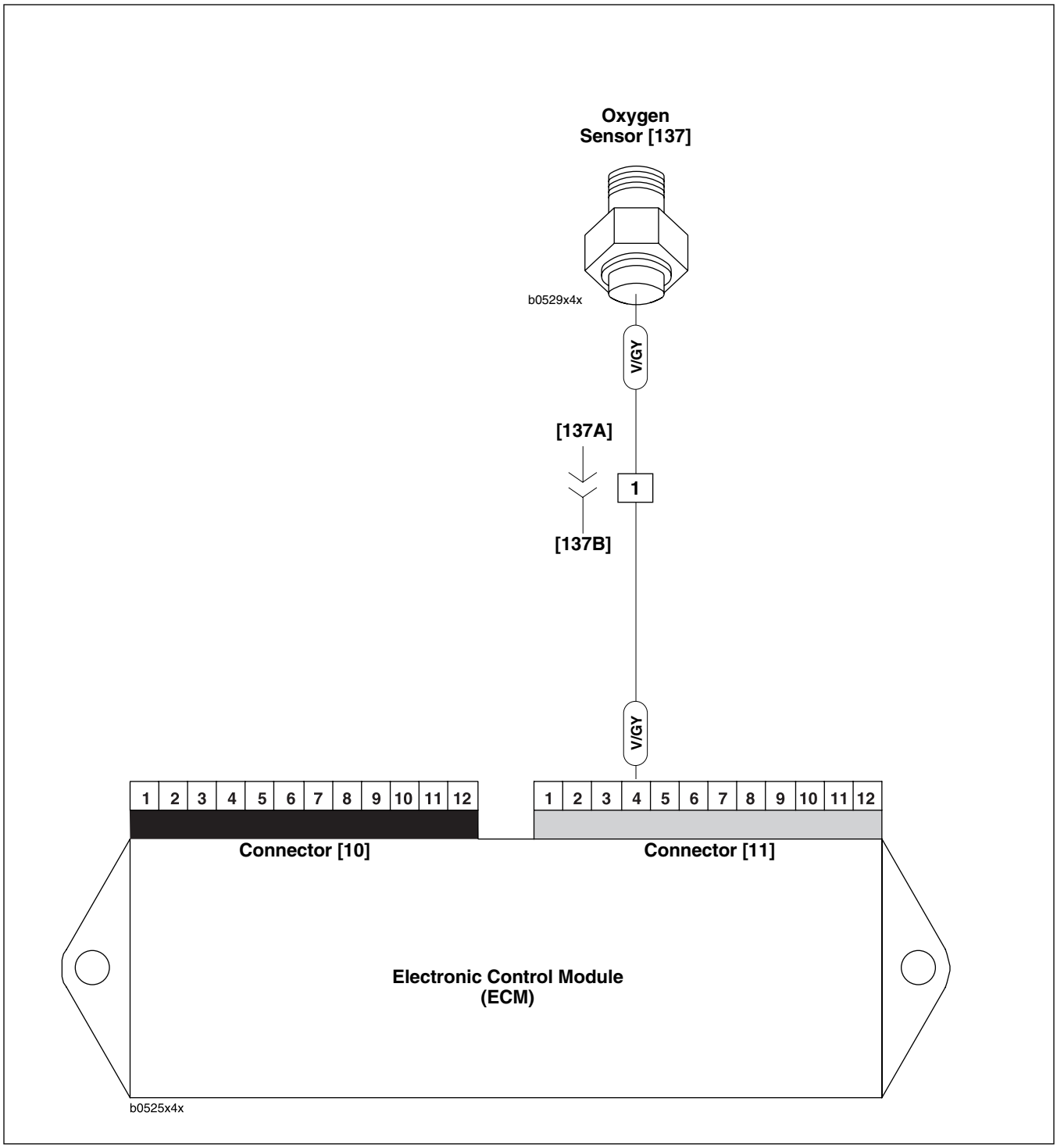
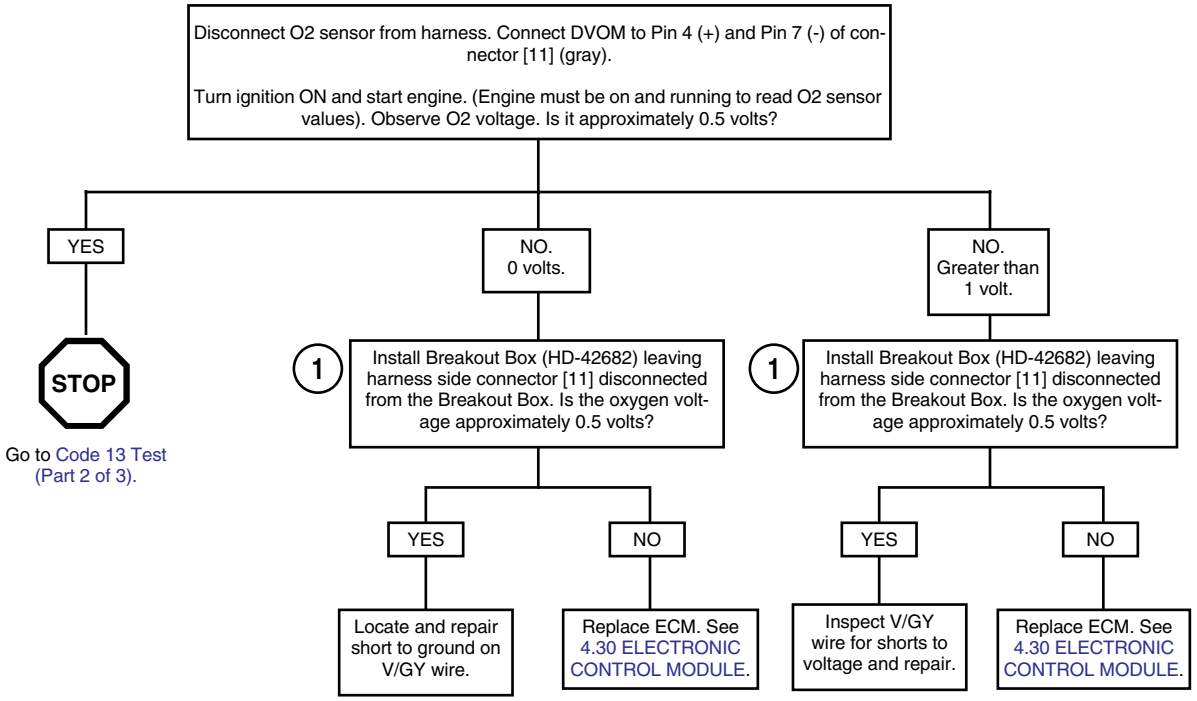


Figure 4-36. Oxygen Sensor Circuit

Table 4-18. Wire Harness Connectors in Figure 4-36.

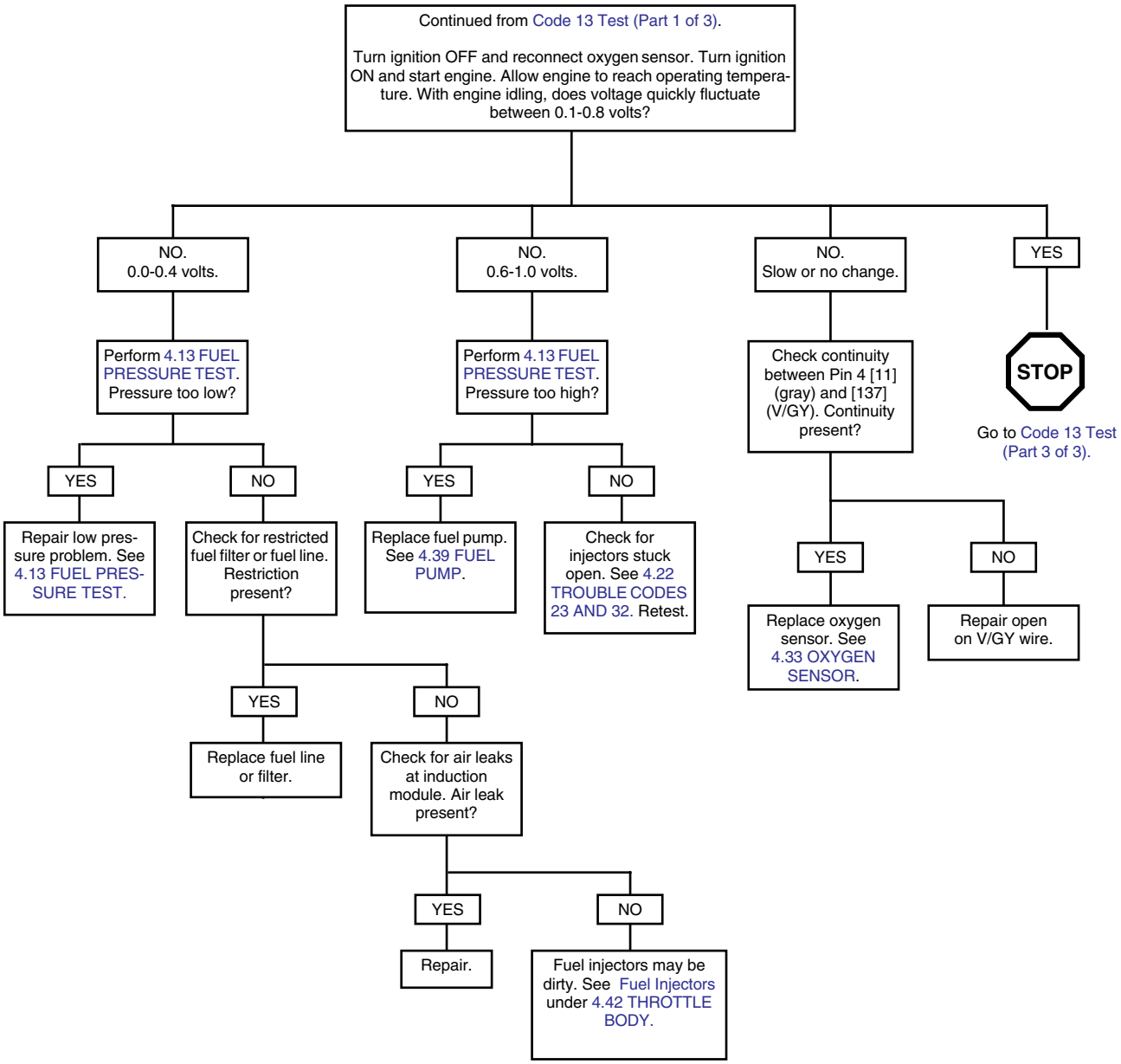
NO.	DESCRIPTION	TYPE	LOCATION
[11]	ECM (gray)	12-place Deutsch	in fairing
[137]	oxygen sensor	1-place Packard	behind rear cylinder head

Code 13 Test (Part 1 of 3)



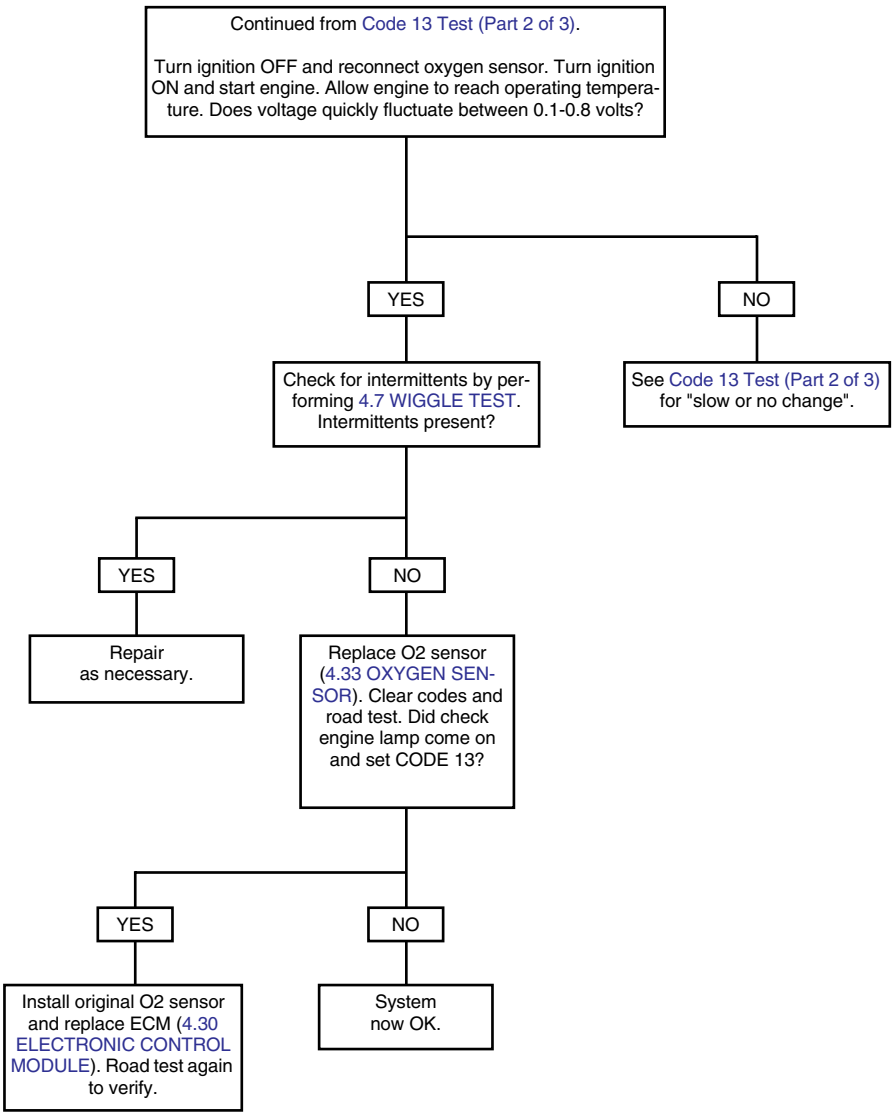
Clear codes and confirm proper operation with no check engine lamp. Codes can be cleared using DIGITAL TECHNICIAN (Part No. HD-44750).

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

NOTE

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

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 4-19. 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.

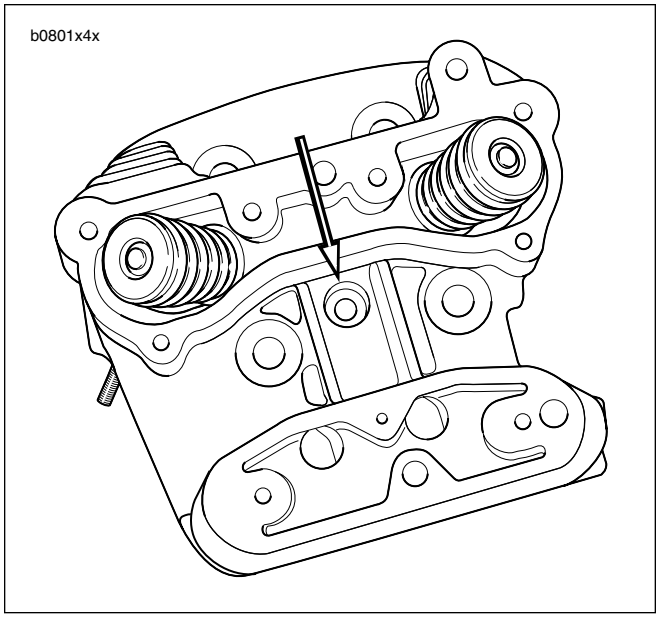


Figure 4-37. Location of Engine Temperature Sensor in Rear Cylinder Head

Table 4-19. 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]).

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.

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), gray pin probes and patch cord.

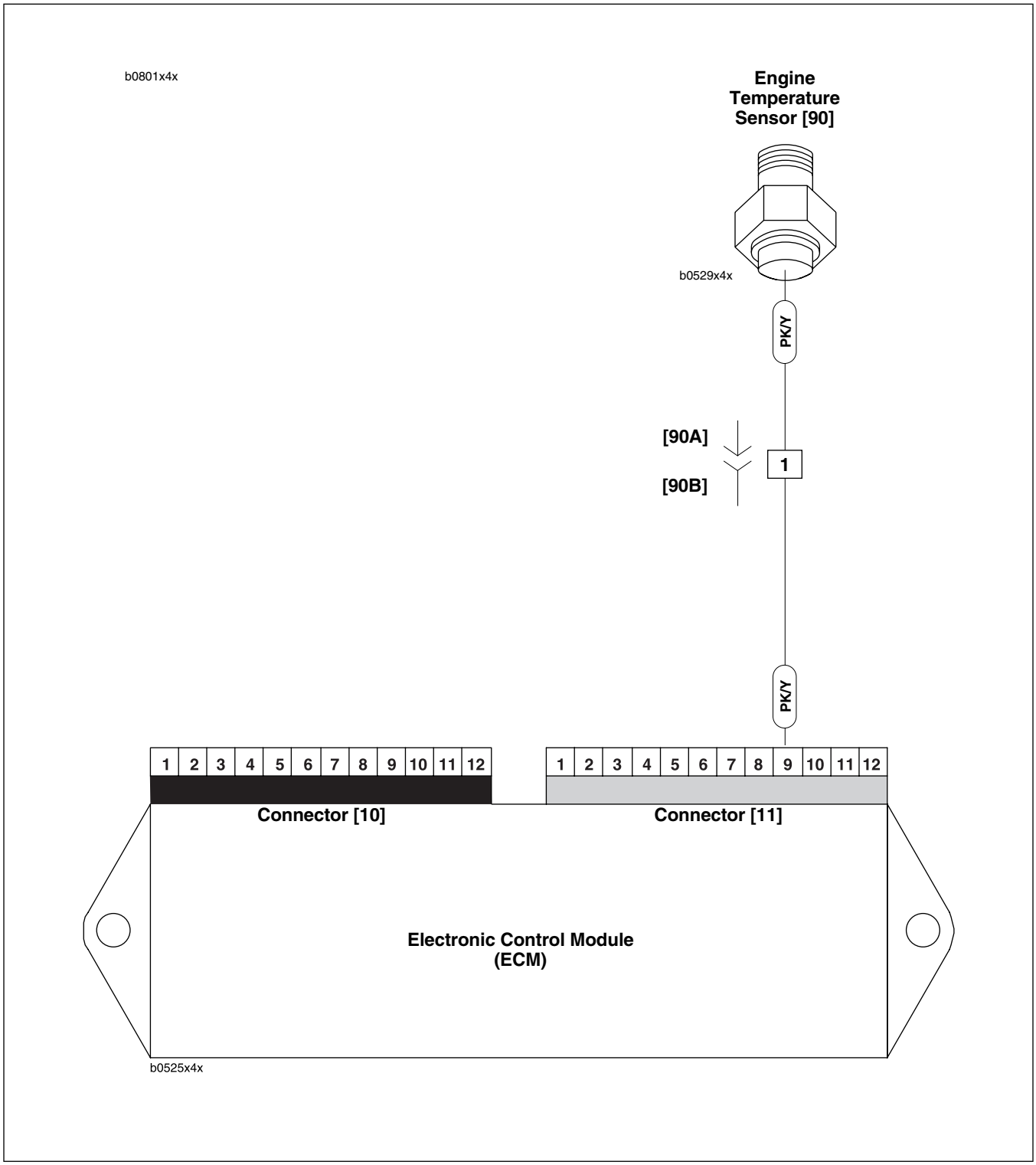
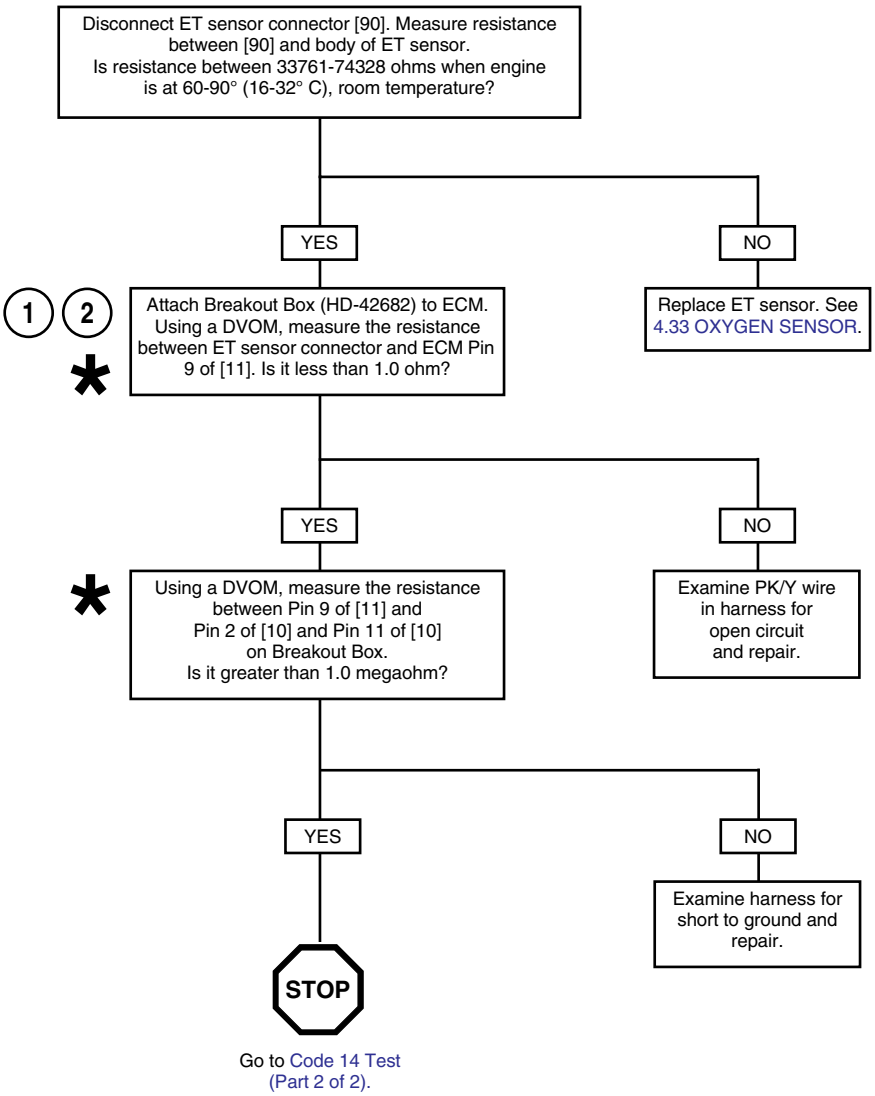


Figure 4-38. Engine Temperature Sensor Circuit

Table 4-20. Wire Harness Connectors in Figure 4-38.

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

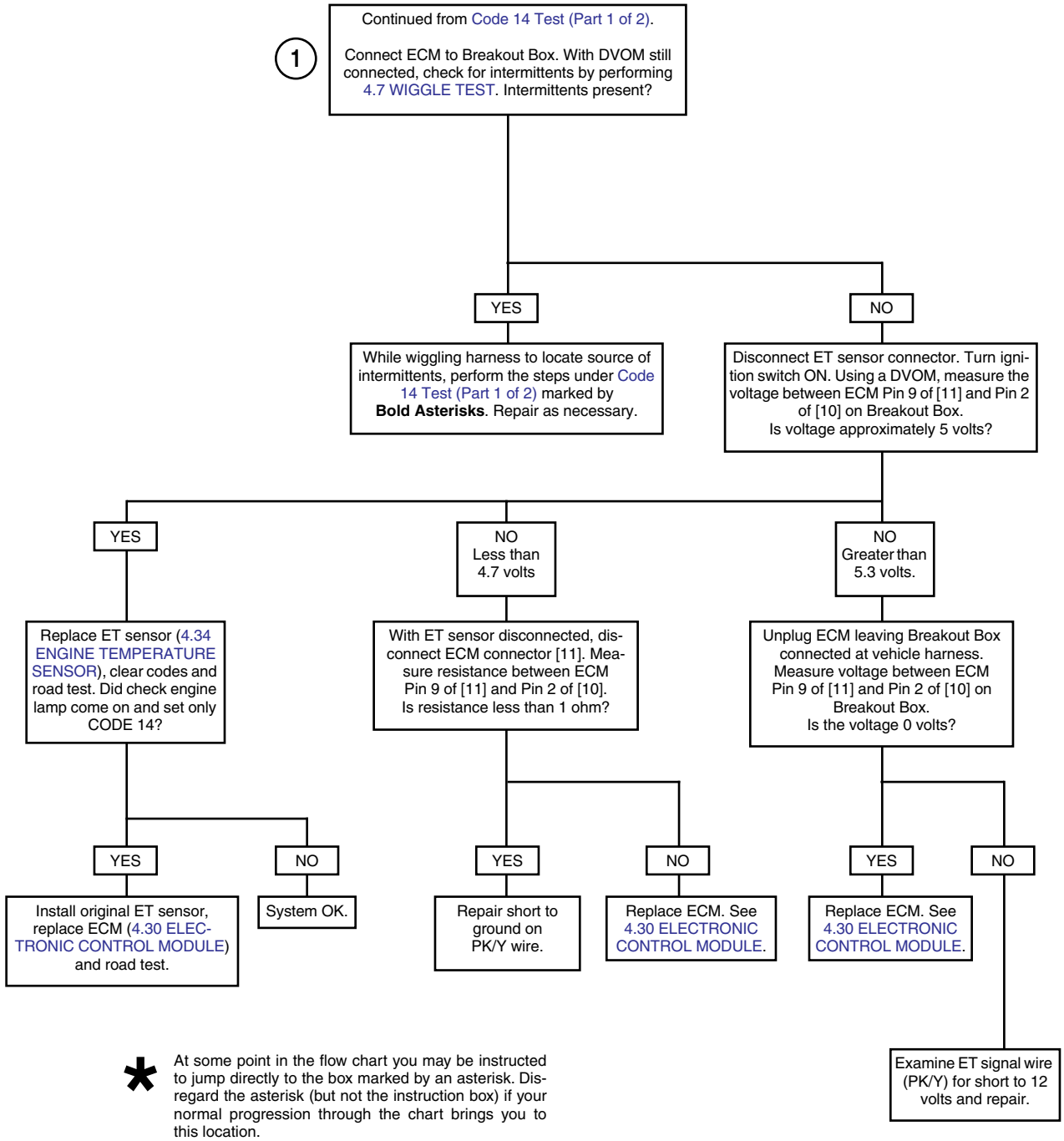
Code 14 Test (Part 1 of 2)



* 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

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]).

See Table 4-21. 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 4-21. 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]).

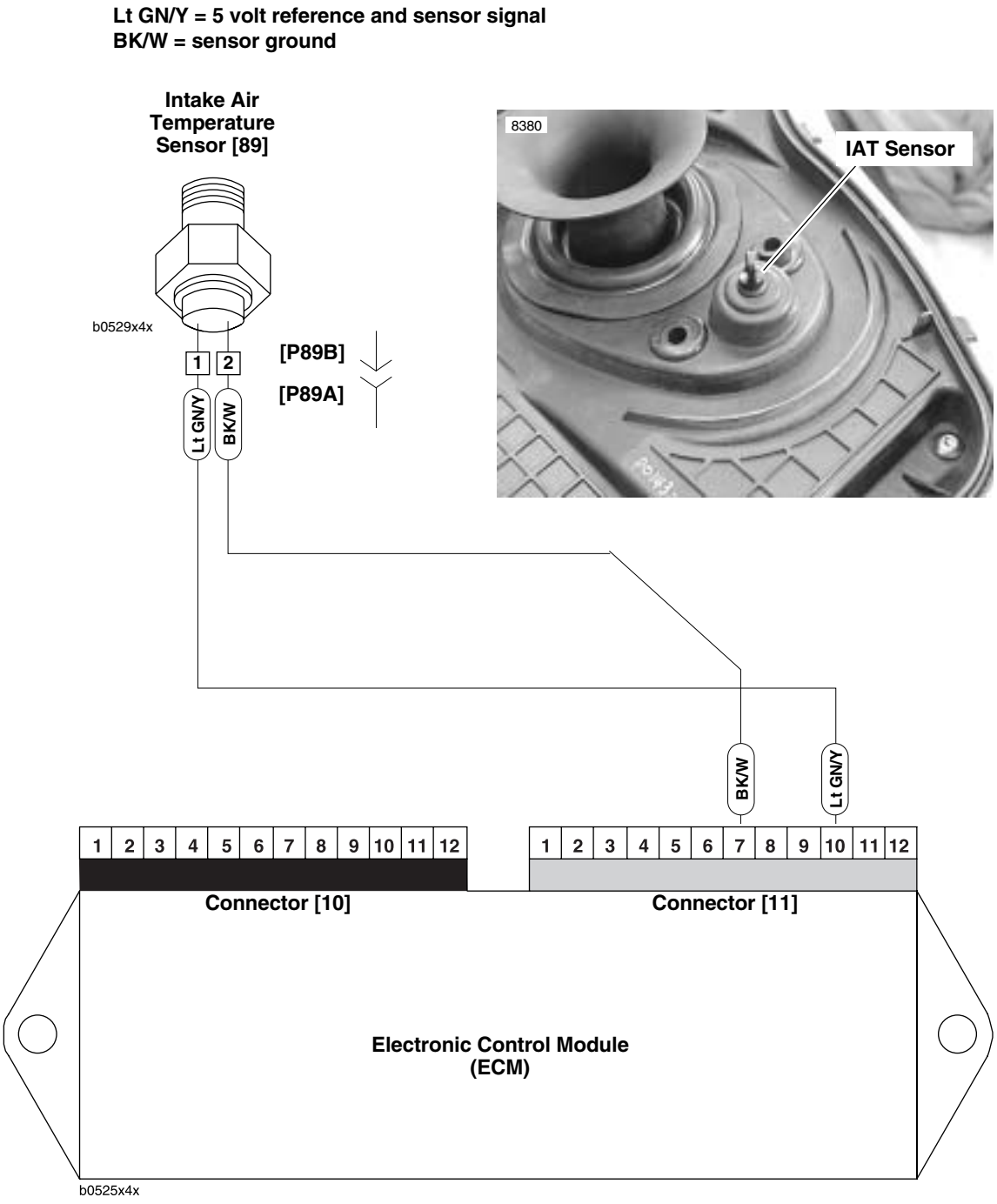
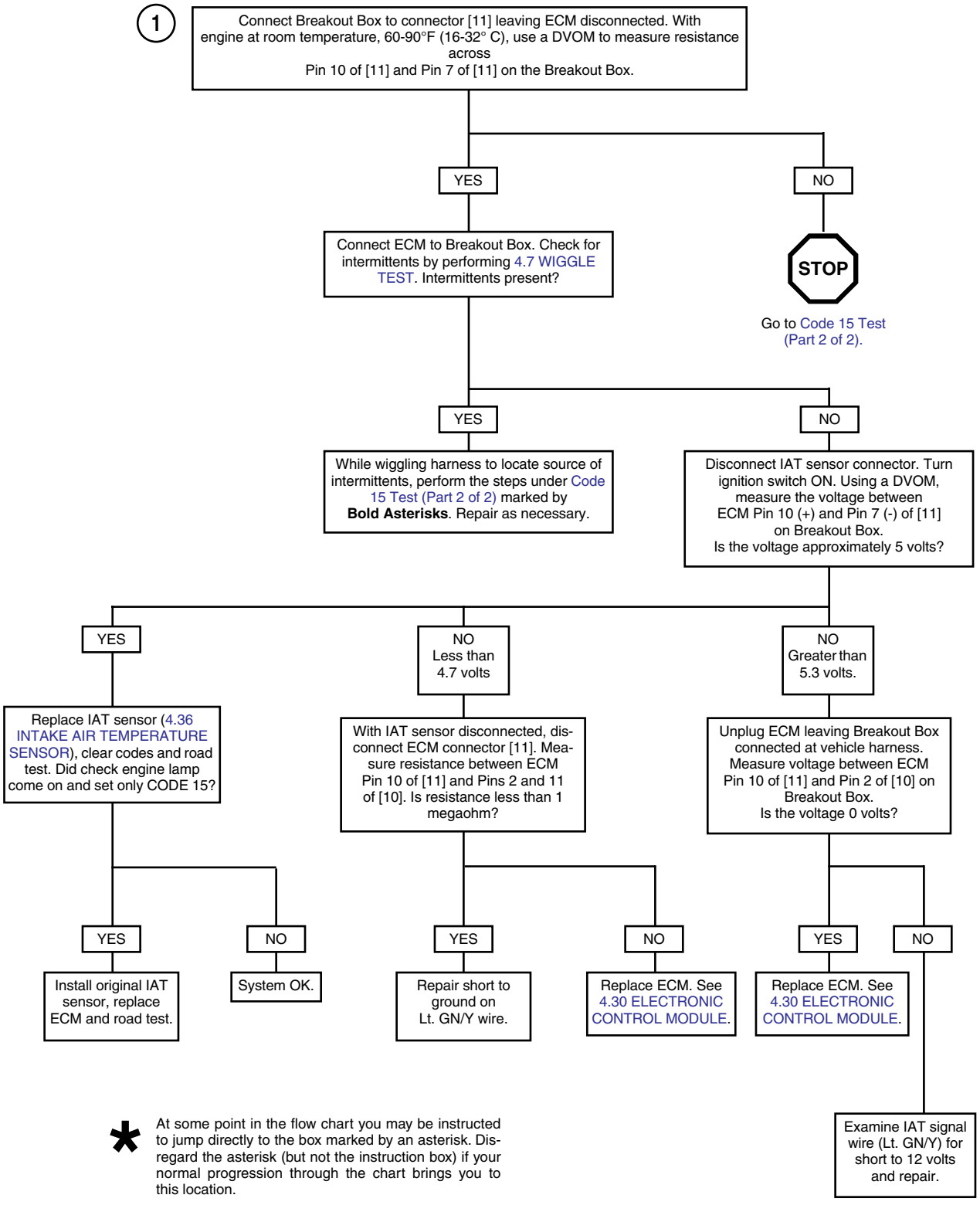


Figure 4-39. Intake Air Temperature Sensor Circuit

Table 4-22. Wire Harness Connectors in Figure 4-39.

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

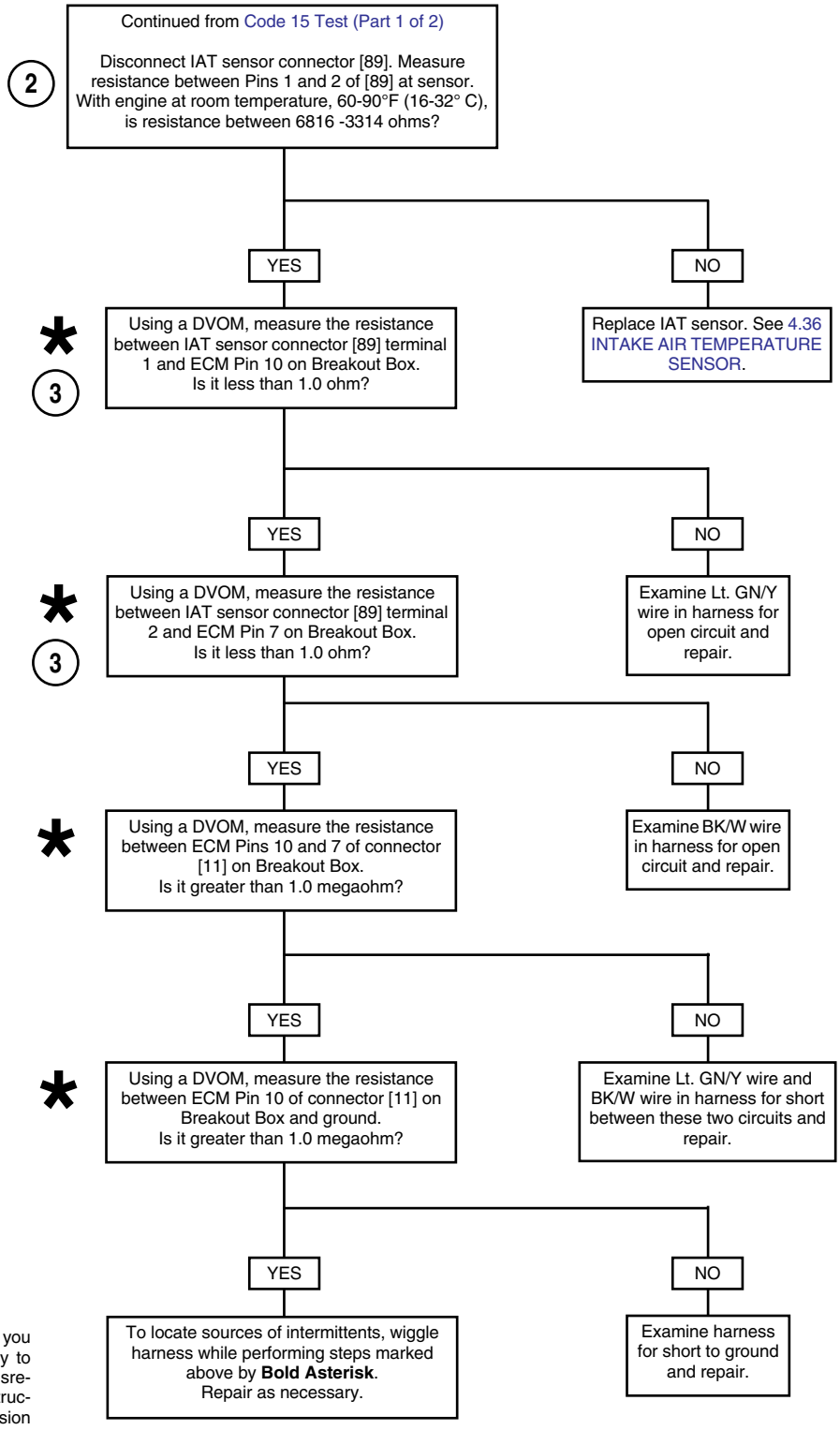
Code 15 Test (Part 1 of 2)



* 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 15 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).

TROUBLE CODE 16 4.20

GENERAL

Battery Voltage

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

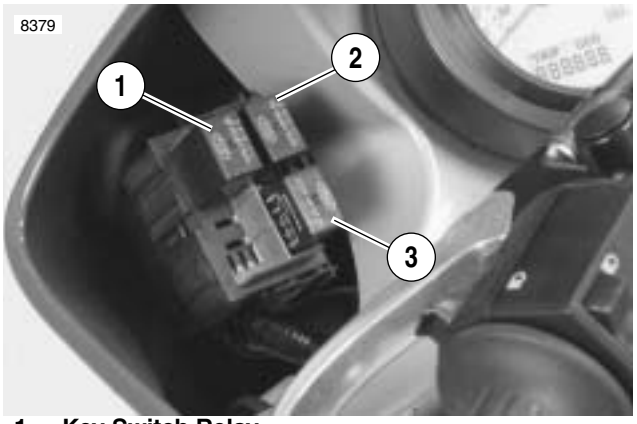
- A low voltage condition typically occurs during activation of the starter or generally indicates loose wire connections.
- A high voltage condition is usually caused by a faulty voltage regulator.

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.



1. **Key Switch Relay**
2. **Ignition Relay**
3. **Start Relay**

Figure 4-40. Electrical Relays

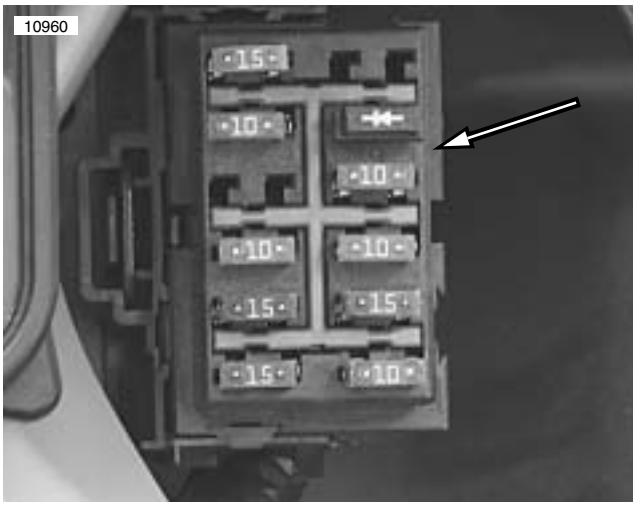


Figure 4-41. Fuse Block

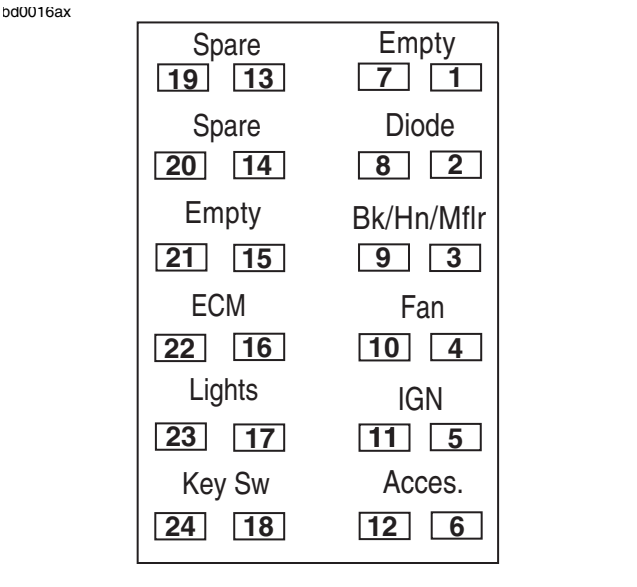


Figure 4-42. Fuses and Diode

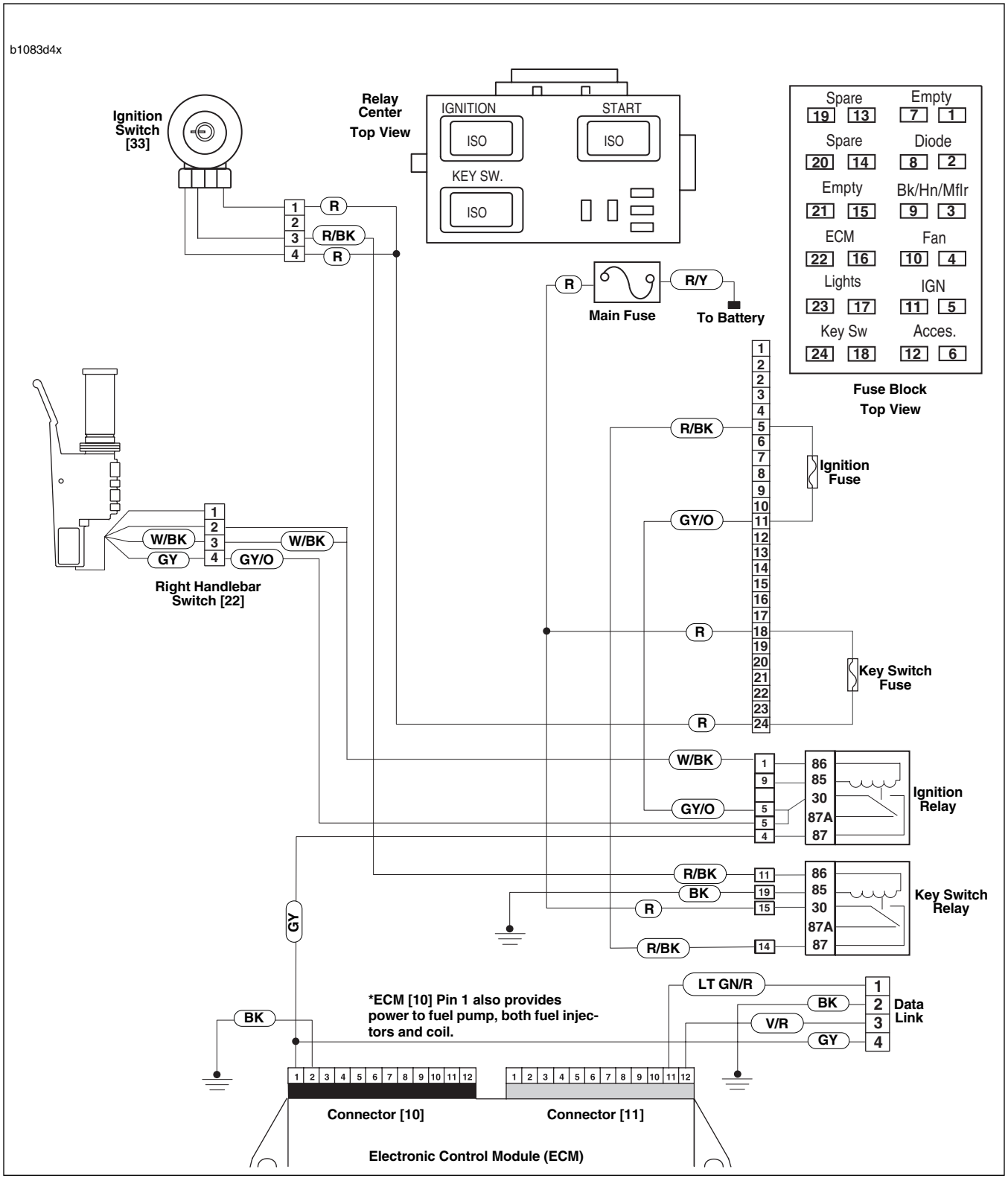
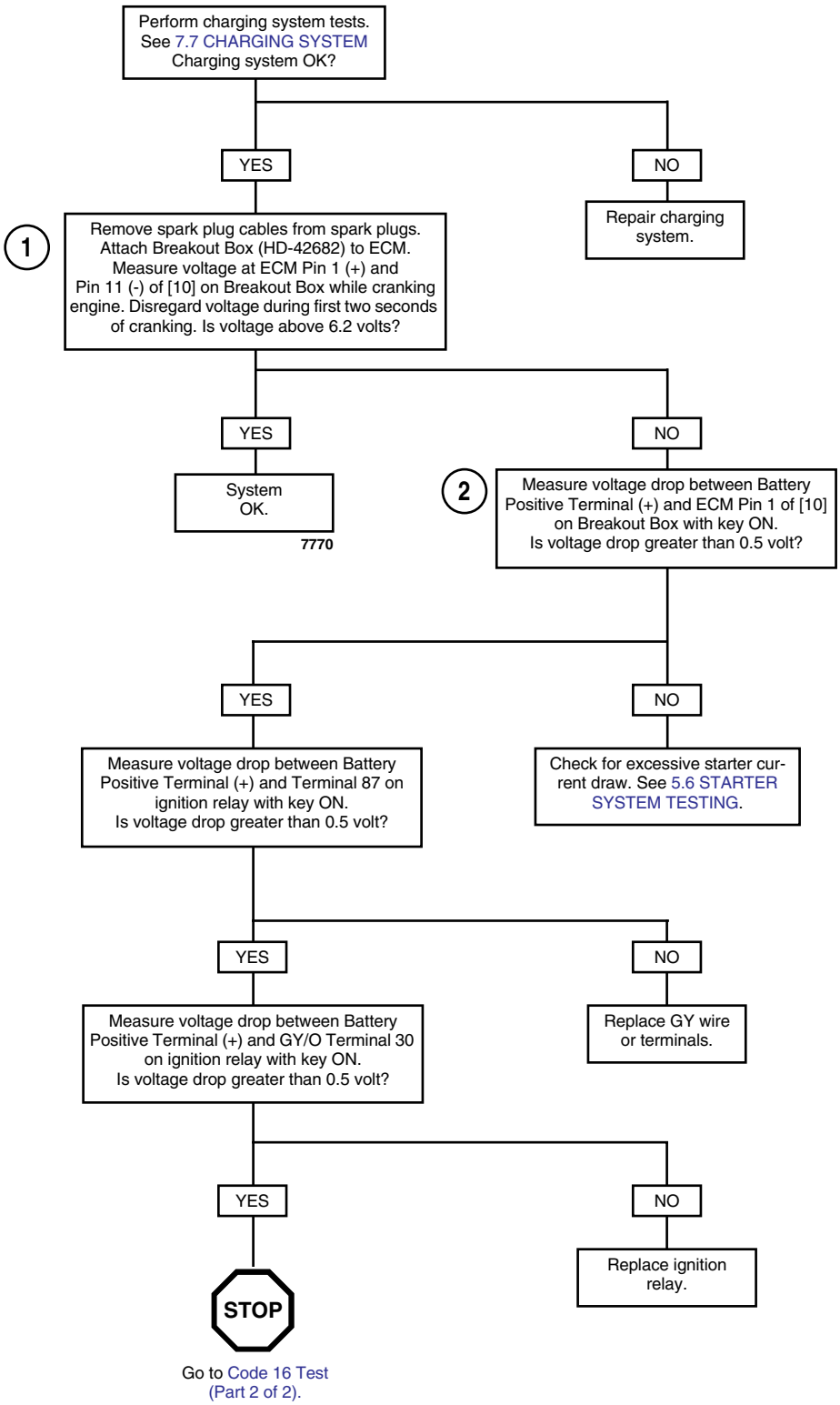


Figure 4-43. Battery Voltage Circuit

Table 4-23. Wire Harness Connectors in Figure 4-43.

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

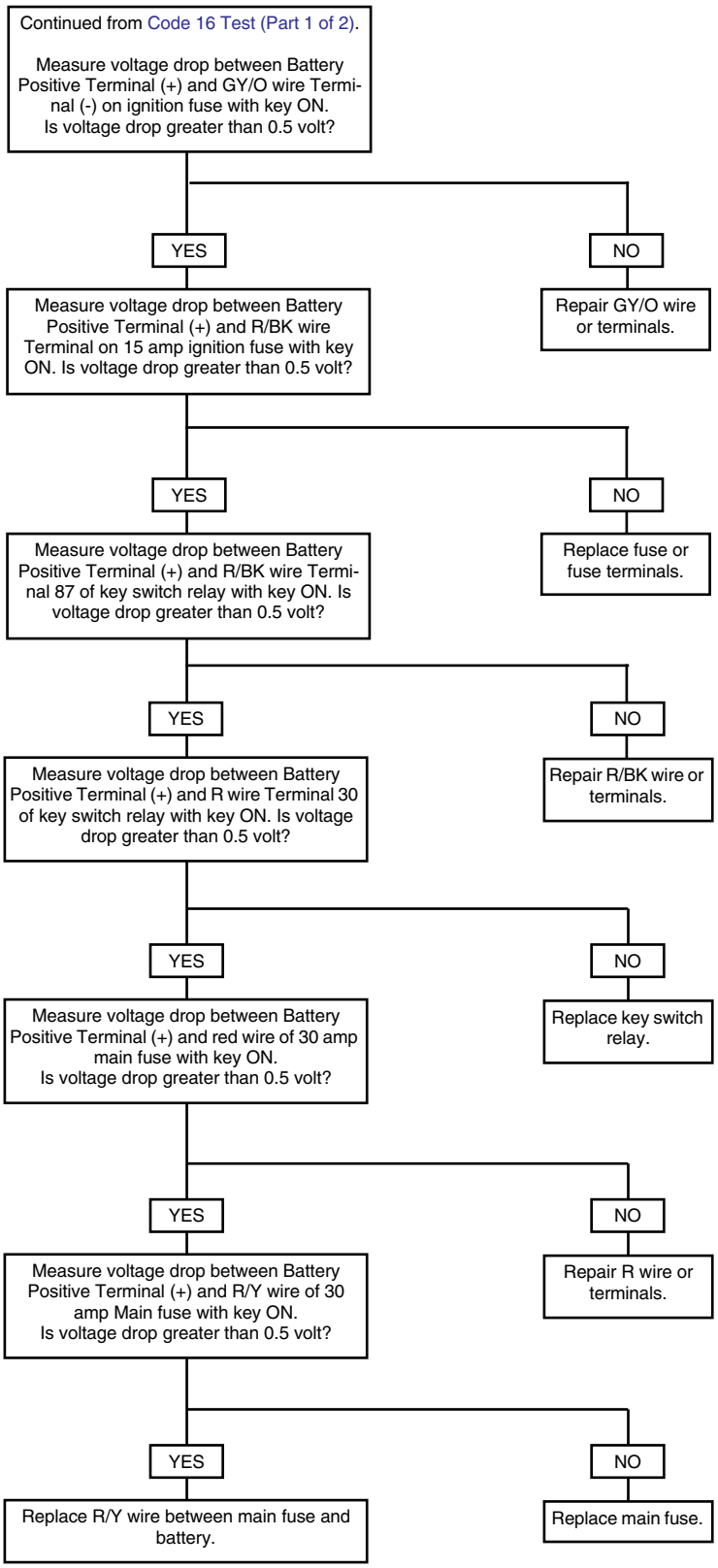
Code 16 Test (Part 1 of 2)



Go to 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).

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).

TROUBLE CODE 21 4.21

GENERAL

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

Active Muffler Control (XB12 Models Only)

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.
- Electrical fault in the brake light or horn circuits.
- Blown fuse.

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.

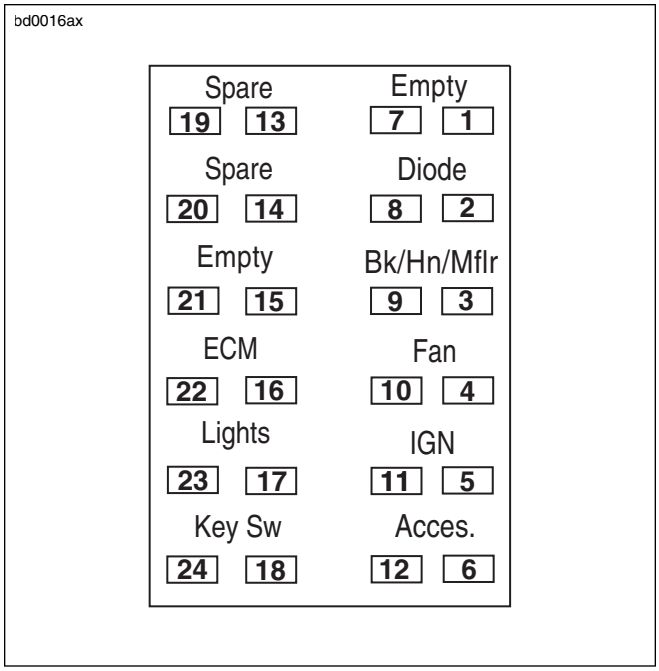


Figure 4-44. Fuses and Diode

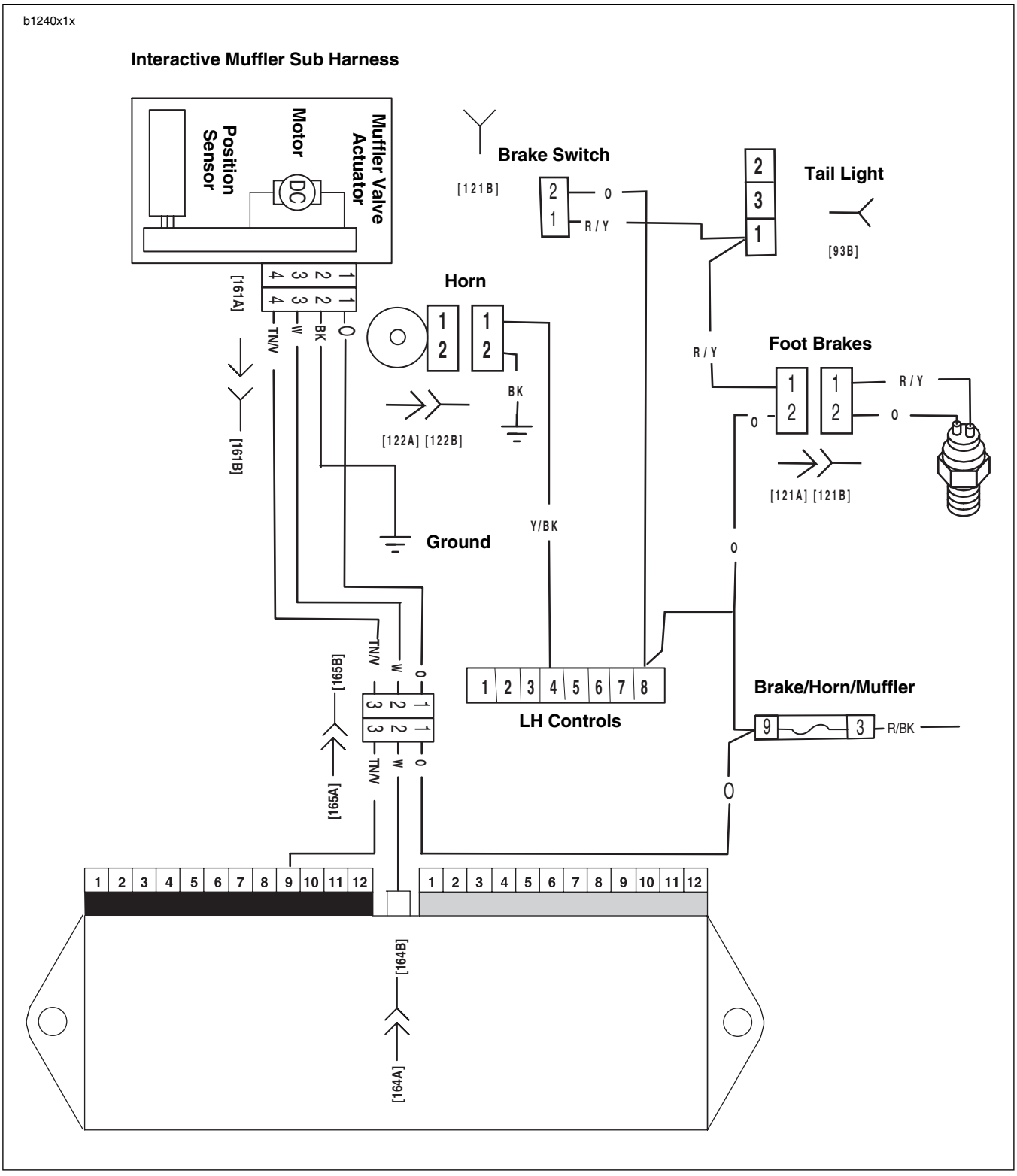
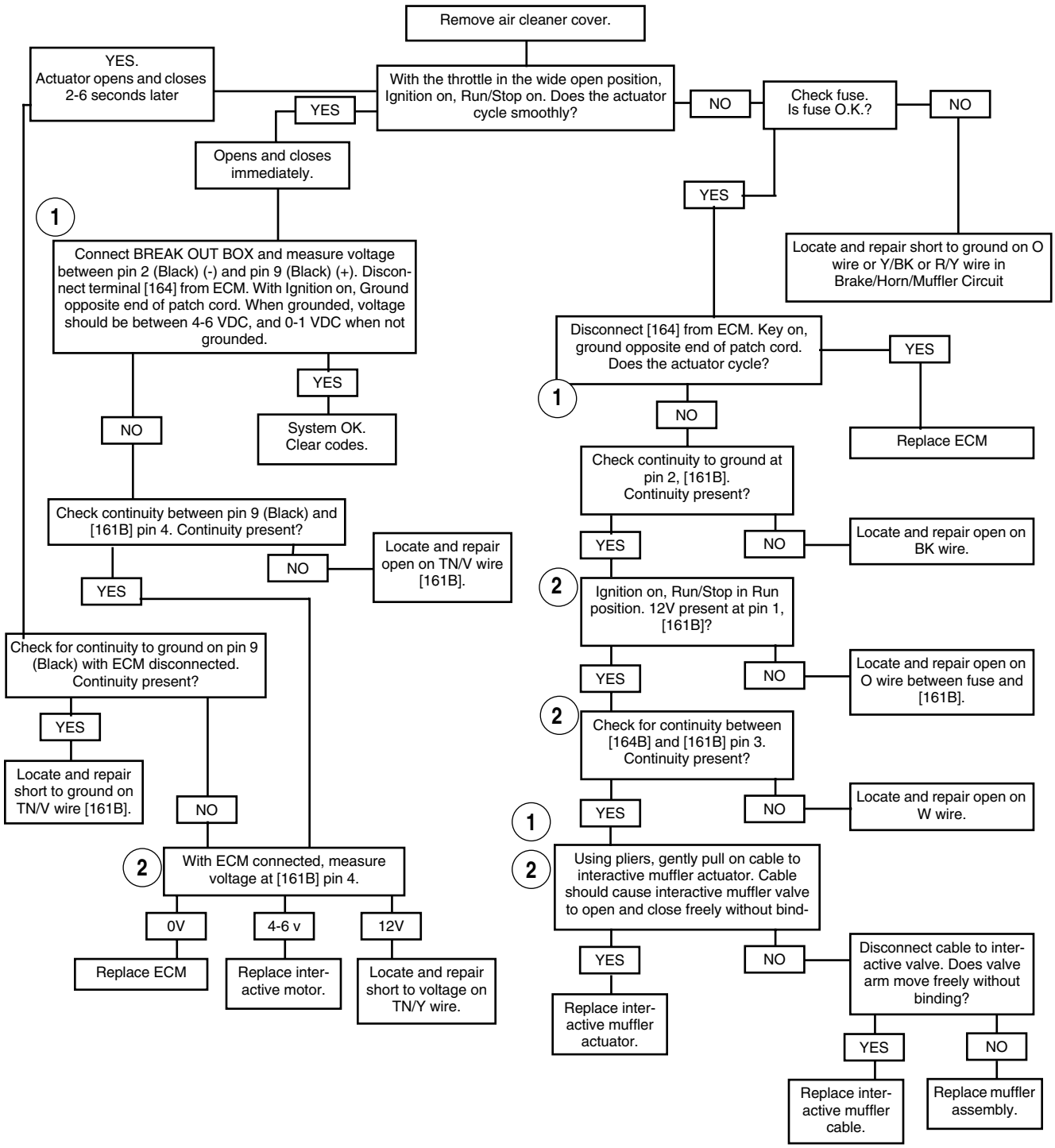


Figure 4-45. Interactive Exhaust Circuit

Table 4-24. Wire Harness Connectors in Figure 4-45.

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

Code 21 Test


Remove air cleaner cover.
With the throttle in the wide open position, Ignition on, Run/Stop on. Does the actuator cycle smoothly?
YES.
Actuator opens and closes 2-6 seconds later
YES
Opens and closes immediately.
NO
Check fuse. Is fuse O.K.?
NO
YES
Locate and repair short to ground on O wire or Y/BK or R/Y wire in Brake/Horn/Muffler Circuit
1
Connect BREAK OUT BOX and measure voltage between pin 2 (Black) (-) and pin 9 (Black) (+). Disconnect terminal [164] from ECM. With Ignition on, Ground opposite end of patch cord. When grounded, voltage should be between 4-6 VDC, and 0-1 VDC when not grounded.
YES
System OK. Clear codes.
NO
Check continuity between pin 9 (Black) and [161B] pin 4. Continuity present?
NO
Locate and repair open on TN/V wire [161B].
YES
Check for continuity to ground on pin 9 (Black) with ECM disconnected. Continuity present?
YES
Locate and repair short to ground on TN/V wire [161B].
NO
2
With ECM connected, measure voltage at [161B] pin 4.
0V
4-6 v
12V
Replace ECM
Replace interactive motor.
Locate and repair short to voltage on TN/Y wire.
Disconnect [164] from ECM. Key on, ground opposite end of patch cord. Does the actuator cycle?
YES
Replace ECM
1
NO
Check continuity to ground at pin 2, [161B]. Continuity present?
YES
NO
Locate and repair open on BK wire.
2
Ignition on, Run/Stop in Run position. 12V present at pin 1, [161B]?
YES
NO
Locate and repair open on O wire between fuse and [161B].
2
Check for continuity between [164B] and [161B] pin 3. Continuity present?
YES
NO
Locate and repair open on W wire.
1
2
Using pliers, gently pull on cable to interactive muffler actuator. Cable should cause interactive muffler valve to open and close freely without binding.
YES
NO
Replace interactive muffler actuator.
Disconnect cable to interactive valve. Does valve arm move freely without binding?
YES
NO
Replace interactive muffler cable.
Replace muffler assembly.

GENERAL

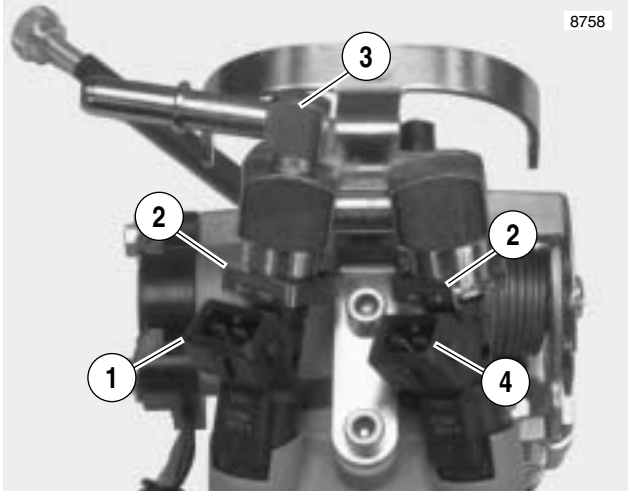
Front Fuel Injector (Code 23) And Rear Fuel Injector (Code 32)

See Figure 4-46. 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.

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

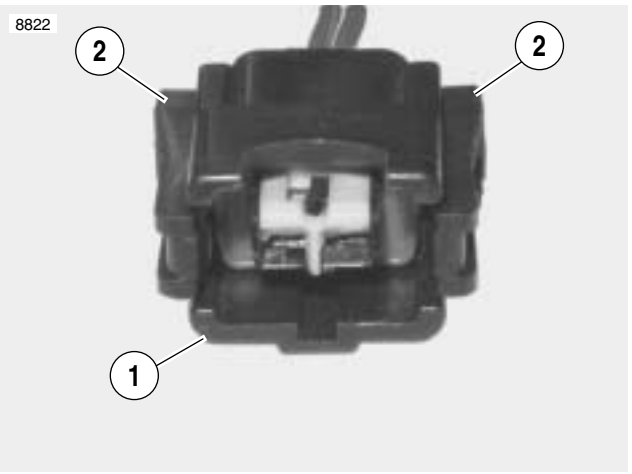
NOTE

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



1. **Rear fuel injector**
2. **Clip (2)**
3. **Fuel rail**
4. **Front fuel injector**

Figure 4-46. Fuel Injectors (XB9R Shown)



1. **Fuel injector connector**
2. **Tab**

Figure 4-47. Fuel Injector Connector

DIAGNOSTICS

Diagnostic Notes

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

⚠WARNING

To prevent spray of fuel, purge system of high-pressure fuel before supply line is disconnected. Gasoline is extremely flammable and highly explosive, which could result in death or serious injury. (00275a)

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).

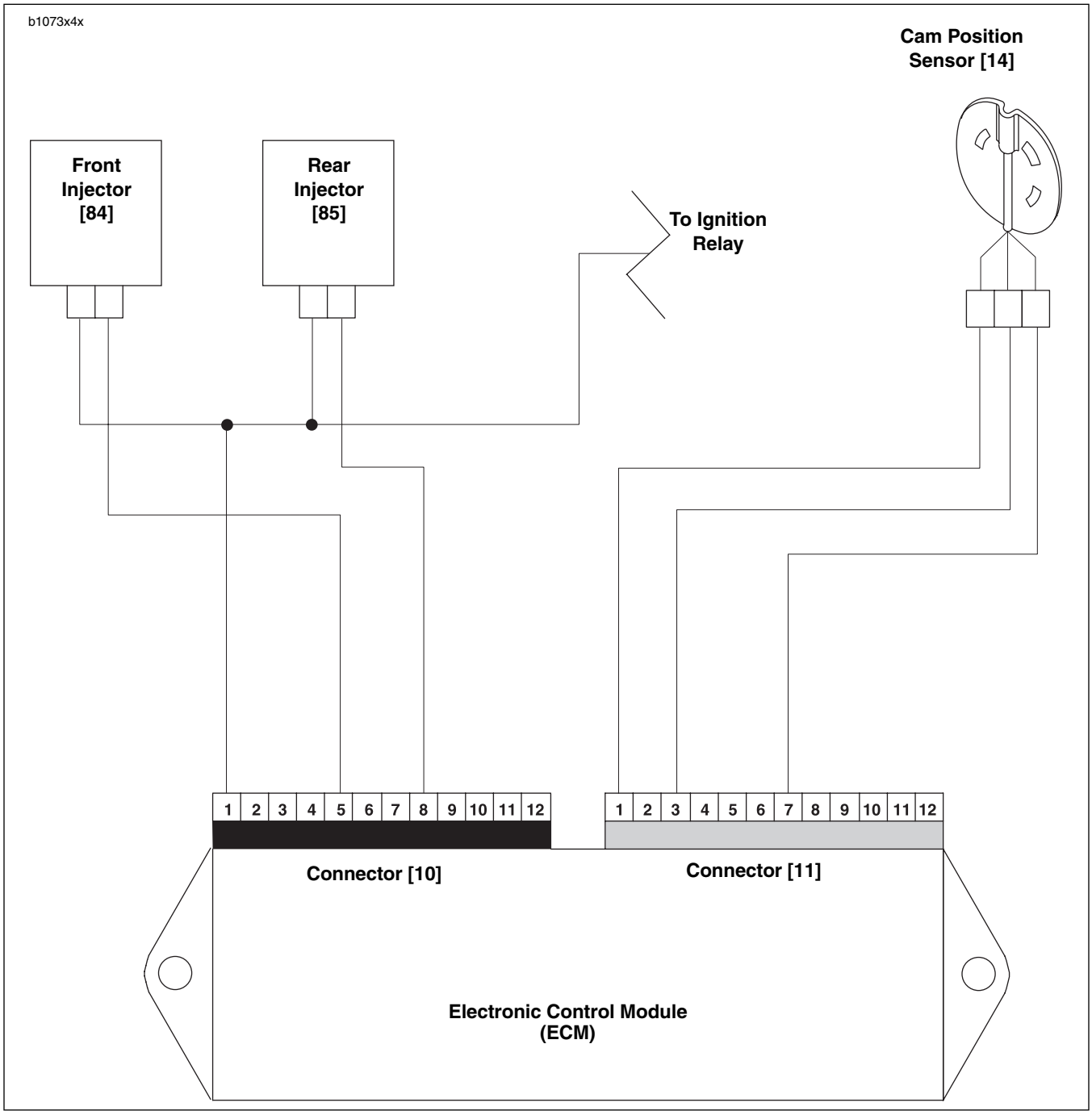
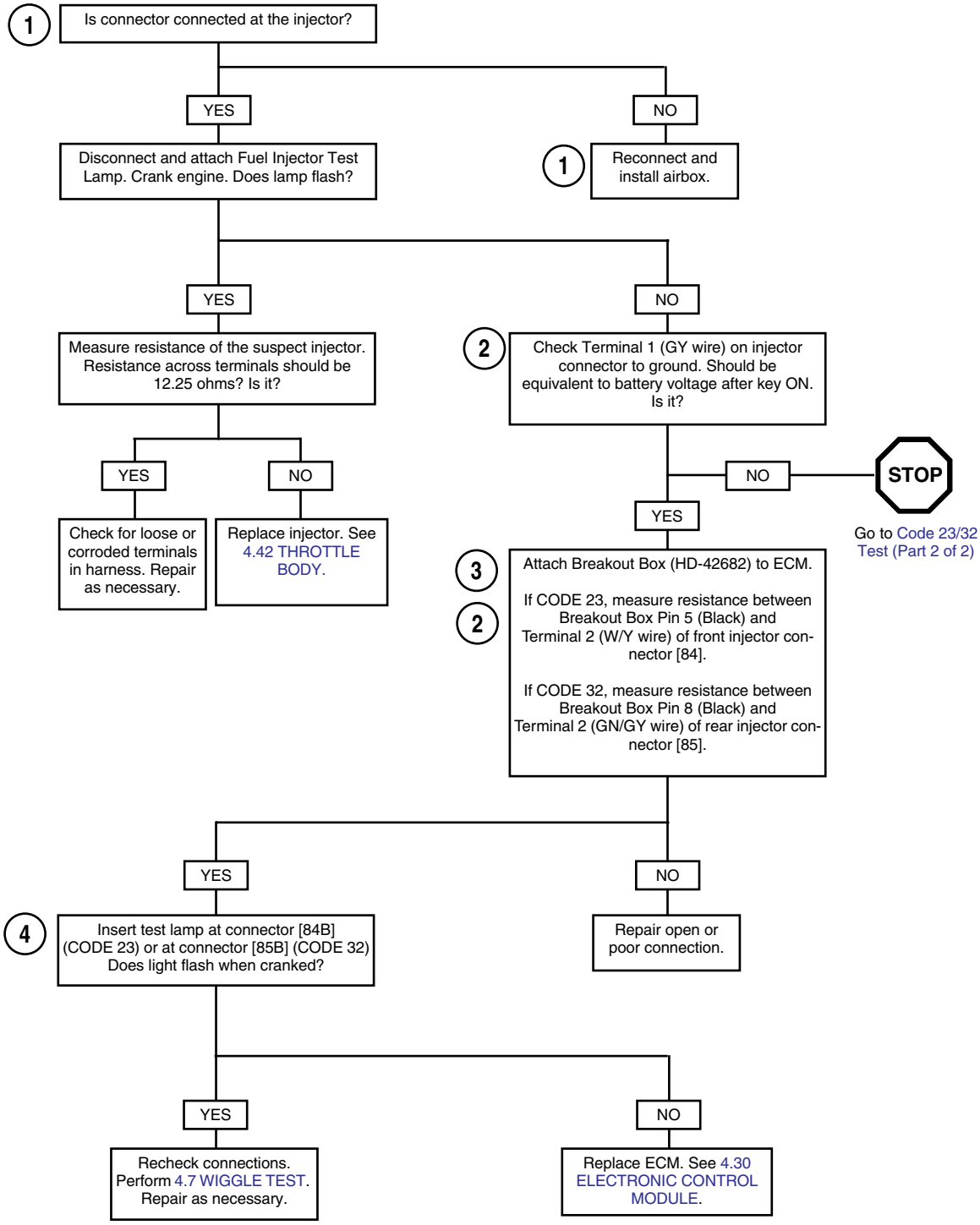


Figure 4-48. Fuel Injector Circuit

Table 4-25. Wire Harness Connectors in Figure 4-48.

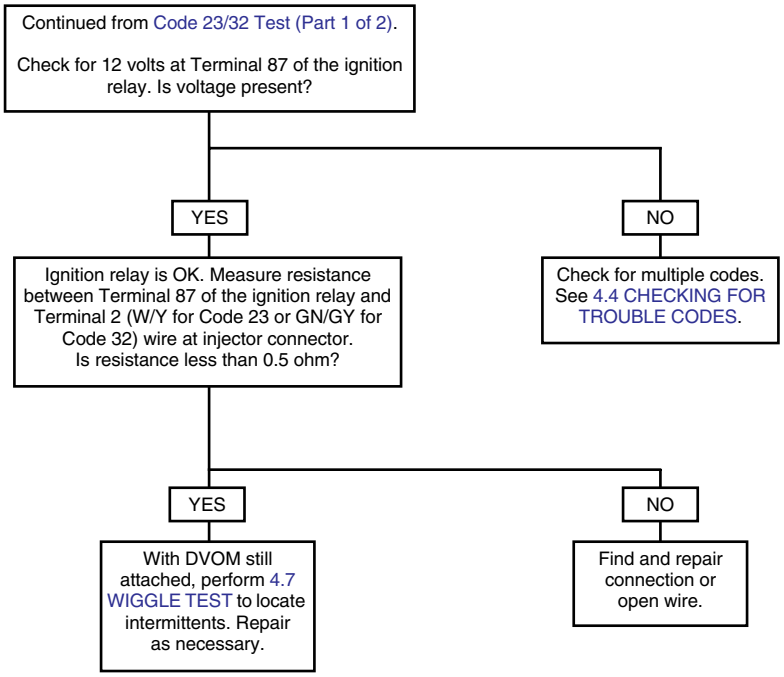
NO.	DESCRIPTION	TYPE	LOCATION
[10]	ECM (black)	12-place Deutsch	in fairing
[14]	cam position sensor	3-place Deutsch	under sprocket cover
[84]	front fuel injector	2-place Packard	underneath airbox base
[85]	rear fuel injector	2-place Packard	underneath airbox base

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).

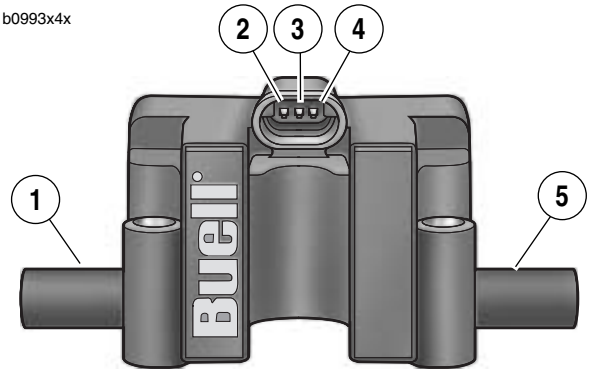
TROUBLE CODES 24 AND 25 4.23

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 4-49. 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.



1. **Front cylinder post**
2. **Coil Pin A (rear cylinder)**
3. **Coil Pin B (12 VDC)**
4. **Coil Pin C (front cylinder)**
5. **Rear cylinder post**

Figure 4-49. Ignition Coil

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 4-35. 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 his condition occurs.

Figure 4-50. Testing Ignition Coil Connectors

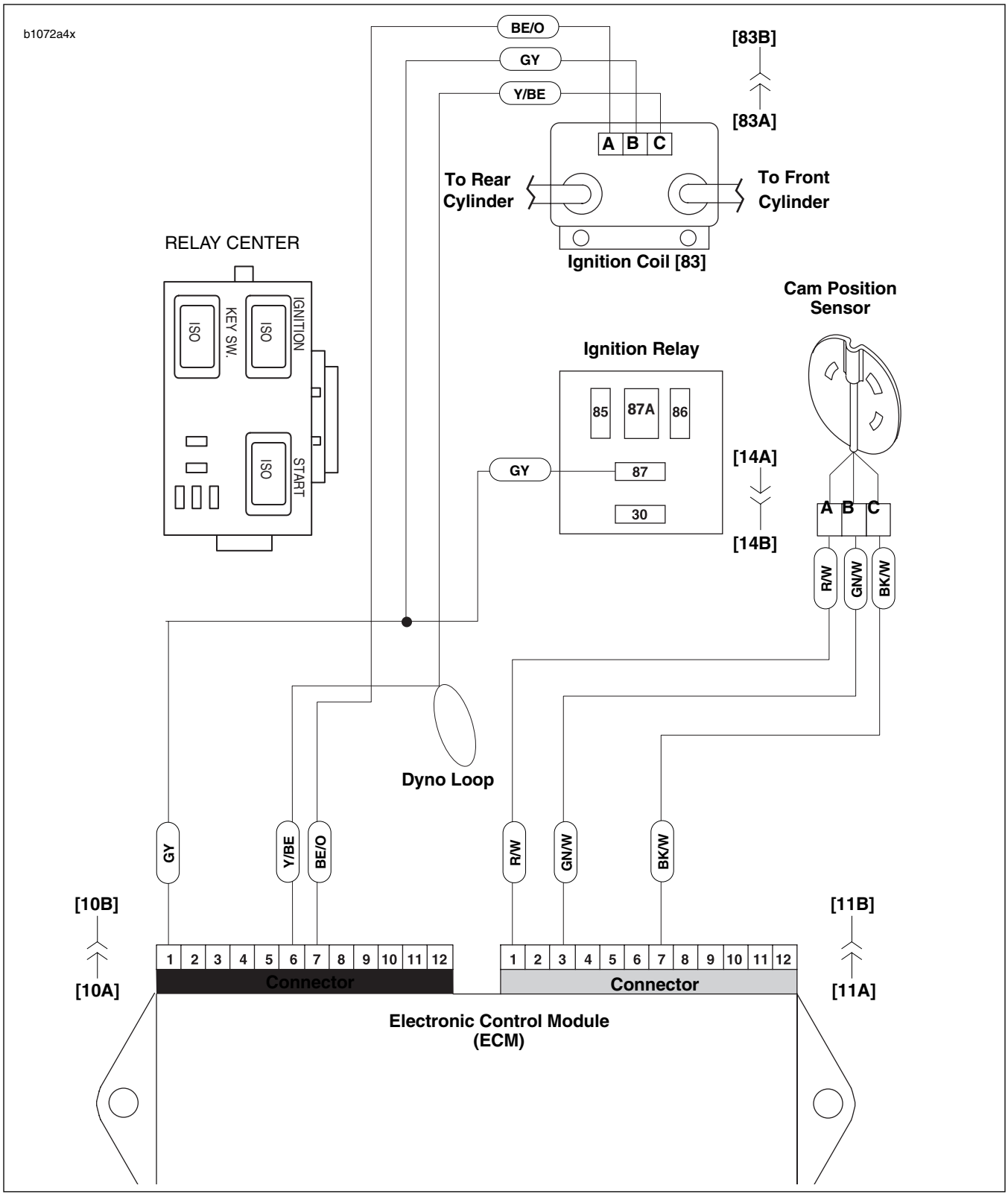
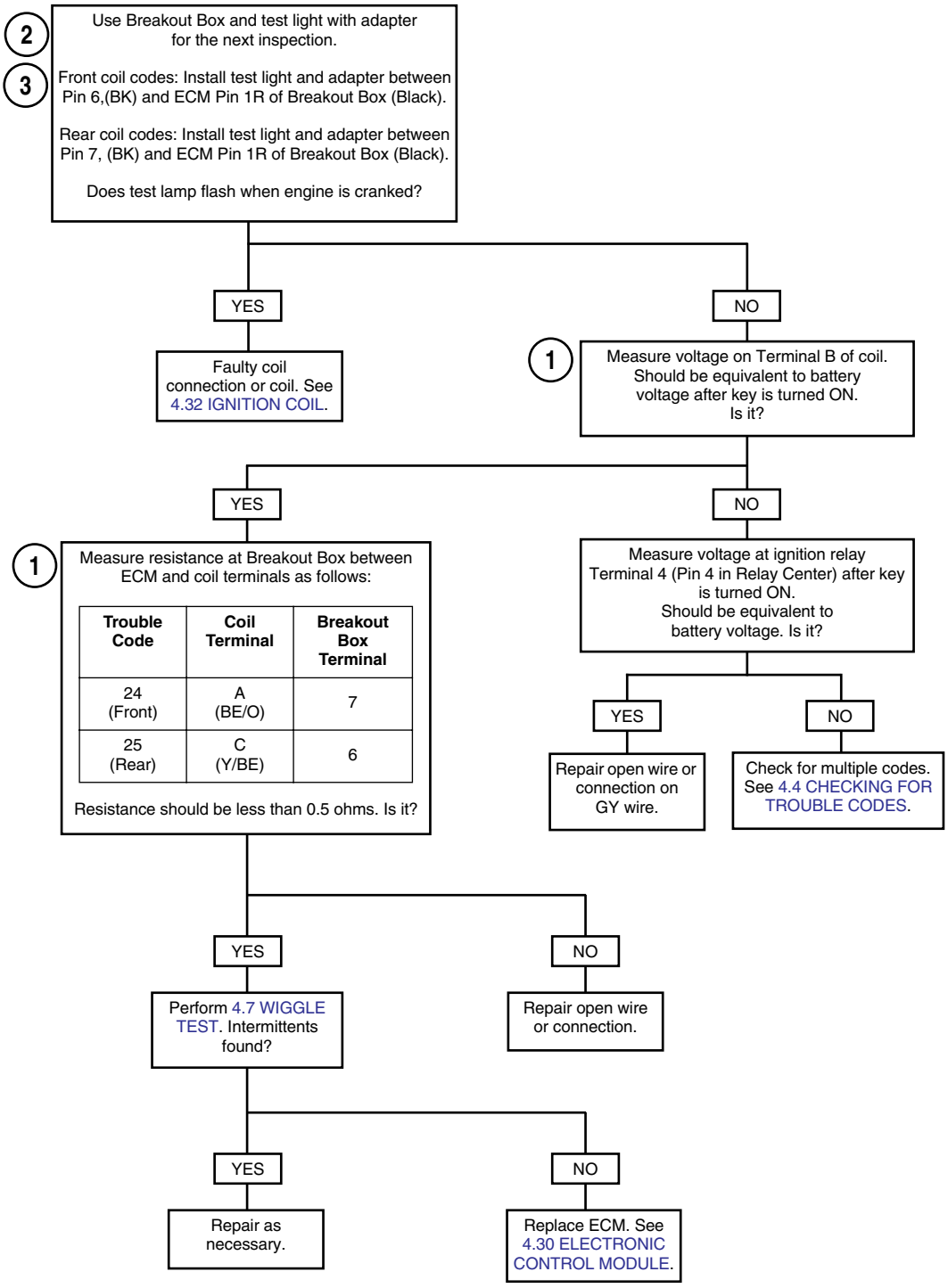


Figure 4-51. Ignition Coil Circuit

Table 4-26. Wire Harness Connectors in Figure 4-51.

NO.	DESCRIPTION	TYPE	LOCATION
[10]	ECM (black)	12-place Deutsch	under fairing
[83]	ignition coil	3-place Packard	beneath airbox base

Code 24/25 Test



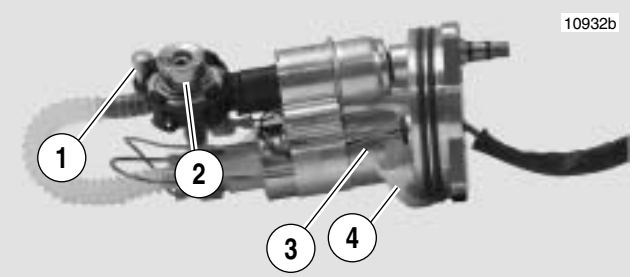
Clear codes and confirm proper operation with no check engine lamp. Codes can be cleared using DIGITAL TECHNICIAN (Part No. HD-44750).

GENERAL

Fuel Pump

The fuel pump assembly is shown in Figure 4-52. ECM Pin 3 provides ground to the fuel pump. Code 33 will set if:

- BN/Y wire is shorted to 12 volts. This will also cause the ignition fuse to blow. See Figure 4-39.
- 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.



1. **Low fuel level sensor**
2. **Pressure regulator**
3. **Wiring harness**
4. **Fuel screen**

Figure 4-52. Fuel Pump Assembly

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.

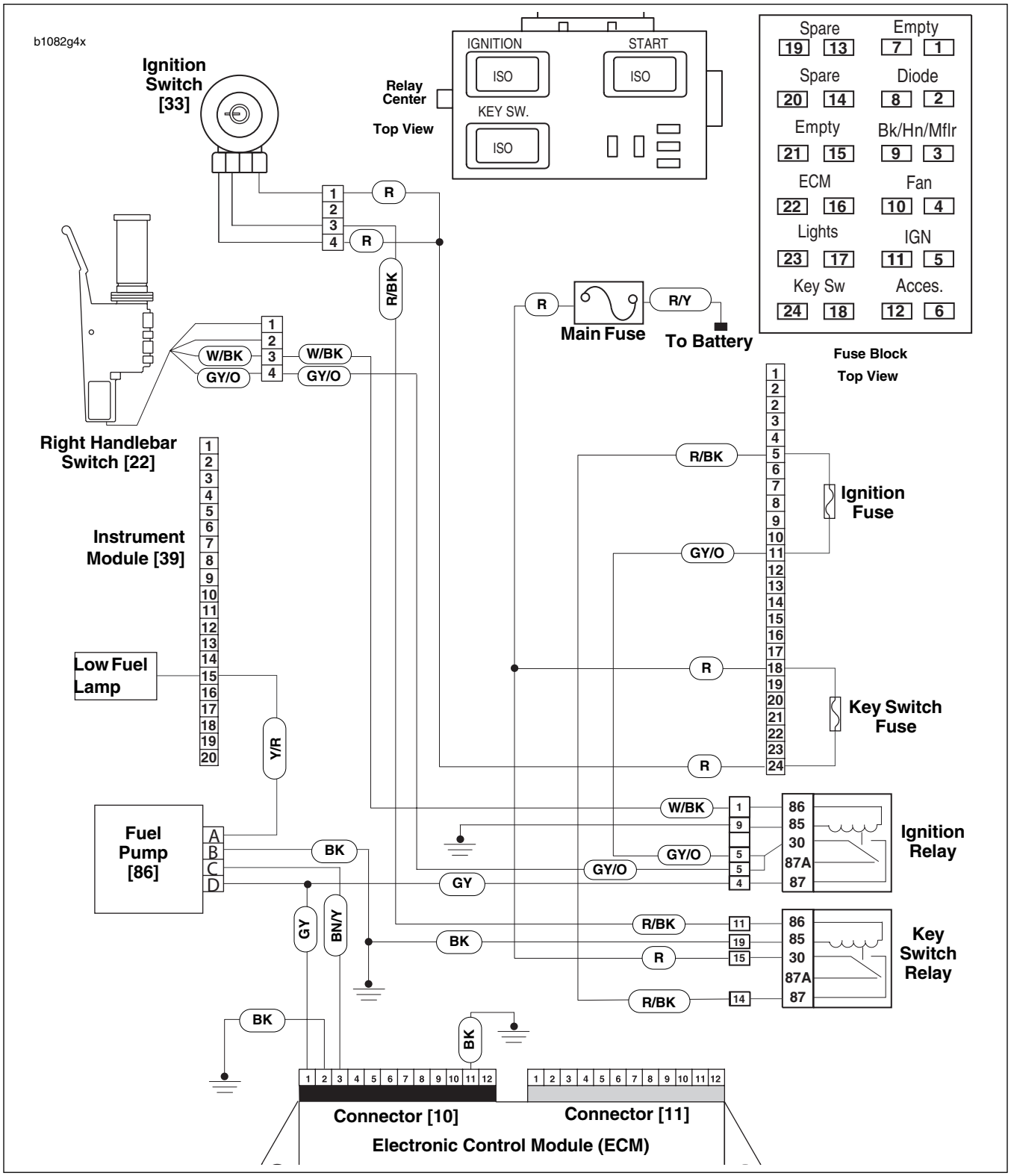
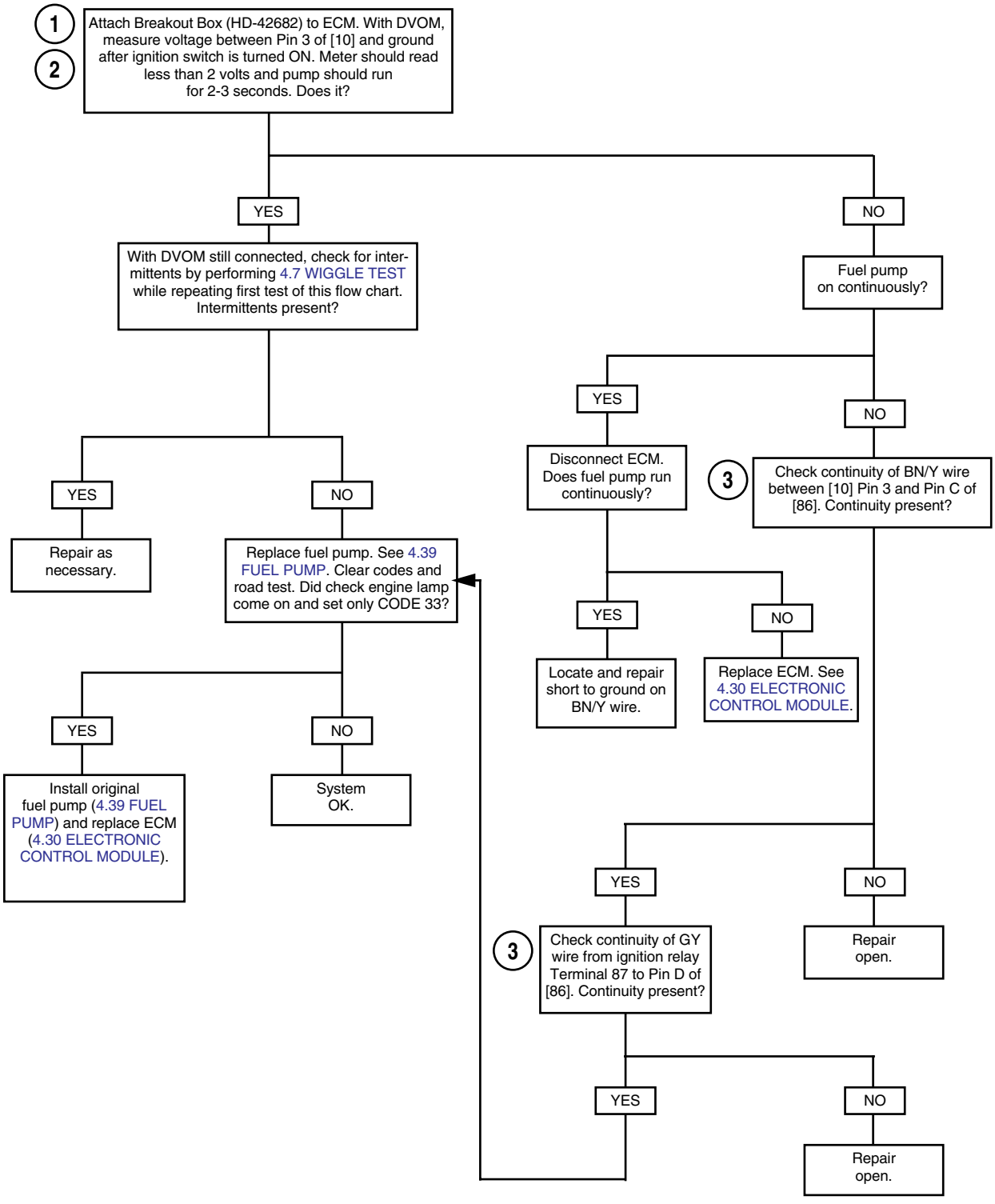


Figure 4-53. Fuel Pump Circuit

Table 4-27. Wire Harness Connectors in Figure 4-53.

NO.	DESCRIPTION	TYPE	LOCATION
[10]	ECM (black)	12-place Deutsch	in fairing
[39]	instrument module	20-place Multilock	in fairing
[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).

TROUBLE CODE 35 4.25

GENERAL

Tachometer

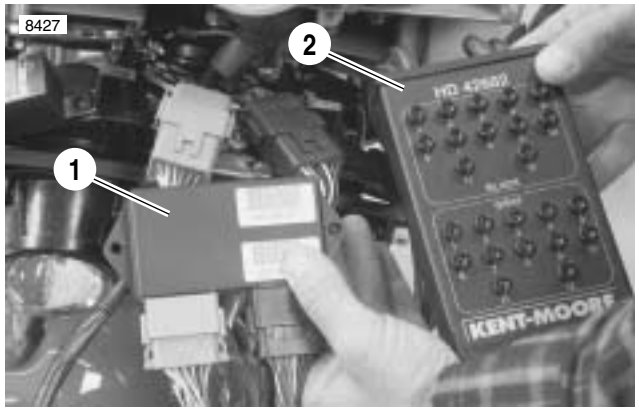
A Code 35 will set if the PK tachometer wire is shorted to power or ground.

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 7.18 INSTRUMENT MODULE.



1. ECM
2. Breakout box

Figure 4-54. Installed Breakout Box

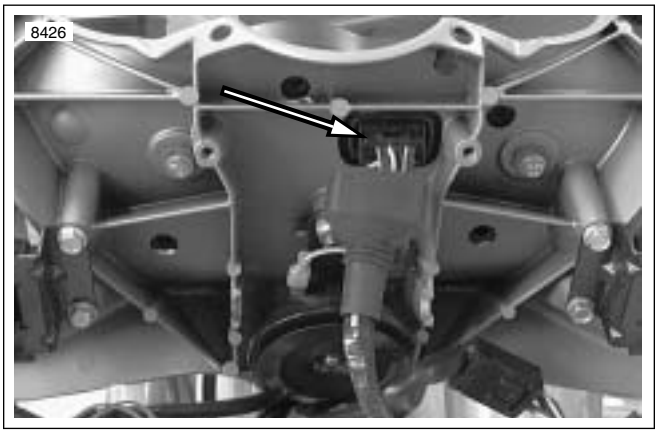


Figure 4-55. Instrument Module Connector [39]

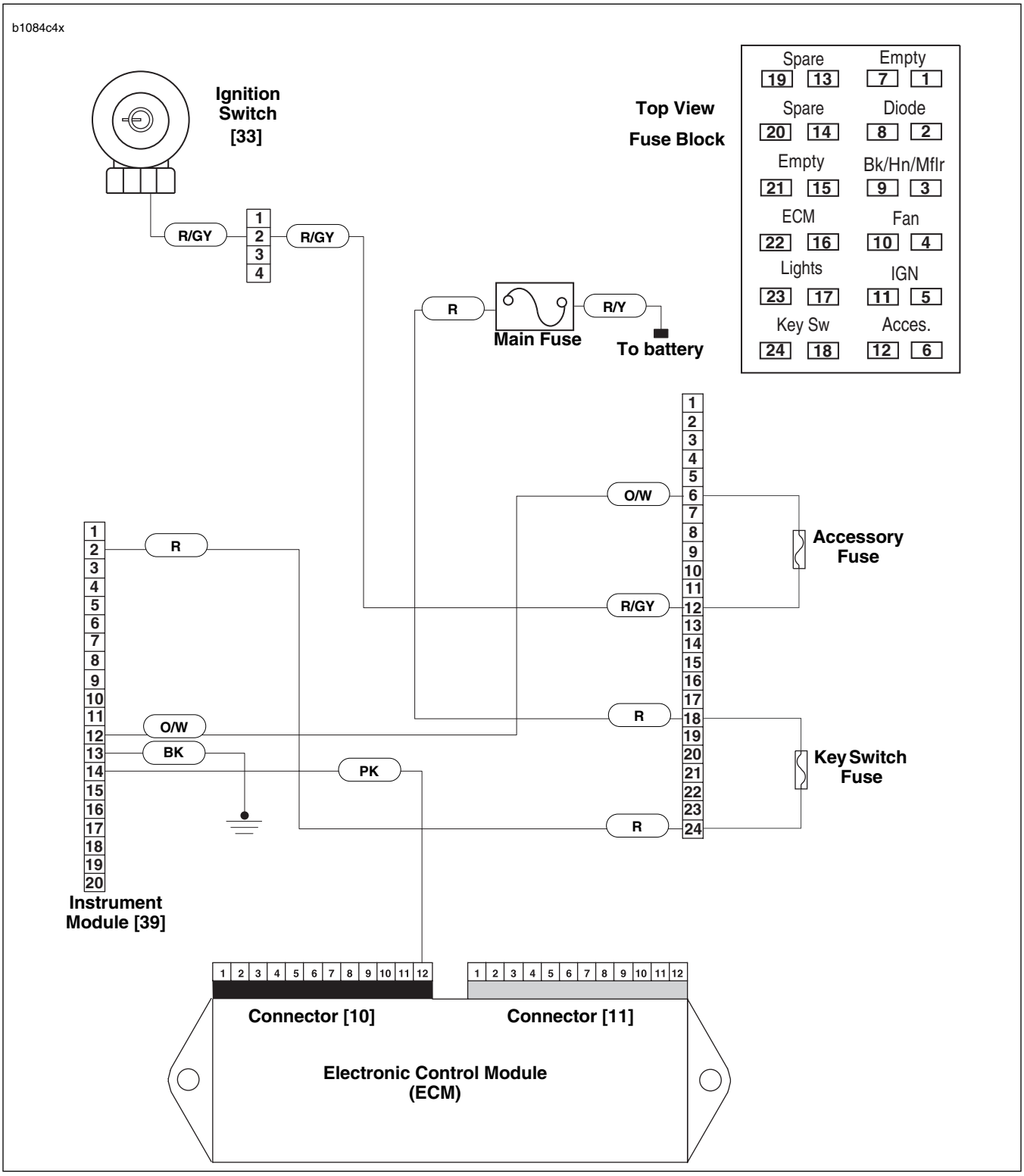
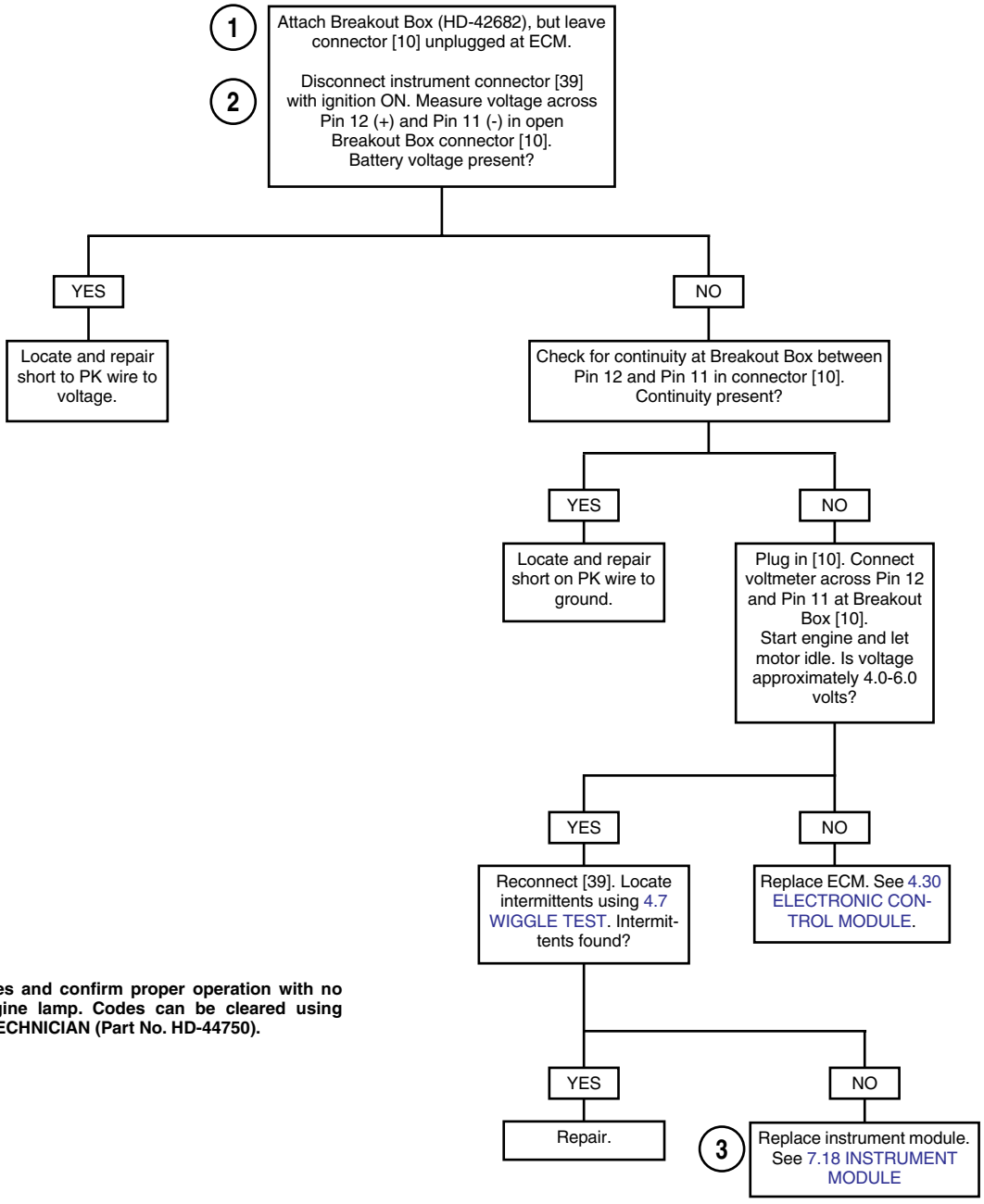


Figure 4-56. Tachometer Circuit

Table 4-28. Wire Harness Connectors in Figure 4-56.

NO.	DESCRIPTION	TYPE	LOCATION
[10]	ECM (black)	12-place Deutsch	in fairing
[39]	instrument module	20-place Multilock	in fairing

Code 35 Test



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

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 runs at approximately half speed. See Table 4-29. Cooling Fan Specifications.

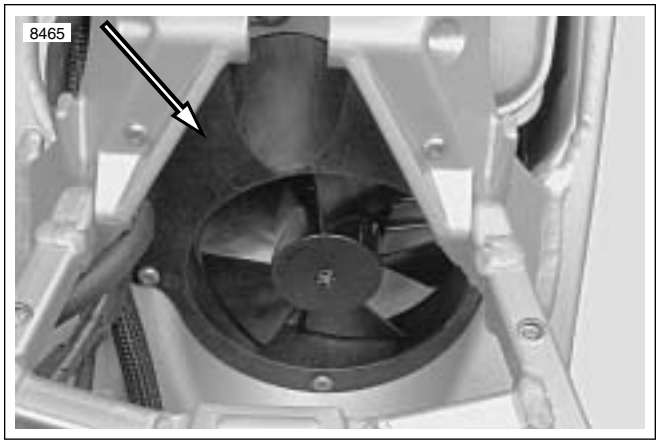


Figure 4-57. Cooling Fan

Table 4-29. 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.

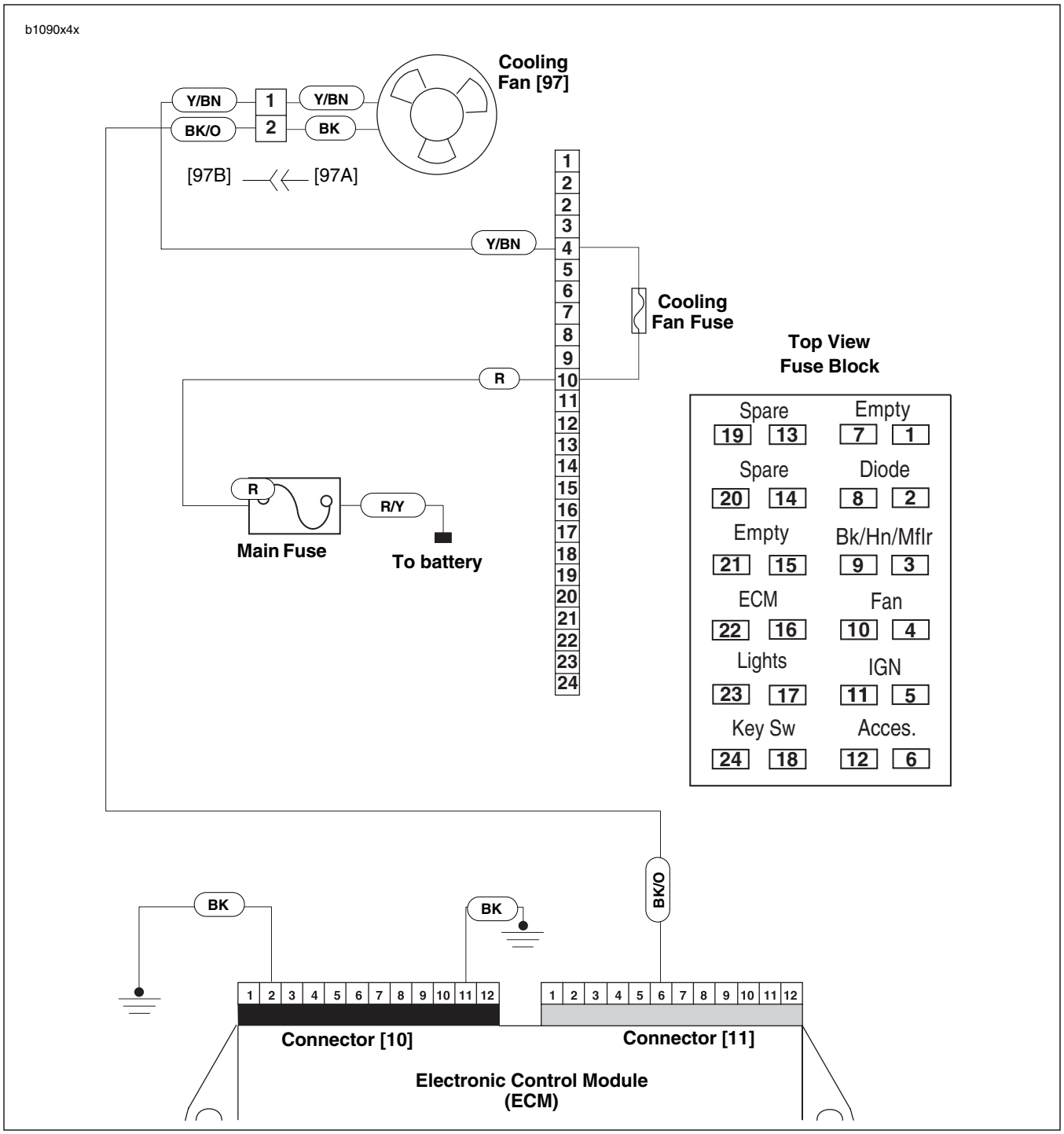
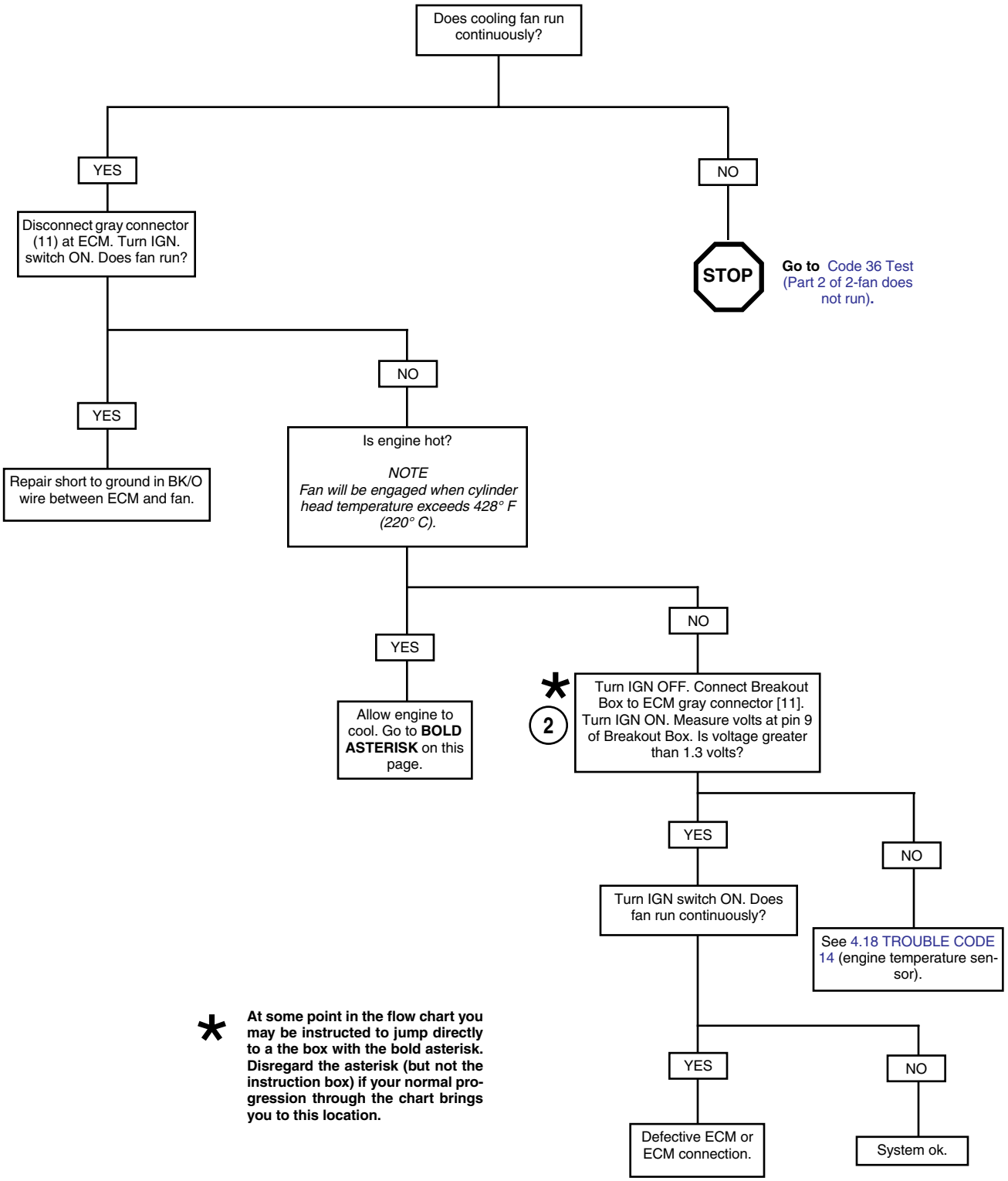


Figure 4-58. Cooling Fan Circuit

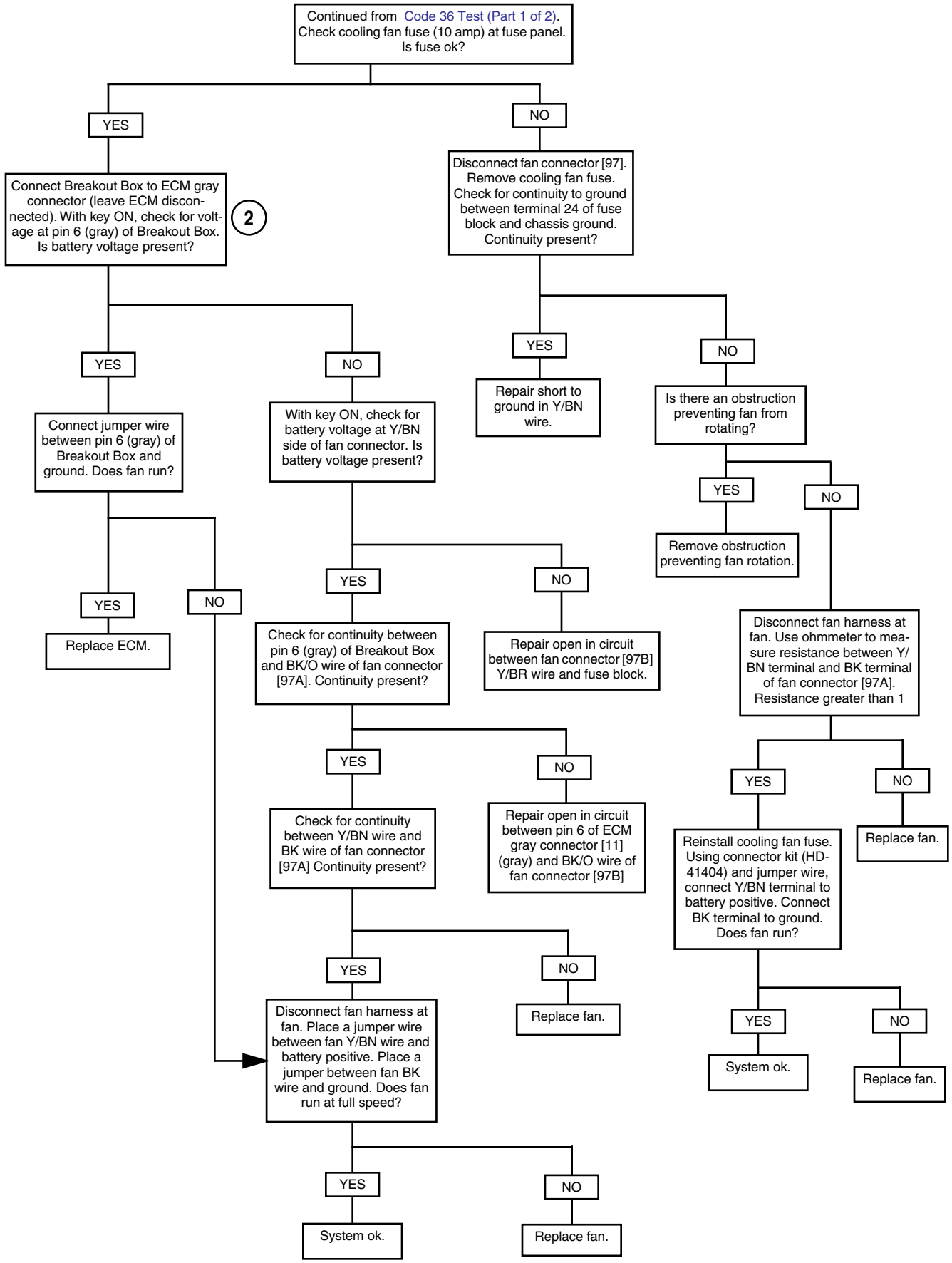
Table 4-30. Wire Harness Connectors in Figure 4-58.

NO.	DESCRIPTION	TYPE	LOCATION
[11]	ECM (gray)	12-place Deutsch	in fairing
[97]	cooling fan	2-place Multilock	behind rear cylinder

Code 36 Test (Part 1 of 2)



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



TROUBLE CODE 44 4.27

GENERAL

NOTE

See Figure 4-59. 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 4-60. A Code 44 occurs when the bank angle sensor (1) voltage is outside the normal operating range of 0.25-4.8 volts. 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.

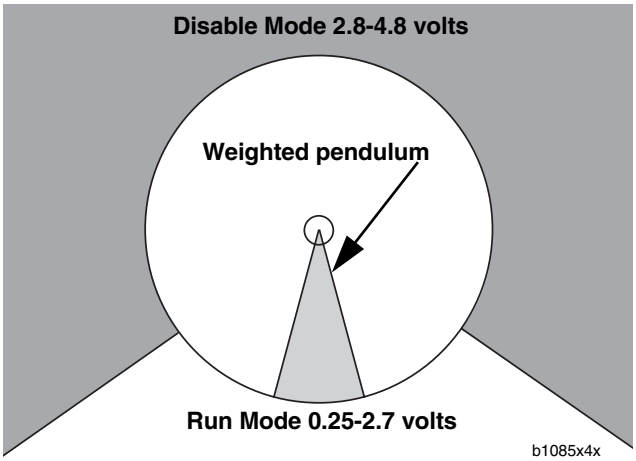
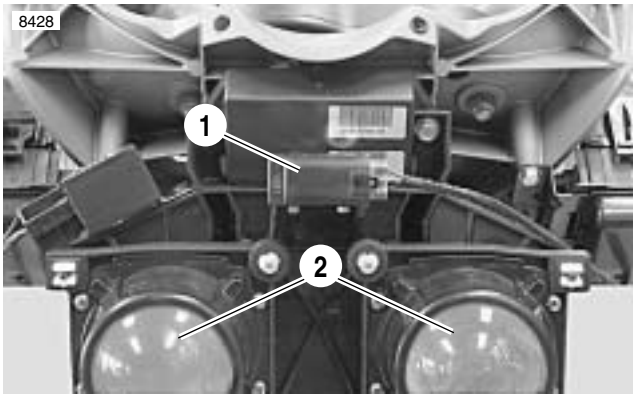


Figure 4-59. Bank Angle Sensor Operation



1. **Bank angle sensor**
2. **Headlights**

Figure 4-60. Bank Angle Sensor

Table 4-31. Bank Angle Sensor Voltage

MODE	VOLTS
Run	0.25-2.7
Disable	2.8-4.8

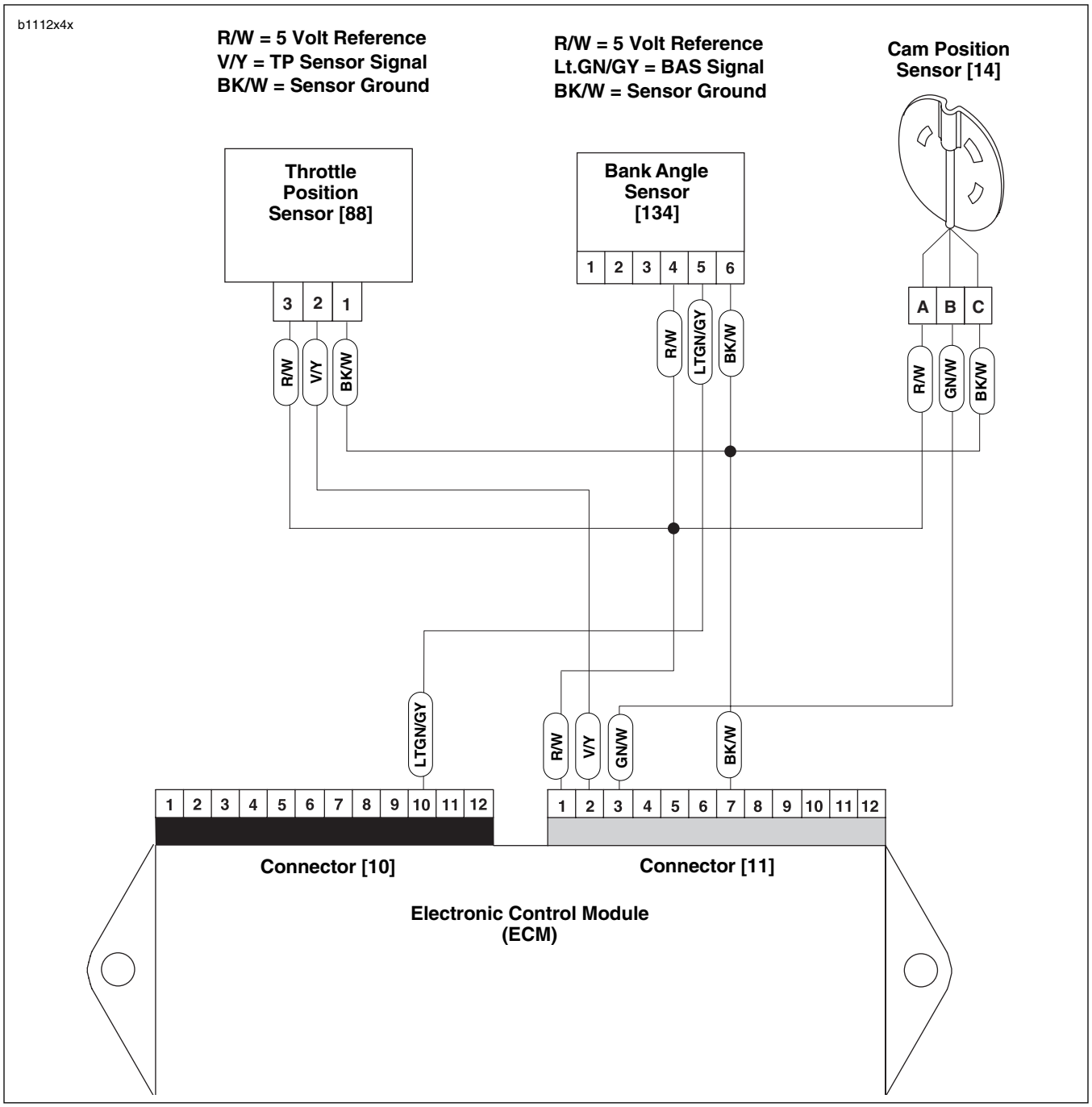
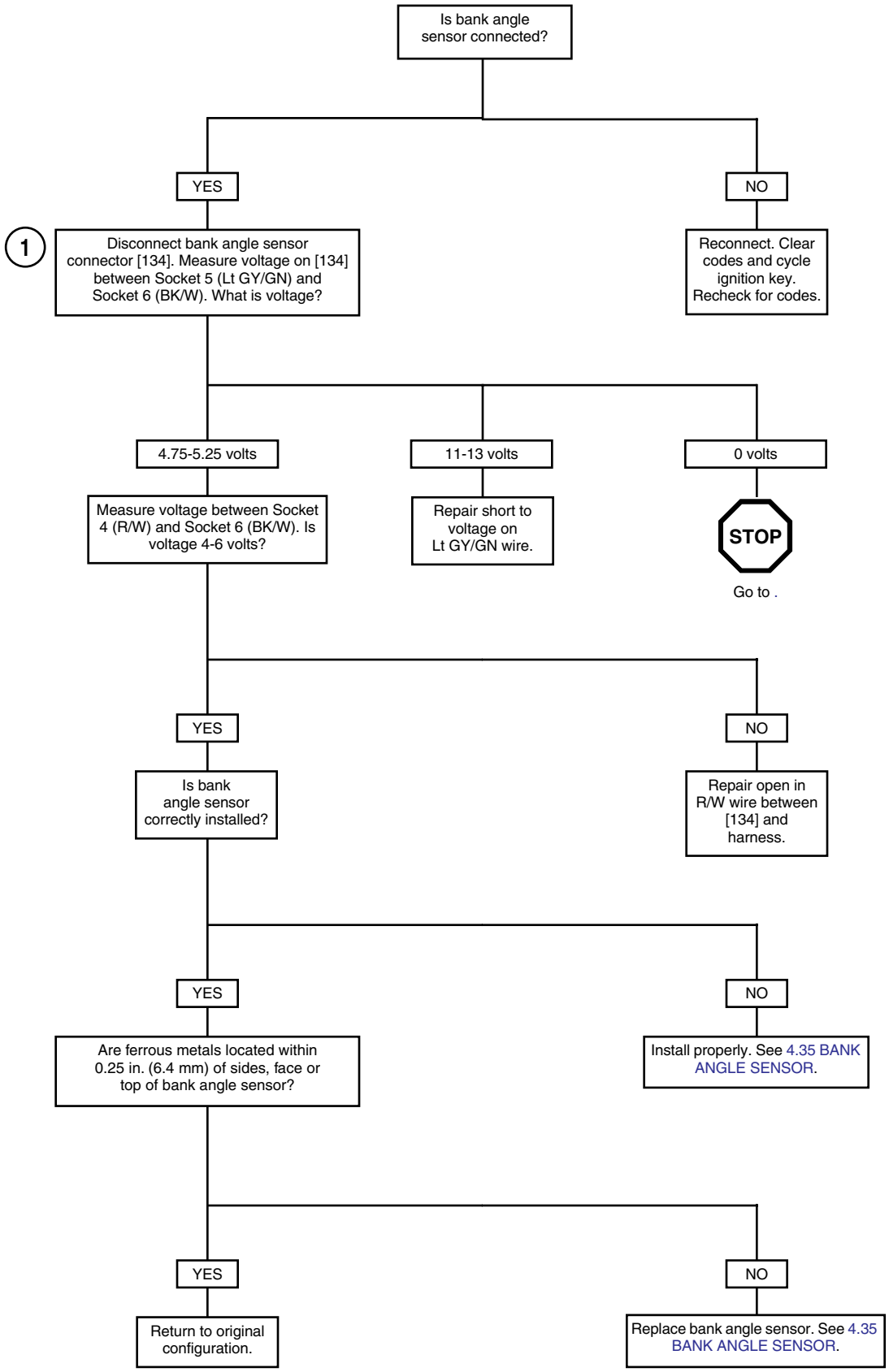


Figure 4-61. Bank Angle Sensor Circuit

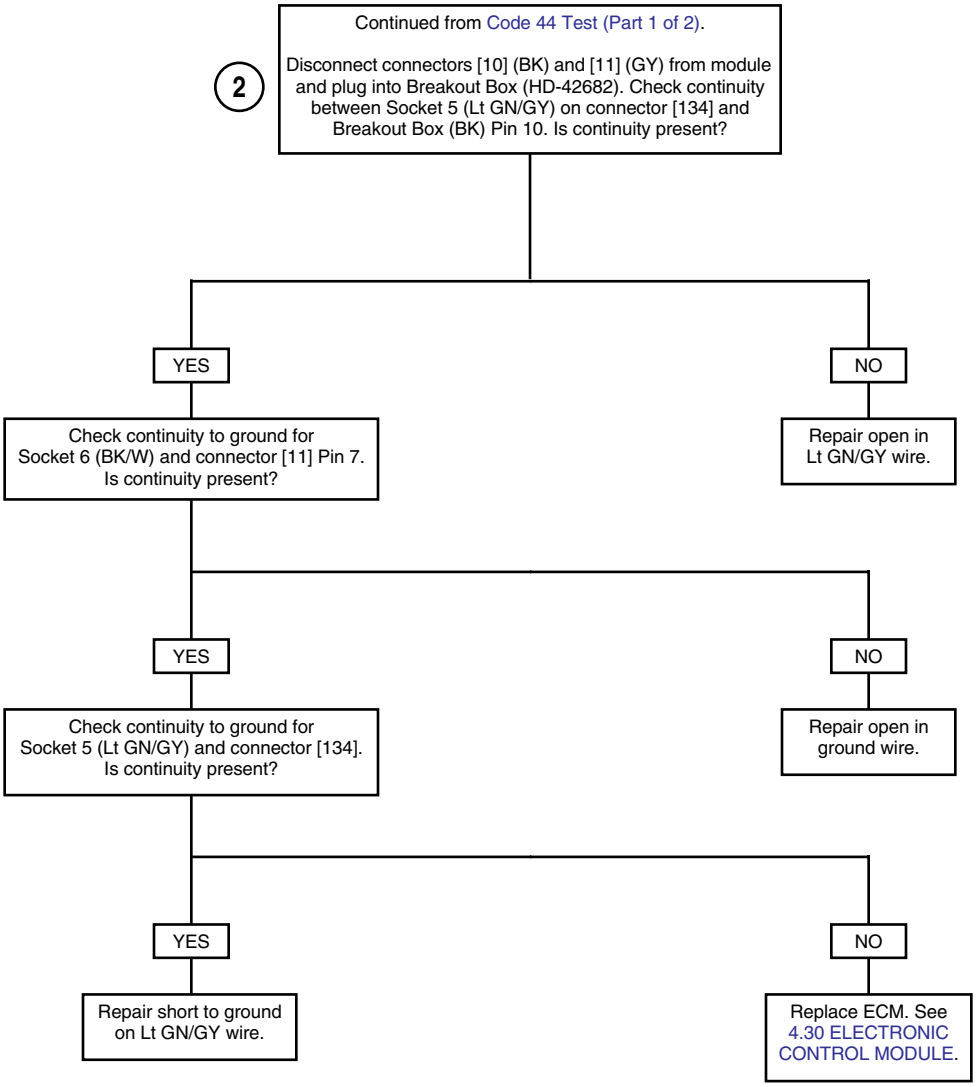
Table 4-32. Wire Harness Connectors in Figure 4-61.

NO.	DESCRIPTION	TYPE	LOCATION
[10]	ECM (black)	12-place Deutsch	in fairing
[11]	ECM (gray)	12-place Deutsch	in fairing
[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	in fairing

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).

TROUBLE CODES 52, 53, 54 AND 55 4.28

GENERAL

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.

TROUBLE CODE 56 4.29

GENERAL

Cam Sync Failure

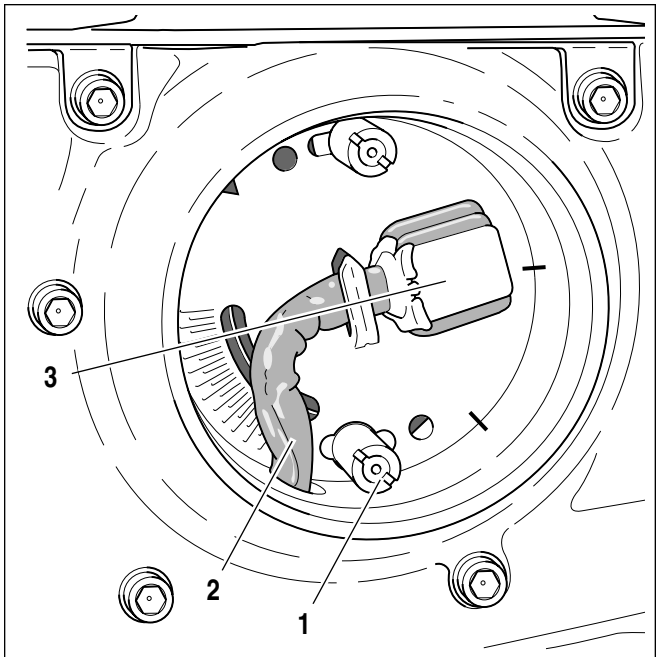
This code occurs only when the engine is running if the electronic control module either receives an intermittent (extra or missing) signal from the cam position sensor or receives an unexpected signal. The motorcycle may continue to run, not run normally or stop running altogether.

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.



1. Timer plate stud (2)
2. Sensor wiring
3. Cam position sensor

Figure 4-62. Cam Position Sensor

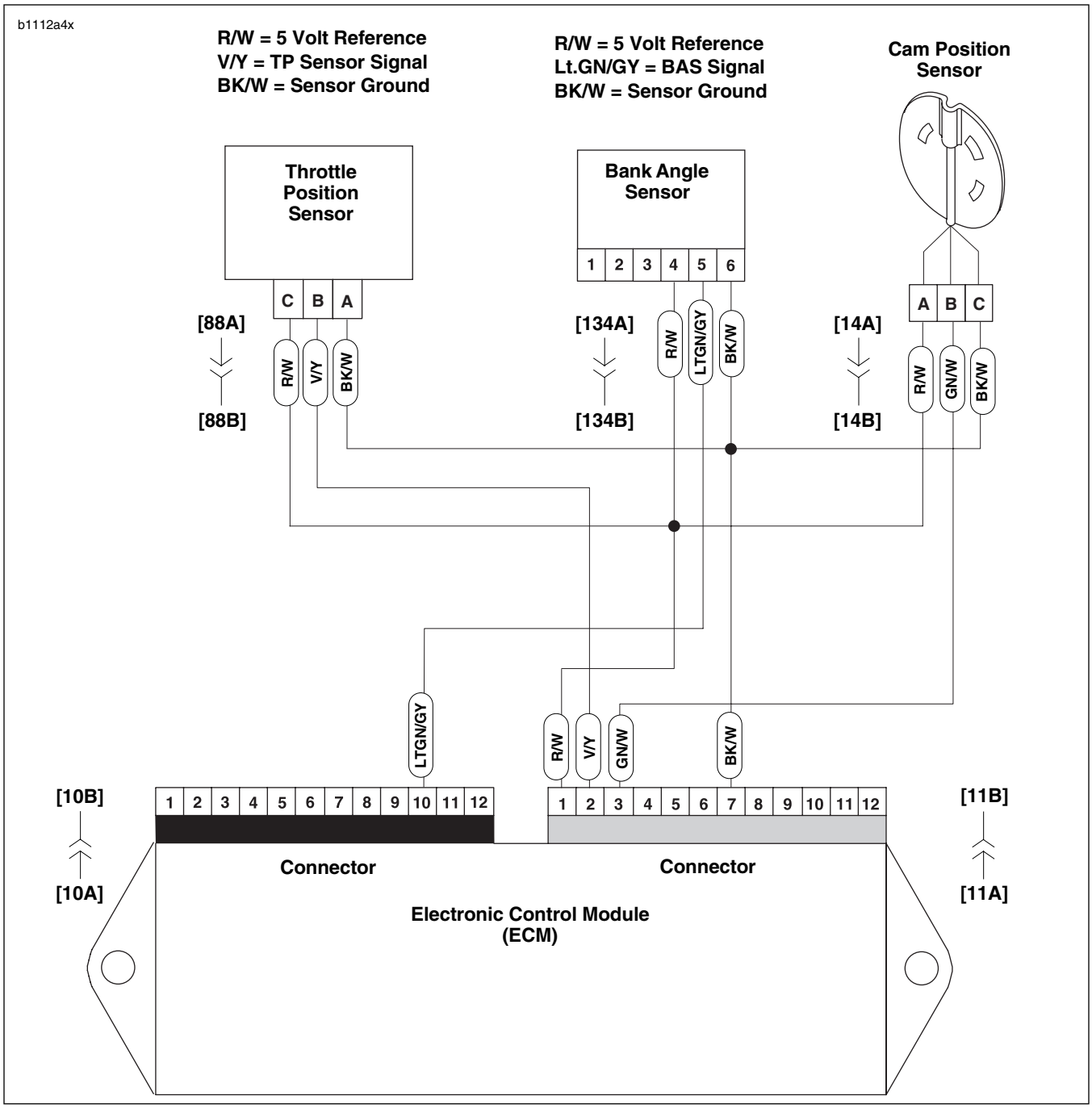
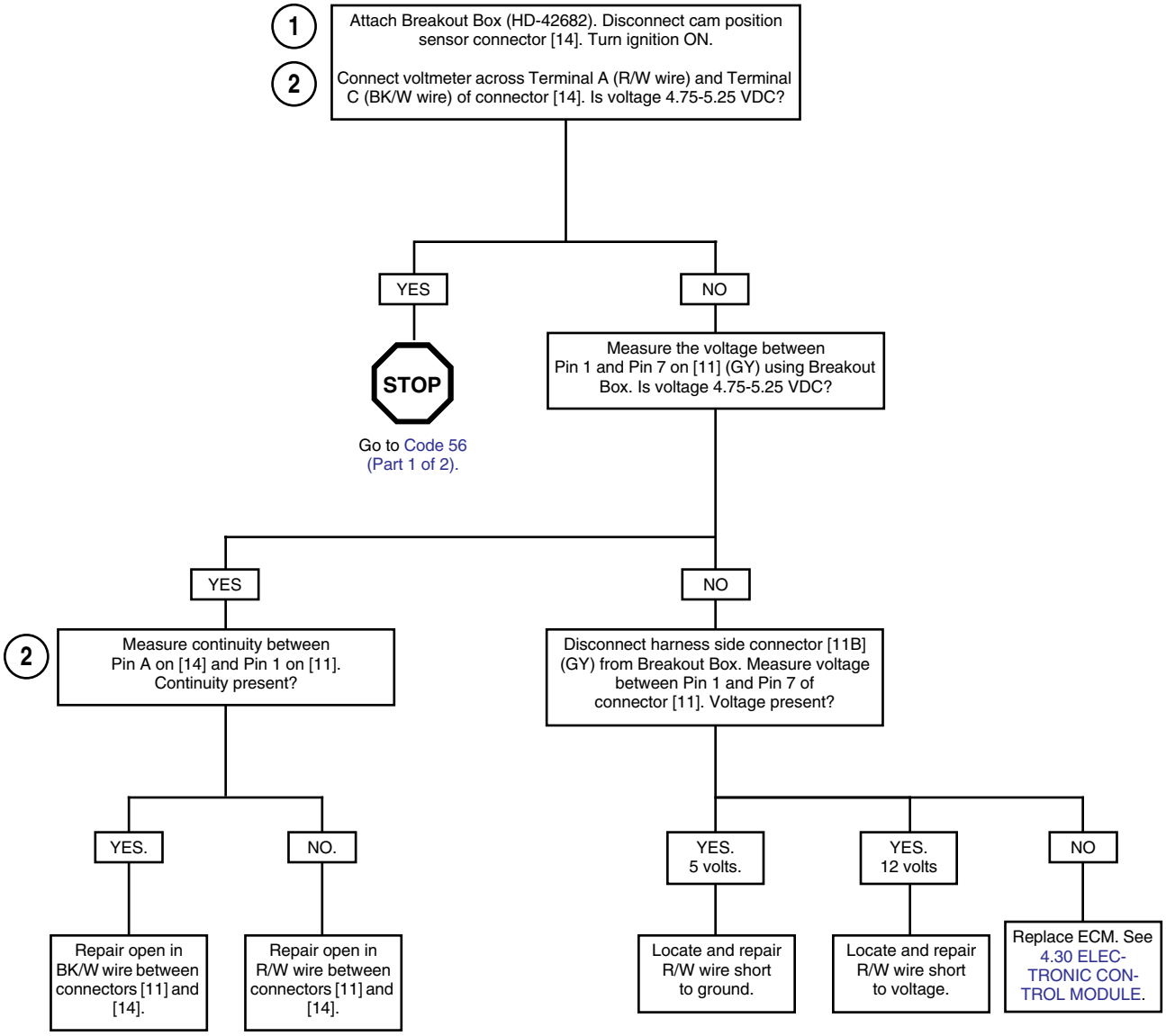


Figure 4-63. Cam Position Sensor Circuit

Table 4-33. Wire Harness Connectors in Figure 4-63.

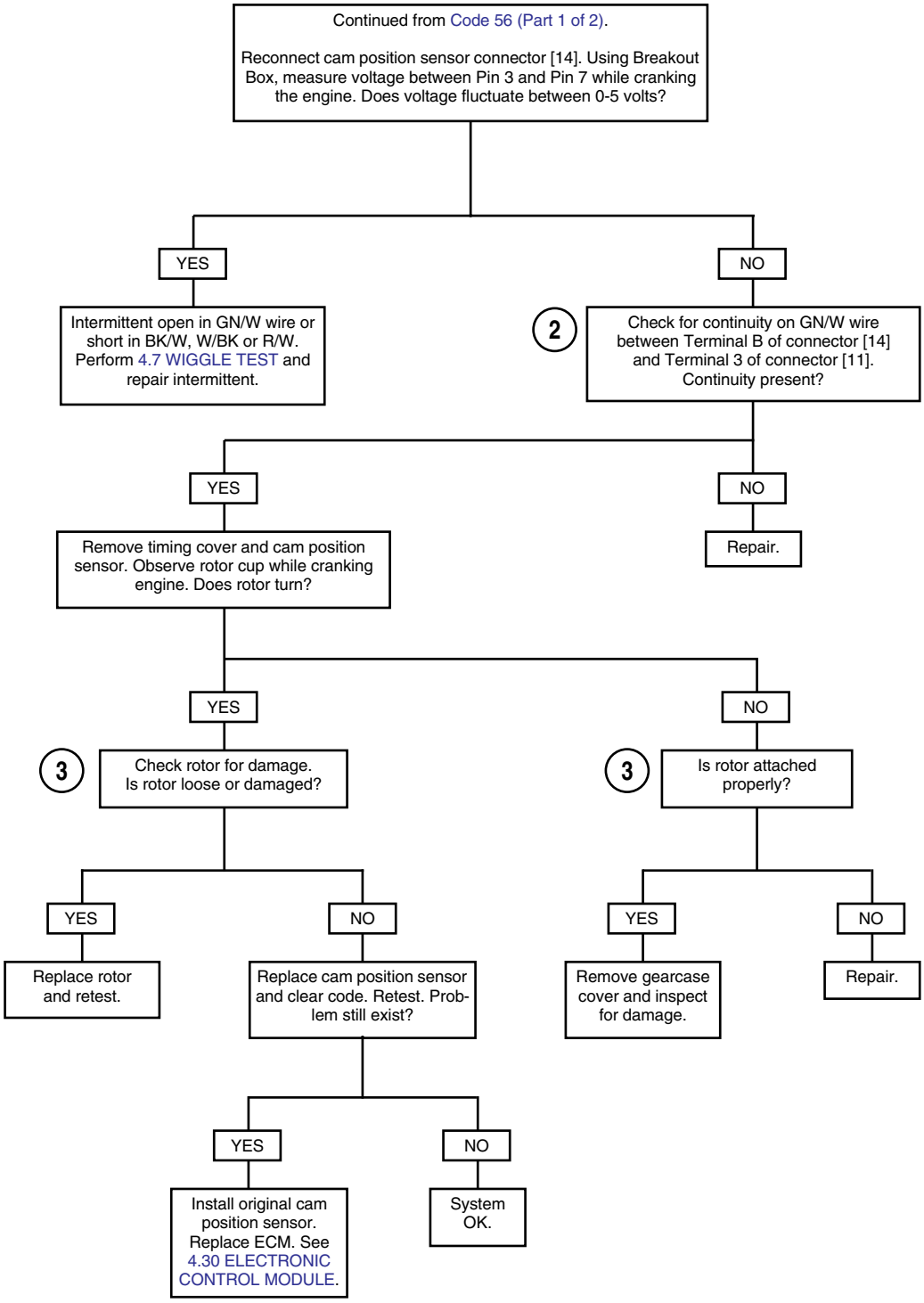
NO.	DESCRIPTION	TYPE	LOCATION
[10]	ECM (black)	12-place Deutsch	in fairing
[11]	ECM (gray)	12-place Deutsch	in fairing
[14]	cam position sensor	3-place Deutsch	under sprocket cover
[88]	throttle position sensor	3-place Packard	right side of engine between cylinders
[134]	bank angle sensor	6-place Sumitomo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

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).