

GENERAL

MAP Sensor

See [Figure 5-45](#). The MAP sensor is supplied 5 volts from the ECM (Pin 14) and sends a signal back to the ECM (Pin 25). This signal varies in accordance with engine vacuum and atmospheric barometric pressure. Changes in barometric pressure are influenced by weather and altitude.

Table 5-26. Code Description

DTC	DESCRIPTION
P0107	MAP sensor open/low
P0108	MAP sensor high

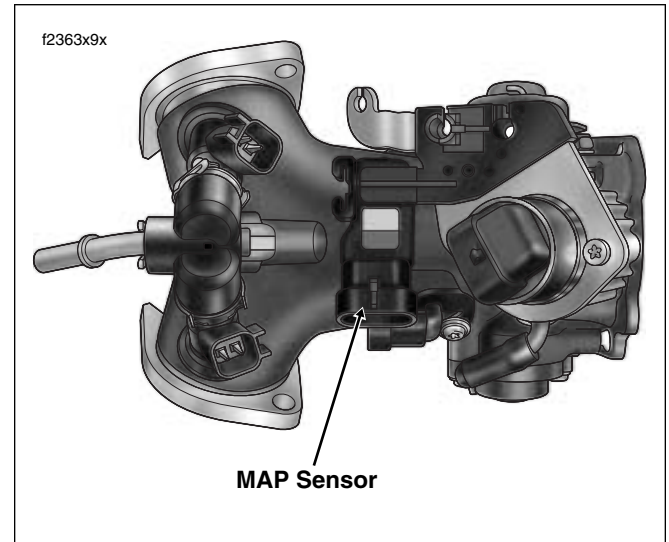


Figure 5-45. Induction Module (Top View)

DIAGNOSTICS

Diagnostic Tips

- These codes will set if the MAP sensor signal is out of range. Code P0108 can only be detected with the engine running.
- MAP sensor output check. Using the VACUUM PUMP (Part No. HD-23738), apply a vacuum to the pressure port of the MAP sensor. The signal voltage should lower as the vacuum is applied.
- The MAP, TP and VSS sensors are connected to the same reference line (+5V Vref). If the reference line goes to ground or open, multiple codes will be set (DTC P0107, P0108, P0122, P0123).

Diagnostic Notes

The reference numbers below correlate with the circled numbers on the Test 5.19 flow charts.

1. Connect BREAKOUT BOX (Part No. HD-43876) between wire harness and ECM. See [Section 5.7 BREAKOUT BOX: EFI](#).
2. Use HARNESS CONNECTOR TEST KIT (Part No. HD-41404A), gray pin probes and patch cords.

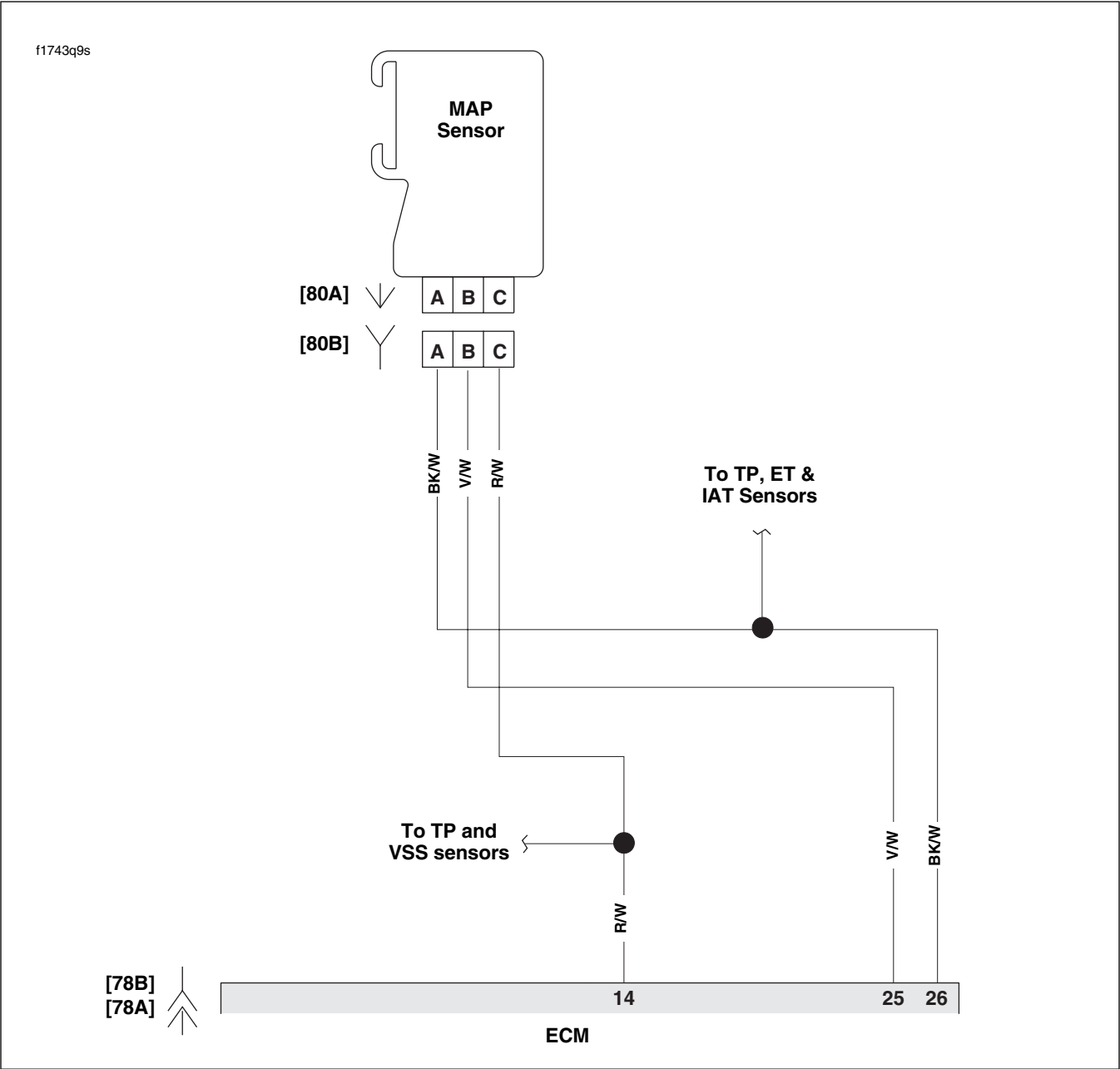


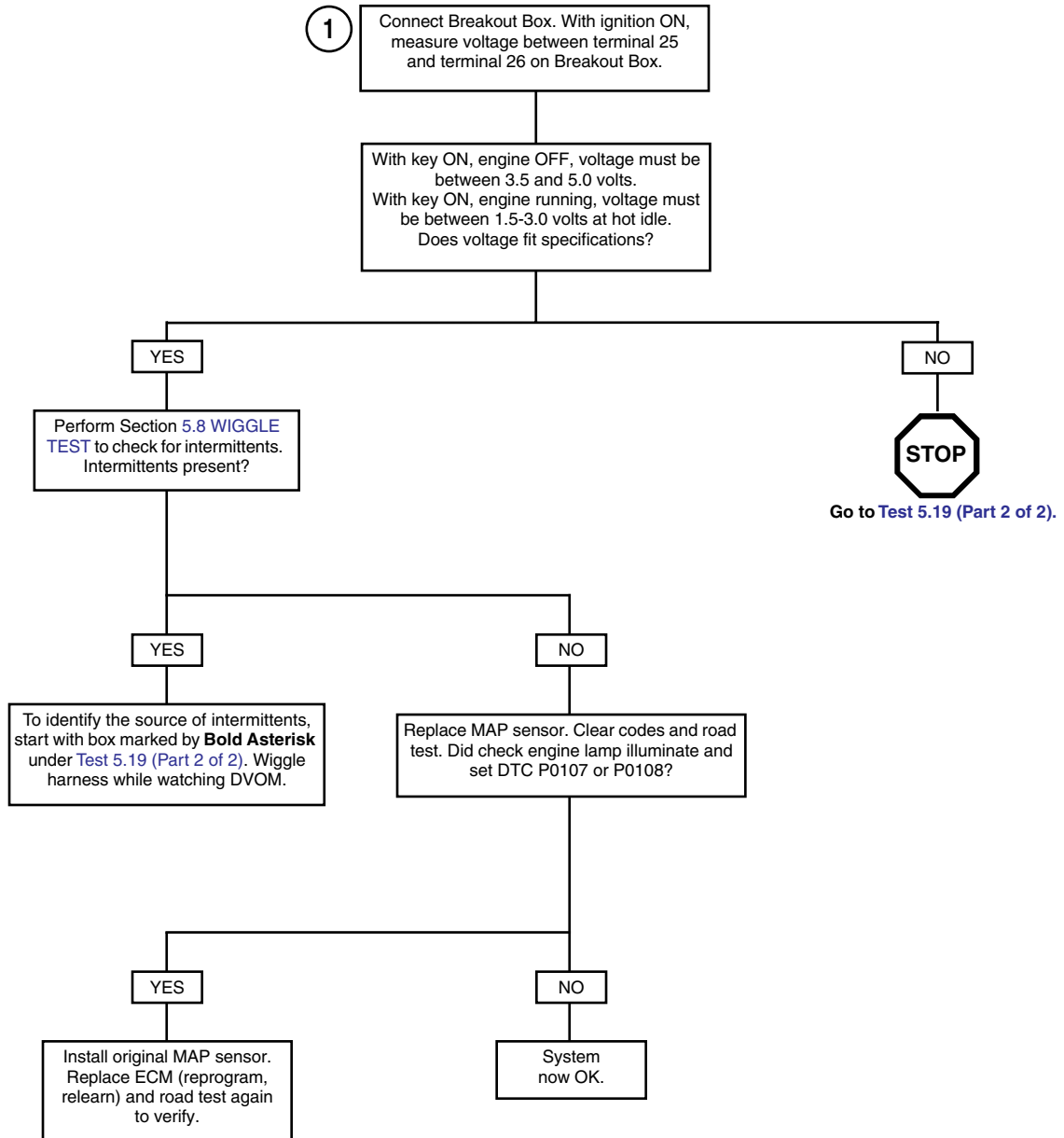
Figure 5-46. MAP Sensor Circuit

Table 5-27. Wire Harness Connectors in [Figure 5-46](#).

NO.	DESCRIPTION	TYPE	LOCATION
[78]	ECM	36-Place Packard	Under Right Side Cover
[80]	MAP Sensor	3-Place Packard	Top of Induction Module

Test 5.19 (Part 1 of 2)

MAP SENSOR: DTC P0107, P0108



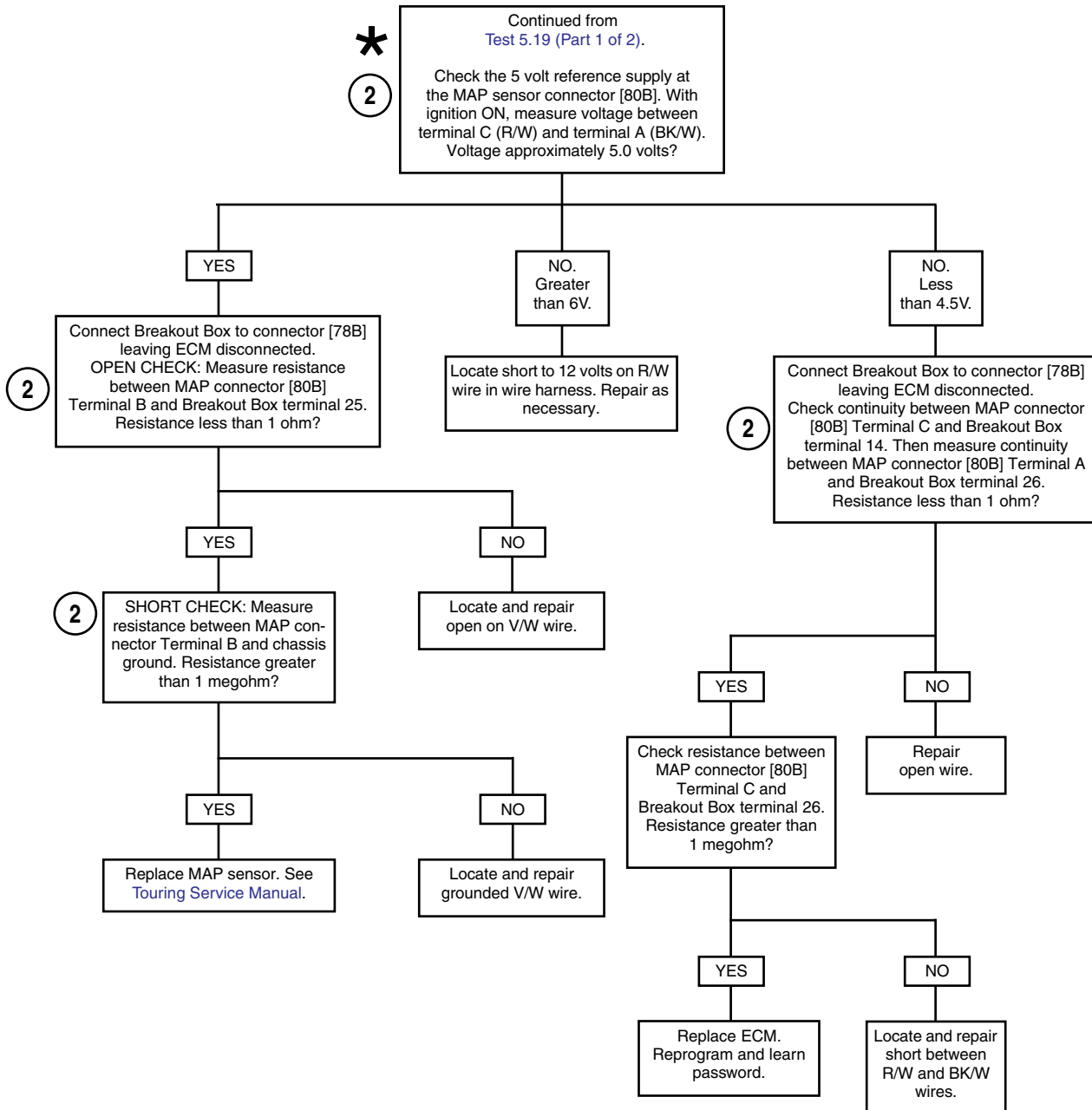
At some point in the flow chart you may be instructed to jump directly to a the box with the bold asterisk. Disregard the asterisk (but not the instruction box) if your normal progression through the chart brings you to this location.



Clear codes using speedometer self diagnostics. See Section 5.6 SPEEDOMETER SELF DIAGNOSTICS. Confirm proper operation with no check engine lamp.

Test 5.19 (Part 2 of 2)

MAP SENSOR: DTC P0107, P0108



At some point in the flow chart you may be instructed to jump directly to a 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 using speedometer self diagnostics. See Section 5.6 [SPEEDOMETER SELF DIAGNOSTICS](#). Confirm proper operation with no check engine lamp.

GENERAL

IAT Sensor

The ECM supplies and monitors a voltage signal (terminal 7) to one side of the IAT sensor. The other side of the IAT sensor is connected to a common sensor ground, which is also connected to the ECM (terminal 26).

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 voltage on (terminal 7).

- At high temperatures, the resistance of the sensor is very low, which effectively lowers the signal voltage on terminal 7.
- At low temperatures, the resistance is very high, allowing the voltage to rise close to 5 volts.

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

Table 5-28. Code Description

DTC	DESCRIPTION
P0112	IAT sensor voltage low
P0113	IAT sensor open/high

Table 5-29. IAT Sensor Table

TEMP °C	RESISTANCE	VOLTAGE	TEMP °F
-20	29121	4.9	-4
-10	16599	4.8	14
0	9750	4.6	32
10	5970	4.3	50
20	3747	4.0	68
25	3000	3.8	77
30	2417	3.6	86
40	1598	3.1	104
50	1080	2.6	122
60	746	2.2	140
70	526	1.7	158
80	377	1.4	176
90	275	1.1	194
100	204	0.9	212

DIAGNOSTICS

Diagnostic Tips

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

Check the following conditions:

- **Poor connection:** Inspect ECM and harness connector [78] for backed out terminals, improper mating, broken locks, improperly formed or damaged terminals, poor terminal-to-wire connection and damaged harness.
- **Perform Section 5.8 WIGGLE TEST to locate intermit-tents:** If connections and harness check out OK, use a DVOM to check the IAT sensor voltage reading while moving related connectors and wiring harness. If the failure is induced, the IAT sensor voltage reading will change.
- **Shifted sensor:** Refer to Table 5-29. This 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.

NOTE

All voltage and resistance values are approximate (±20%). Measure IAT sensor resistance between ECM Terminal 7 and system ground (ECM Terminal 26).

Diagnostic Notes

The reference numbers below correlate with the circled numbers on the Test 5.20 flow charts.

1. Connect BREAKOUT BOX (Part No. HD-43876) to EFI wire harness **only** (leave ECM disconnected). See Section 5.7 BREAKOUT BOX: EFI.
2. Use HARNESS CONNECTOR TEST KIT (Part No. HD-41404A), gray pin probes and patch cords.
3. Use HARNESS CONNECTOR TEST KIT (Part No. HD-41404A), gray socket probes and patch cords.
4. Replace IAT sensor. See Touring Service Manual.

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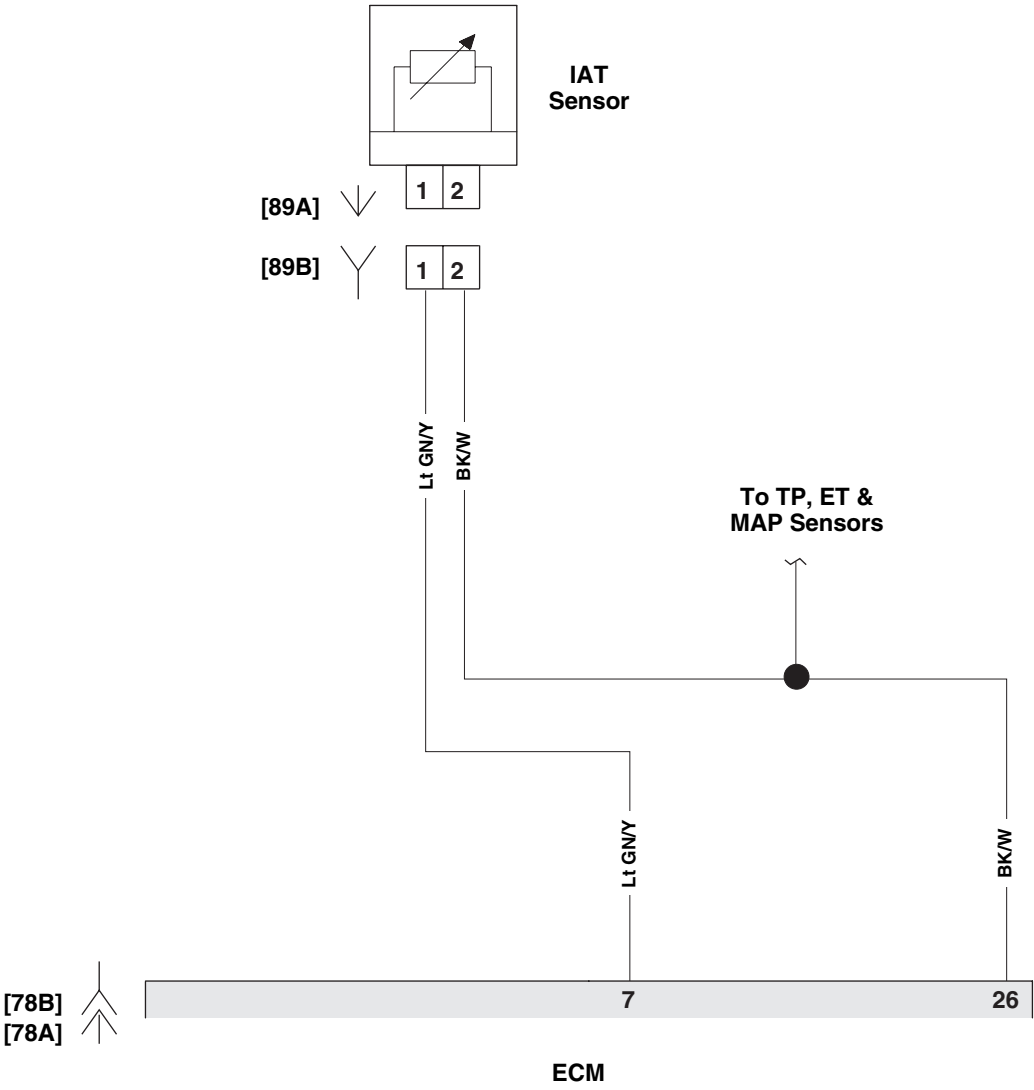


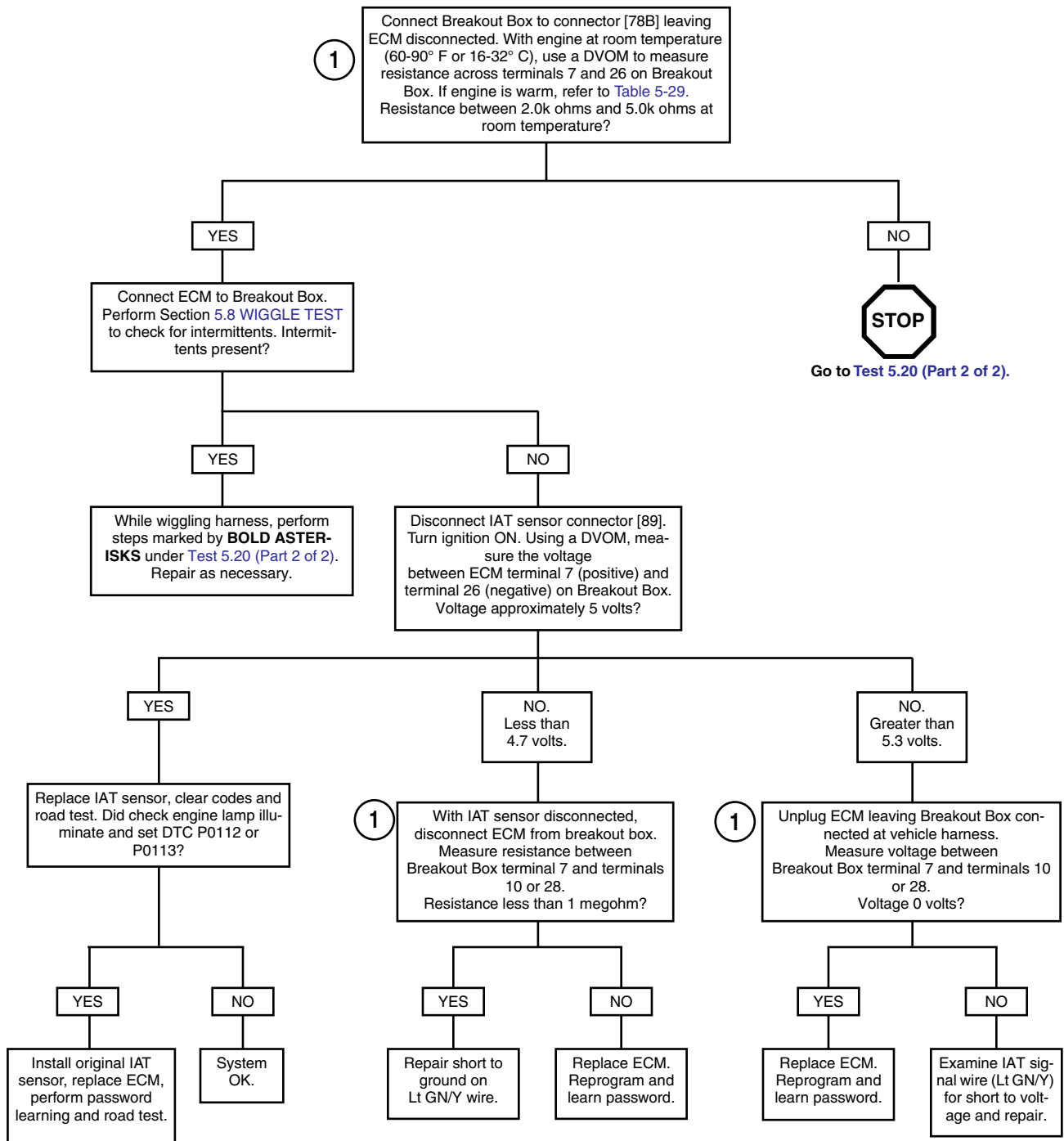
Figure 5-47. IAT Sensor Circuit

Table 5-30. Wire Harness Connectors in [Figure 5-47](#).

NO.	DESCRIPTION	TYPE	LOCATION
[78]	ECM	36-Place Packard	Under Right Side Cover
[89]	IAT Sensor	2-Place Delphi	Below Fuel Tank (Right Side)

Test 5.20 (Part 1 of 2)

IAT SENSOR: DTC P0112, P0113



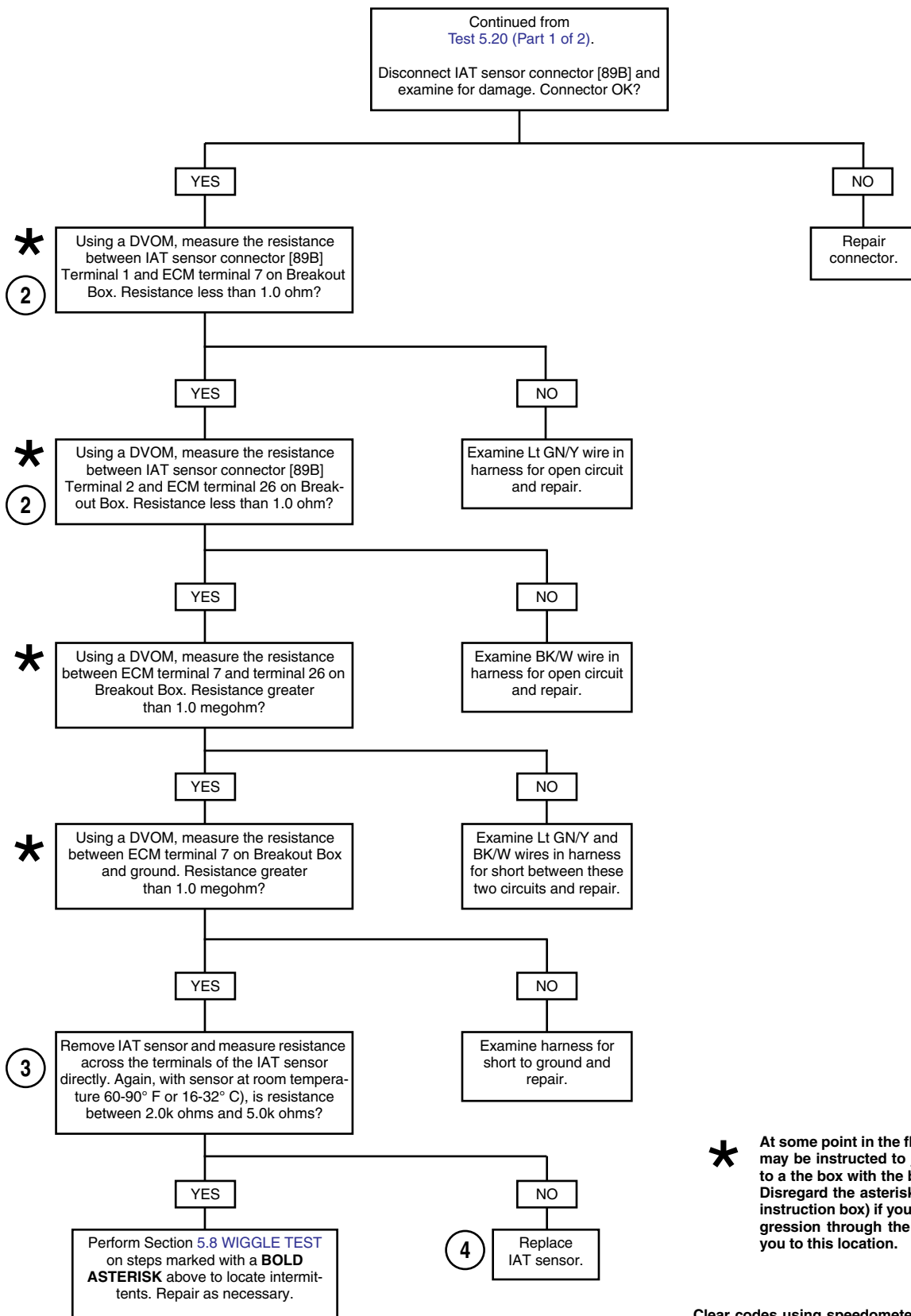
Clear codes using speedometer self diagnostics. See Section 5.6 SPEEDOMETER SELF DIAGNOSTICS. Confirm proper operation with no check engine lamp.



At some point in the flow chart you may be instructed to jump directly to a 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.

Test 5.20 (Part 2 of 2)

IAT SENSOR: DTC P0112, P0113



Clear codes using speedometer self diagnostics. See Section 5.6 SPEEDOMETER SELF DIAGNOSTICS. Confirm proper operation with no check engine lamp.

GENERAL

ET Sensor

The ECM supplies and monitors a voltage signal (terminal 6) to one side of the ET sensor. The other side of the ET sensor is connected to a common sensor ground (terminal 26) of the ECM.

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 voltage (terminal 6).

- At high temperatures, the resistance of the sensor is very low, which effectively lowers the signal voltage on terminal 6.
- At low temperatures, the resistance is very high, allowing the voltage to rise close to 5 volts.

The ECM monitors this voltage to compensate for various operating conditions. The ECM also uses the sensor input as a reference for determining IAC pintle position.

Table 5-31. Code Description

DTC	DESCRIPTION
P0117	ET sensor voltage low
P0118	ET sensor open/high

Table 5-32. ET Sensor Table

TEMP °C	RESISTANCE	VOLTAGE	TEMP °F
-20	28144	4.4	-4
-10	15873	4.0	14
0	9255	3.5	32
10	5571	3.0	50
20	3457	2.4	68
25	2750	2.1	77
30	2205	1.8	86
40	1442	1.3 or 4.1*	104
50	965	1.0 or 3.7*	122
60	661	3.3	140
70	462	2.9	158
80	329	2.5	176
90	238	2.1	194
100	175	1.7	212

* Between 40-50°C the ECM changes scaling. Voltages for ECT sensor will shift scales in that range. This provides proper sensor resolution for all temperatures.

DIAGNOSTICS

Diagnostic Tips

- Once the engine is started, the ET voltage should rise steadily.
- An intermittent may be caused by a poor connection, rubbed through wire insulation or a wire broken inside the insulation.

Check the following conditions:

- **Poor connection:** Inspect ECM and harness connector [78] for backed out terminals, improper mating, broken locks, improperly formed or damaged terminals, poor terminal-to-wire connection and damaged harness.
- **Perform Section 5.8 WIGGLE TEST to locate intermit-tents:** If connections and harness check out OK, use a DVOM to check the ET sensor voltage reading while moving related connectors and wiring harness. If the failure is induced, the ET sensor voltage reading will change.
- **Shifted sensor:** Refer to Table 5-32. This 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.

NOTE

All voltage and resistance values are approximate ($\pm 20\%$). Measure ET sensor resistance between ECM Terminal 6 and system ground (ECM Terminal 26).

Diagnostic Notes

The reference numbers below correlate with the circled numbers on the Test 5.21 flow charts.

1. Connect BREAKOUT BOX (Part No. HD-43876) to EFI wire harness **only** (leave ECM disconnected). See Section 5.7 BREAKOUT BOX: EFI.
2. Use HARNESS CONNECTOR TEST KIT (Part No. HD-41404A), gray pin probes and patch cords.
3. Use HARNESS CONNECTOR TEST KIT (Part No. HD-41404A), gray socket probes and patch cords.
4. Replace ET sensor. See Touring Service Manual.

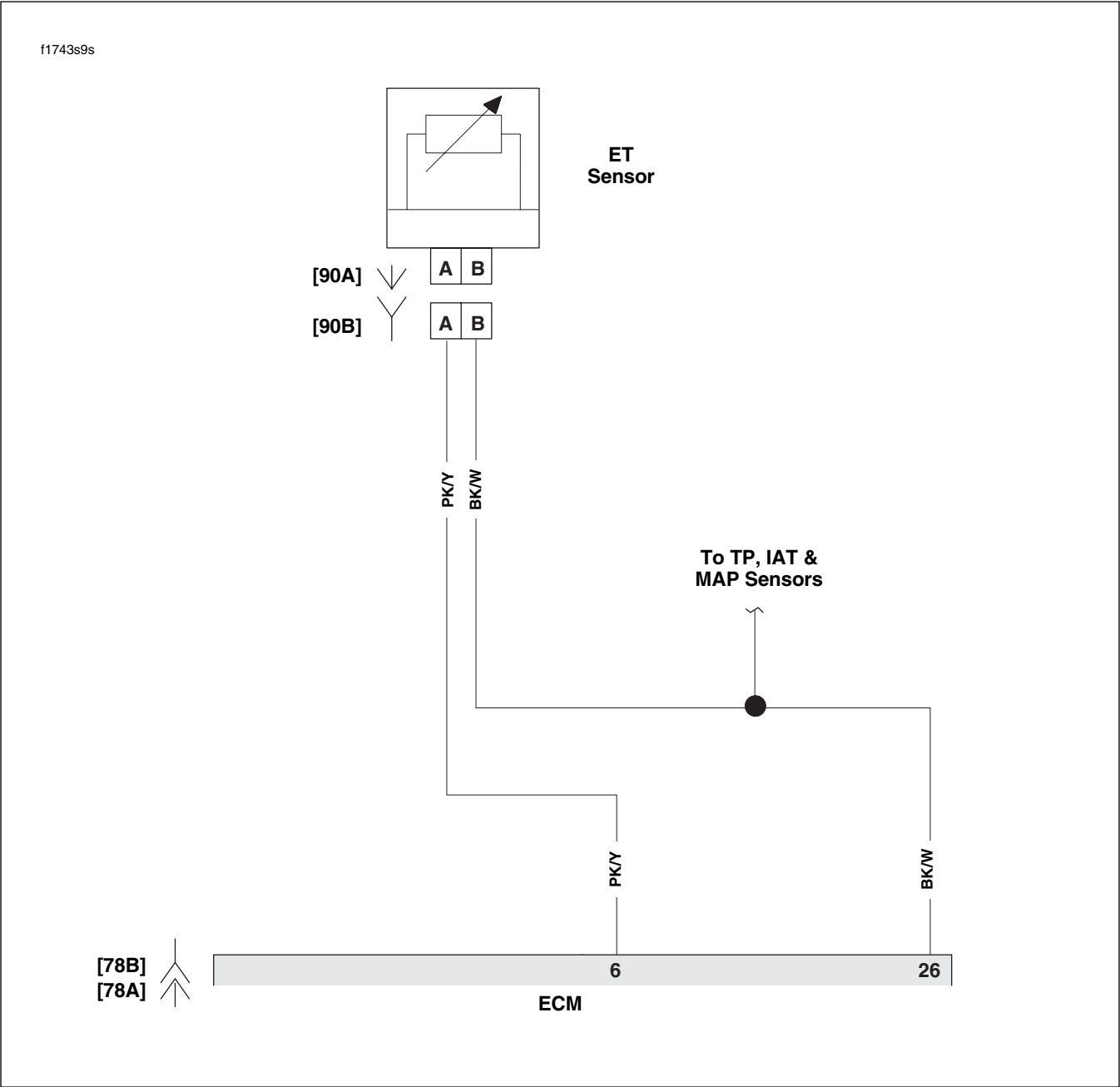


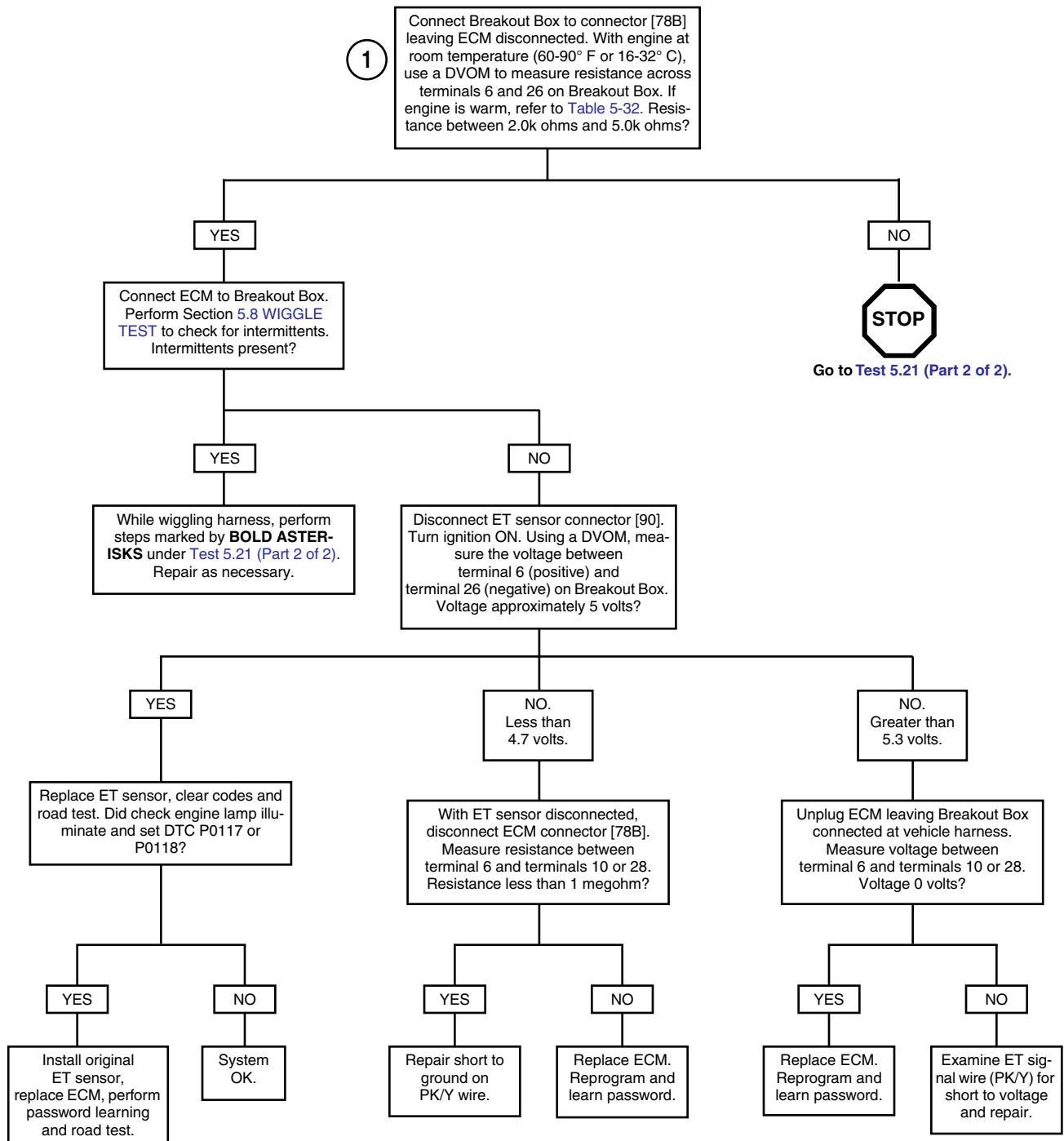
Figure 5-48. ET Sensor Circuit

Table 5-33. Wire Harness Connectors in Figure 5-48.

NO.	DESCRIPTION	TYPE	LOCATION
[78]	ECM	36-Place Packard	Under Right Side Cover
[90]	ET Sensor	2-Place Delphi	Back of Front Cylinder (Left Side)

Test 5.21 (Part 1 of 2)

ET SENSOR: DTC P0117, P0118



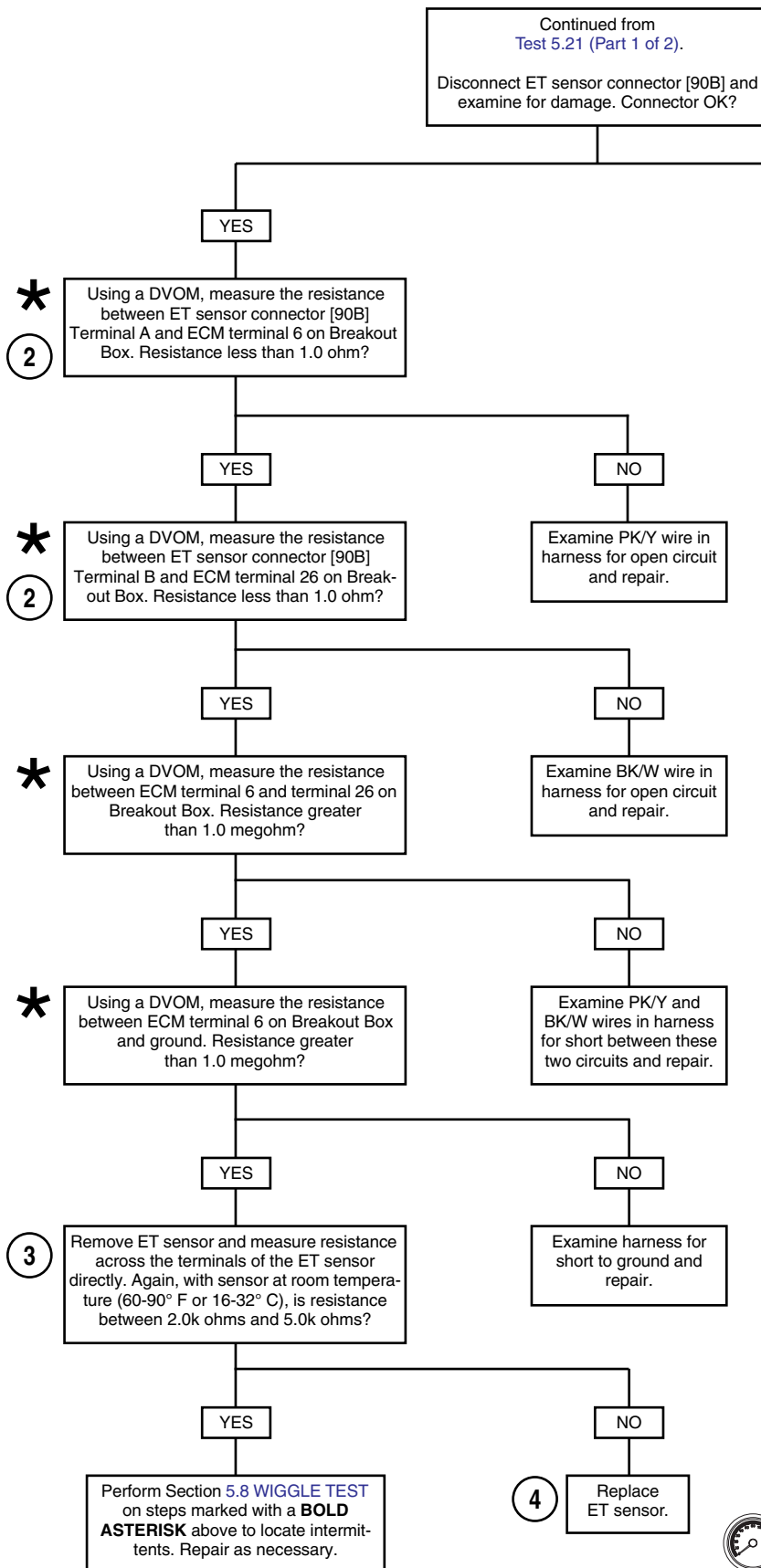
Clear codes using speedometer self diagnostics. See [Section 5.6 SPEEDOMETER SELF DIAGNOSTICS](#). Confirm proper operation with no check engine lamp.



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.

Test 5.21 (Part 2 of 2)

ET SENSOR: DTC P0117, P0118



***** 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 using speedometer self diagnostics. See Section 5.6 SPEEDOMETER SELF DIAGNOSTICS. Confirm proper operation with no check engine lamp.

GENERAL

TP Sensor

The ECM supplies a 5 volt signal (terminal 14) to the TP sensor. The TP sensor sends a signal back to the ECM (terminal 24). The returned signal varies in voltage according to throttle position.

- At idle (closed throttle), the signal is typically in the range of 0.20-0.80 volts.
- At wide open throttle, the signal is normally 4.0-4.9 volts.

A code P0122 or P0123 will set if the TP sensor voltage signal does not fall within the acceptable range.

- Check TP sensor voltage reading with DVOM. If TP sensor is equal to or greater than 3.8 volts then the system is in "clear flood" mode and engine will not start. While spark is present, fuel is shut off. Problem can be mechanical, such as stuck throttle cables.

Table 5-34. Code Description

DTC	DESCRIPTION
P0122	TP sensor open/low
P0123	TP sensor high

DIAGNOSTICS

Diagnostic Tips

The DVOM reads throttle position in volts. Voltage should increase at a steady rate as the throttle is moved from idle to wide open. A short to ground or open on the GY/V or R/W wires also will result in a DTC P0122. A short to ground or open on the R/W wire (+5v REF) sets multiple codes as described below.

NOTE

The MAP, TP and VSS sensors are connected to the same reference line (+5V Vref). If the reference line goes to ground or open, multiple codes will be set (DTC P0107, P0108, P0122, P0123, P0501, P0502). Start with the trouble code having the lowest ranking value.

Check for the following conditions:

- **Poor Connection:** Inspect ECM and harness connector [78B] for backed out terminals, improper mating, broken locks, improperly formed or damaged terminals, poor terminal-to-wire connection and damaged harness.
- **Perform Section 5.8 WIGGLE TEST to locate intermit-tents:** If connections and harness check out OK, monitor TP sensor voltage using a DVOM while moving related connectors and wiring harness. If the failure is induced, the TP sensor voltage reading will change.
- **TP sensor scaling:** Observe the TP sensor voltage display while opening the throttle with engine stopped and ignition key 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.

Diagnostic Notes

The reference numbers below correlate with the circled numbers on the Test 5.22 flow charts.

1. Connect a BREAKOUT BOX (Part No. HD-43876) between EFI wire harness and ECM before measuring voltage. See Section 5.7 BREAKOUT BOX: EFI. If using a DVOM to measure voltage, take reading across terminal 24 (positive lead) and terminal 26 (negative lead) on Breakout Box.
2. Replace TP sensor. See Touring Service Manual.
3. Use HARNESS CONNECTOR TEST KIT (Part No. HD-41404A), gray pin probes and patch cords.

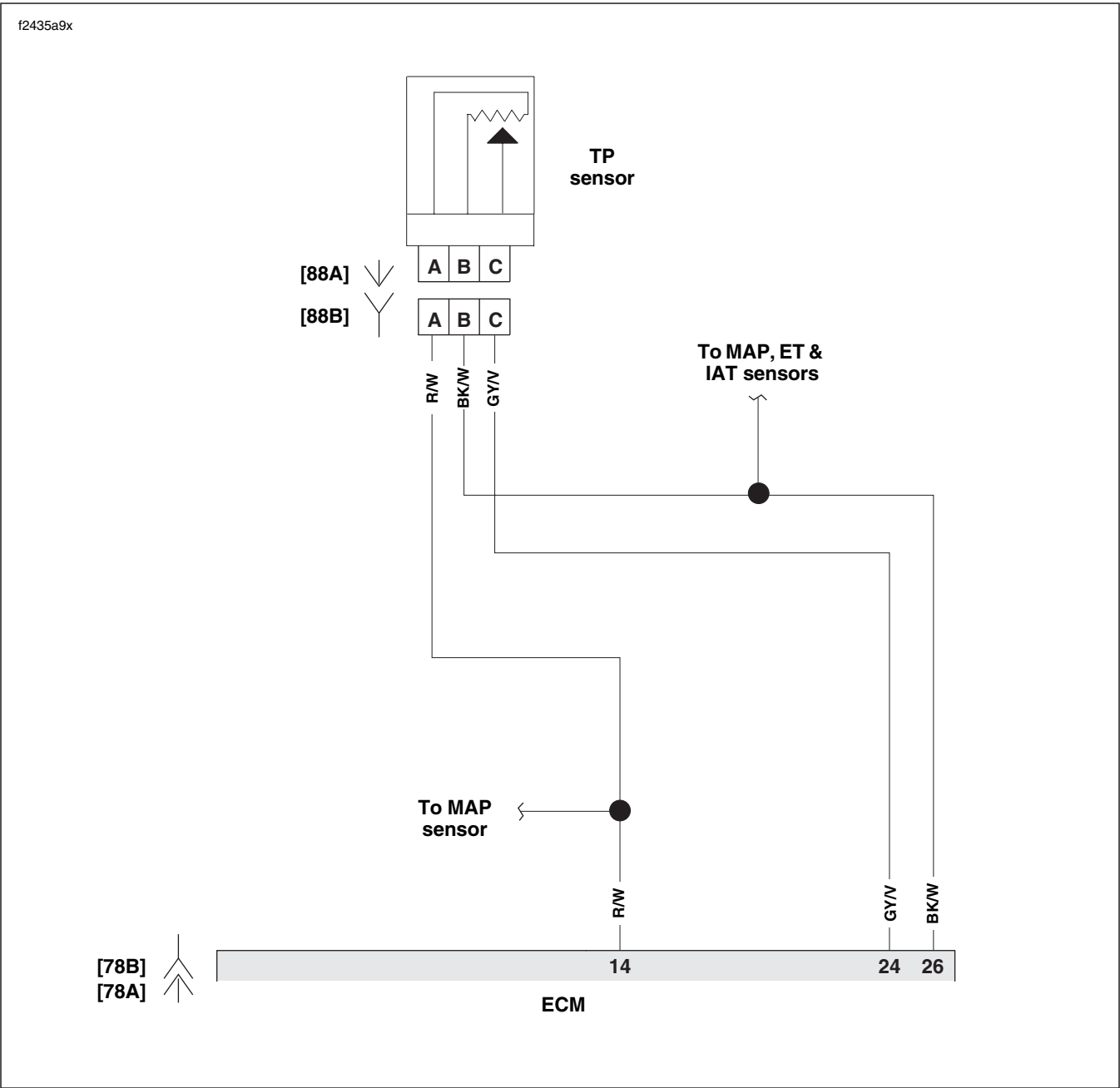


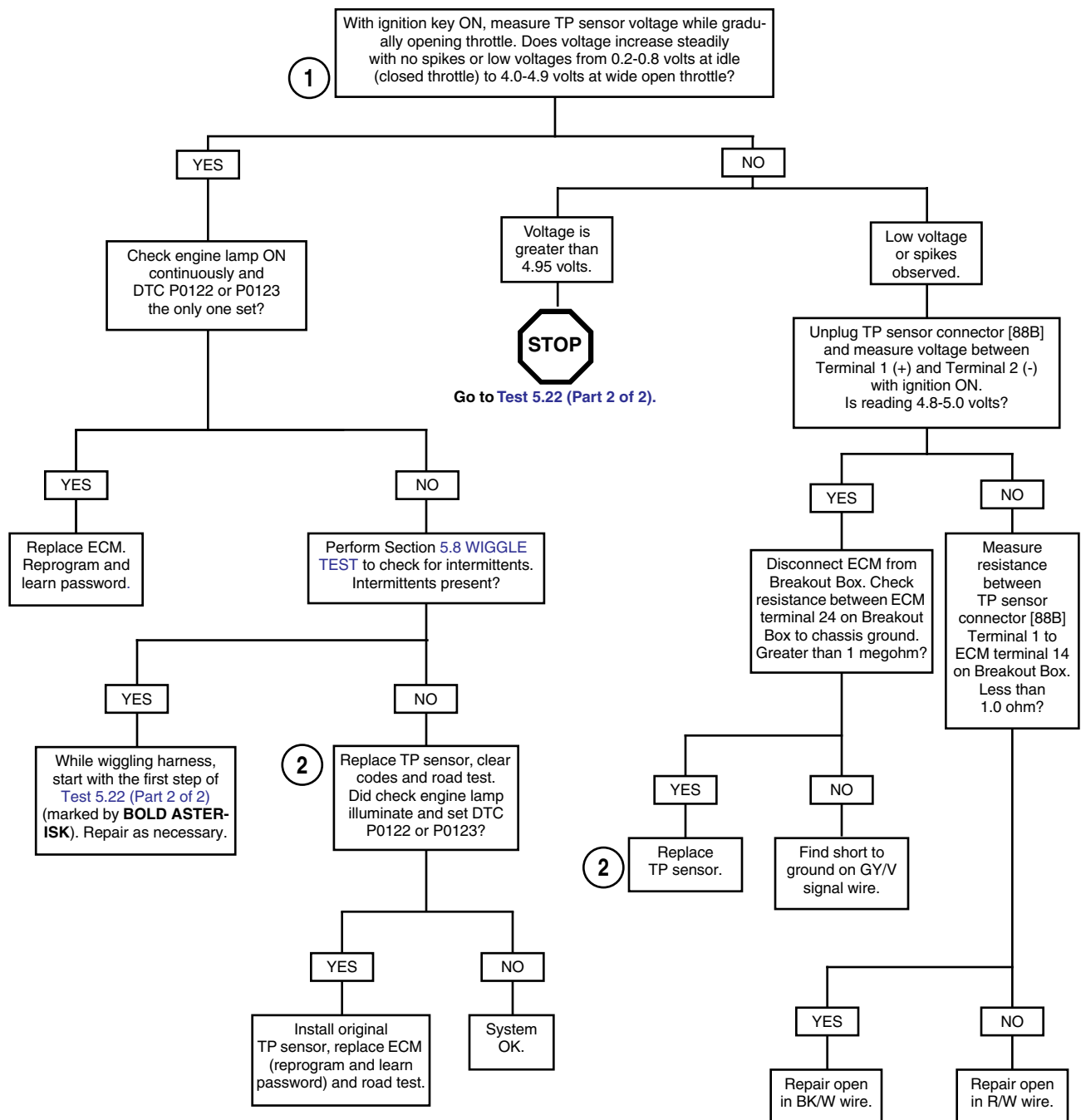
Figure 5-49. TP Sensor Circuit

Table 5-35. Wire Harness Connectors in [Figure 5-49](#).

NO.	DESCRIPTION	TYPE	LOCATION
[78]	ECM	36-Place Packard	Under Right Side Cover
[88]	TP Sensor	3-Place Delphi	Below Fuel Tank (Right Side)

Test 5.22 (Part 1 of 2)

TP SENSOR: DTC P0122, P0123



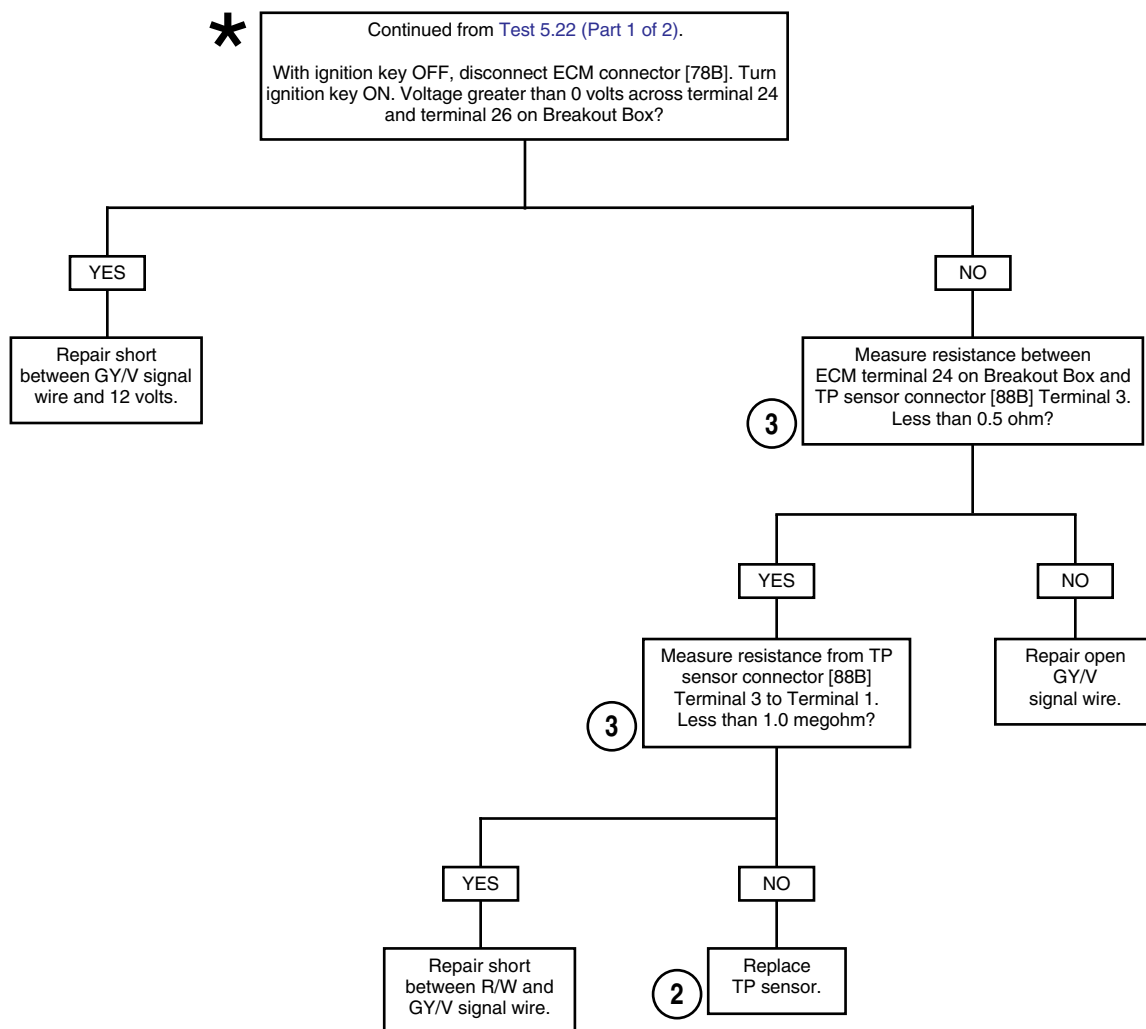
Clear codes using speedometer self diagnostics. See Section 5.6 SPEEDOMETER SELF DIAGNOSTICS. Confirm proper operation with no check engine lamp.



At some point in the flow chart you may be instructed to jump directly to a 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.

Test 5.22 (Part 2 of 2)

TP SENSOR: DTC P0122, P0123



Clear codes using speedometer self diagnostics. See Section 5.6 **SPEEDOMETER SELF DIAGNOSTICS**. Confirm proper operation with no check engine lamp.



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.

GENERAL

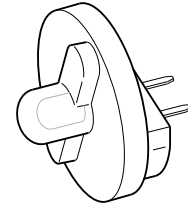
Fuel Injectors

The fuel injectors are solenoids that allow pressurized fuel into the intake tract. The injectors are timed to the engine cycle and triggered sequentially. The power for the injectors comes from the system relay. The system relay also provides power for the fuel pump and the ignition coil. The ECM provides the path to ground to trigger the injectors.

NOTE

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

HD34730-2C



**Figure 5-50. Fuel Injector Test Lamp
(Part No. HD-34730-2C)**

Table 5-36. Code Description

DTC	DESCRIPTION
P0261	Front injector open/low
P0262	Front injector high
P0263	Rear injector open/low
P0264	Rear injector high

DIAGNOSTICS

Diagnostic Notes

The reference numbers below correlate with the circled numbers on the Test 5.23 flow charts.

1. See Touring Service Manual for all service information.
2. Use HARNESS CONNECTOR TEST KIT (Part No. HD-41404A), purple pin probe and patch cord.
3. Connect a BREAKOUT BOX (Part No. HD-43876) between EFI wire harness and ECM. See Section 5.7 [BREAKOUT BOX: EFI](#).

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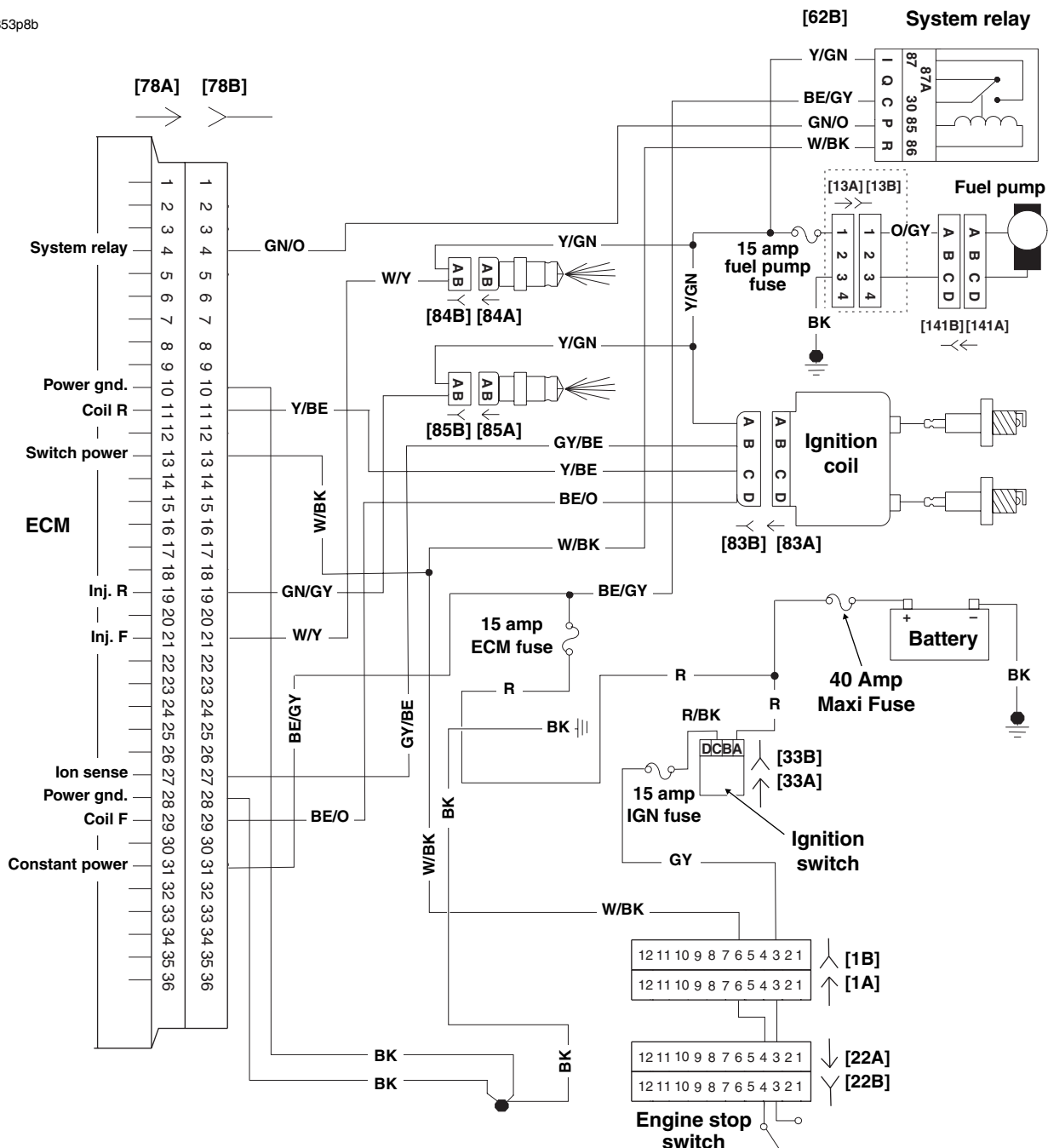


Figure 5-51. Battery Voltage Circuit (FLHX, FLHT/C/U, FLTR)

Table 5-37. Wire Harness Connectors in Figure 5-51.

NO.	DESCRIPTION	TYPE	LOCATION
[1]	Main to Interconnect Harness	12-Place Deutsch (Black)	Inner Fairing - Right Radio Support Bracket
[22]	Right Handlebar Switches	12-Place Deutsch (Black)	Inner Fairing (Fork Stem Nut Lock Plate)
[33]	Ignition/Light Key Switch	3-Place Packard	Inner Fairing -Under Radio
[78]	ECM	36-Place Packard	Under Right Side Cover
[83]	Ignition Coil	4-Place Delphi	Below Fuel Tank (Left Side)
[84]	Front Injector	2-Place Delphi	Below Fuel Tank (Left Side)
[85]	Rear Injector	2-Place Delphi	Below Fuel Tank (Left Side)

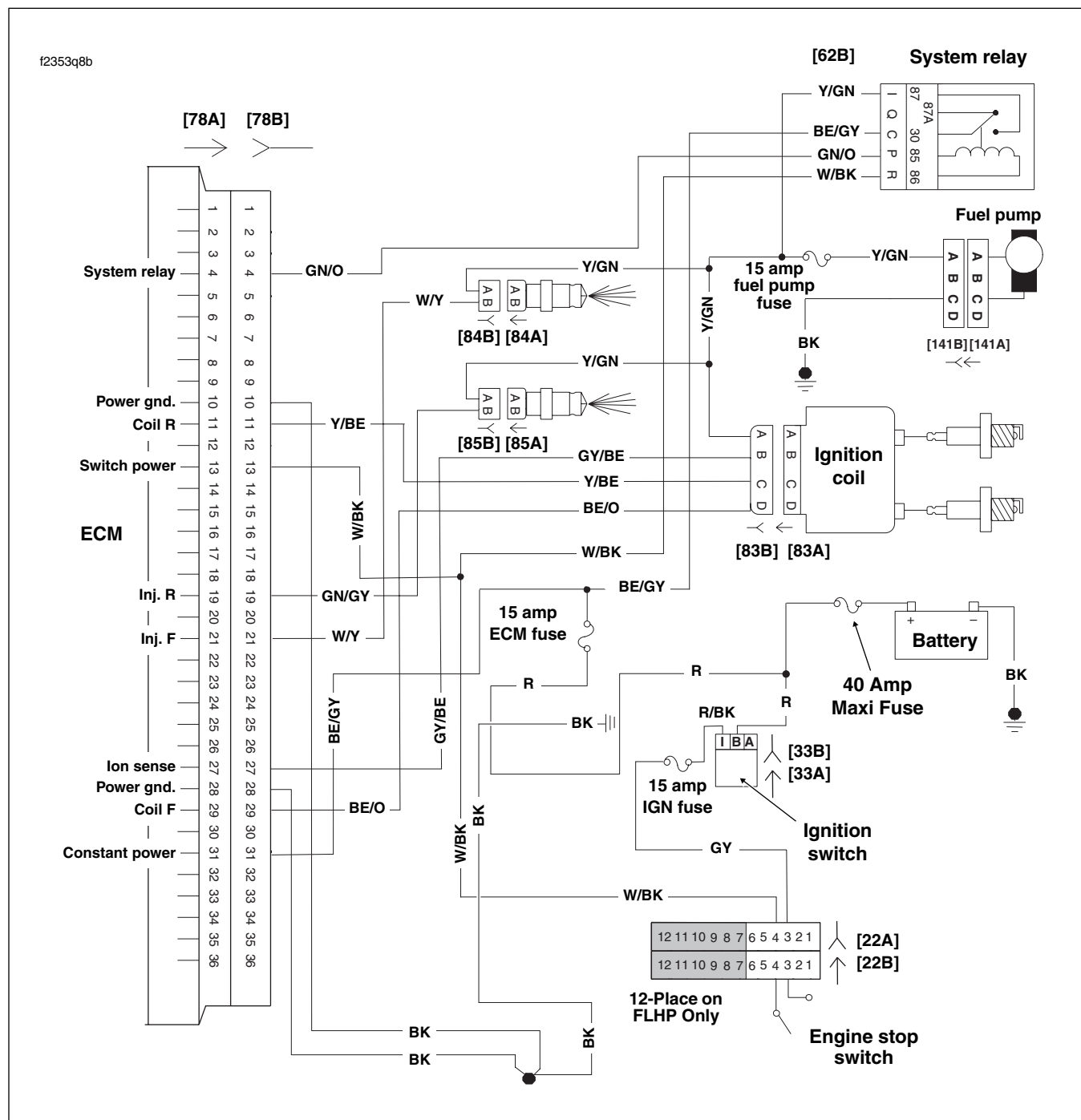


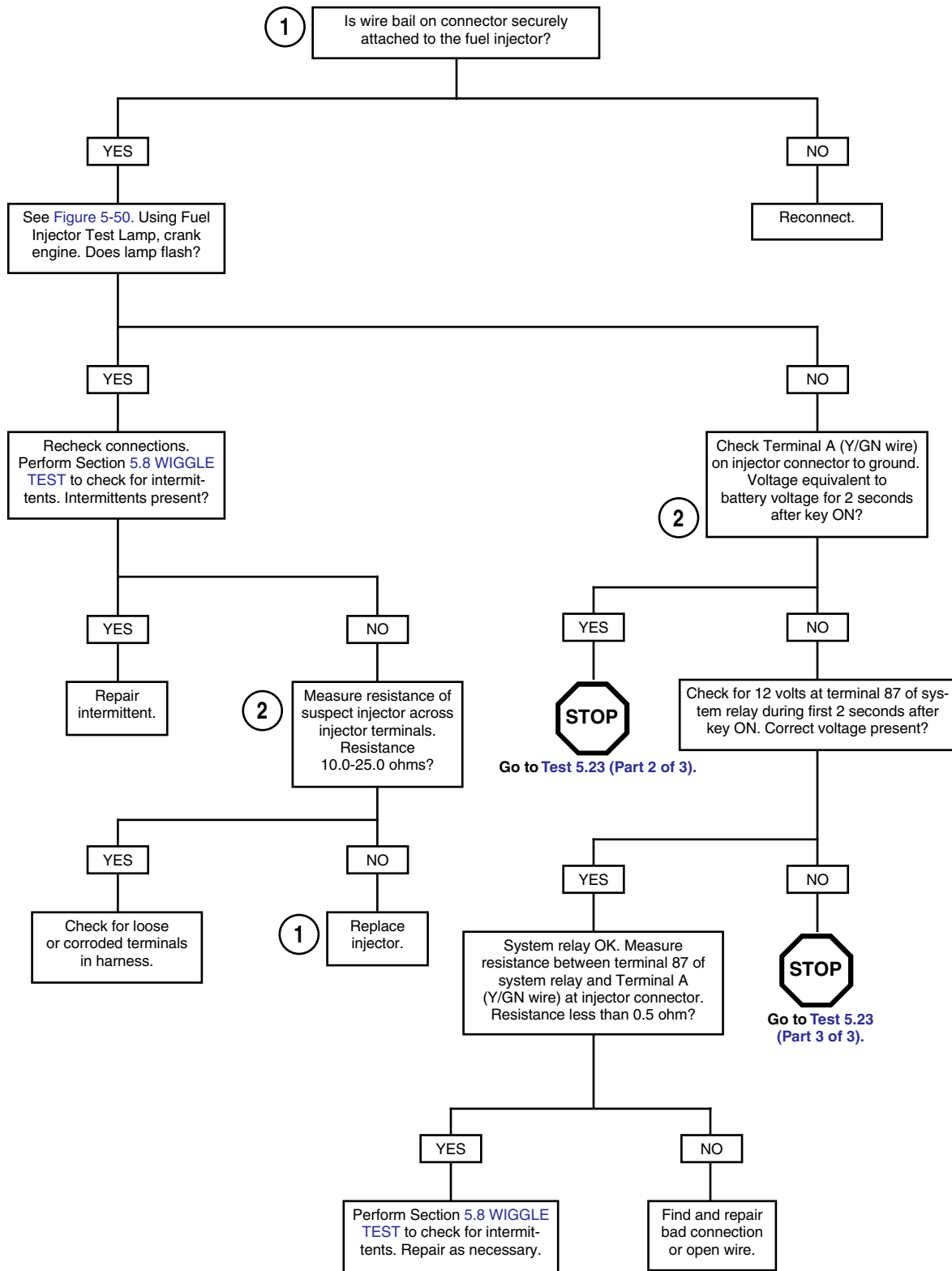
Figure 5-52. Battery Voltage Circuit (FLHR/C/S)

Table 5-38. Wire Harness Connectors in Figure 5-52.

NO.	DESCRIPTION	TYPE	LOCATION
[22]	Right Handlebar Switches	12-Place Deutsch (Black)	Inside Headlamp Nacelle
[33]	Ignition/Light Key Switch	3-Place Packard	Under Console
[78]	ECM	36-Place Packard	Under Right Side Cover
[83]	Ignition Coil	4-Place Delphi	Below Fuel Tank (Left Side)
[84]	Front Injector	2-Place Delphi	Below Fuel Tank (Left Side)
[85]	Rear Injector	2-Place Delphi	Below Fuel Tank (Left Side)

Test 5.23 (Part 1 of 3)

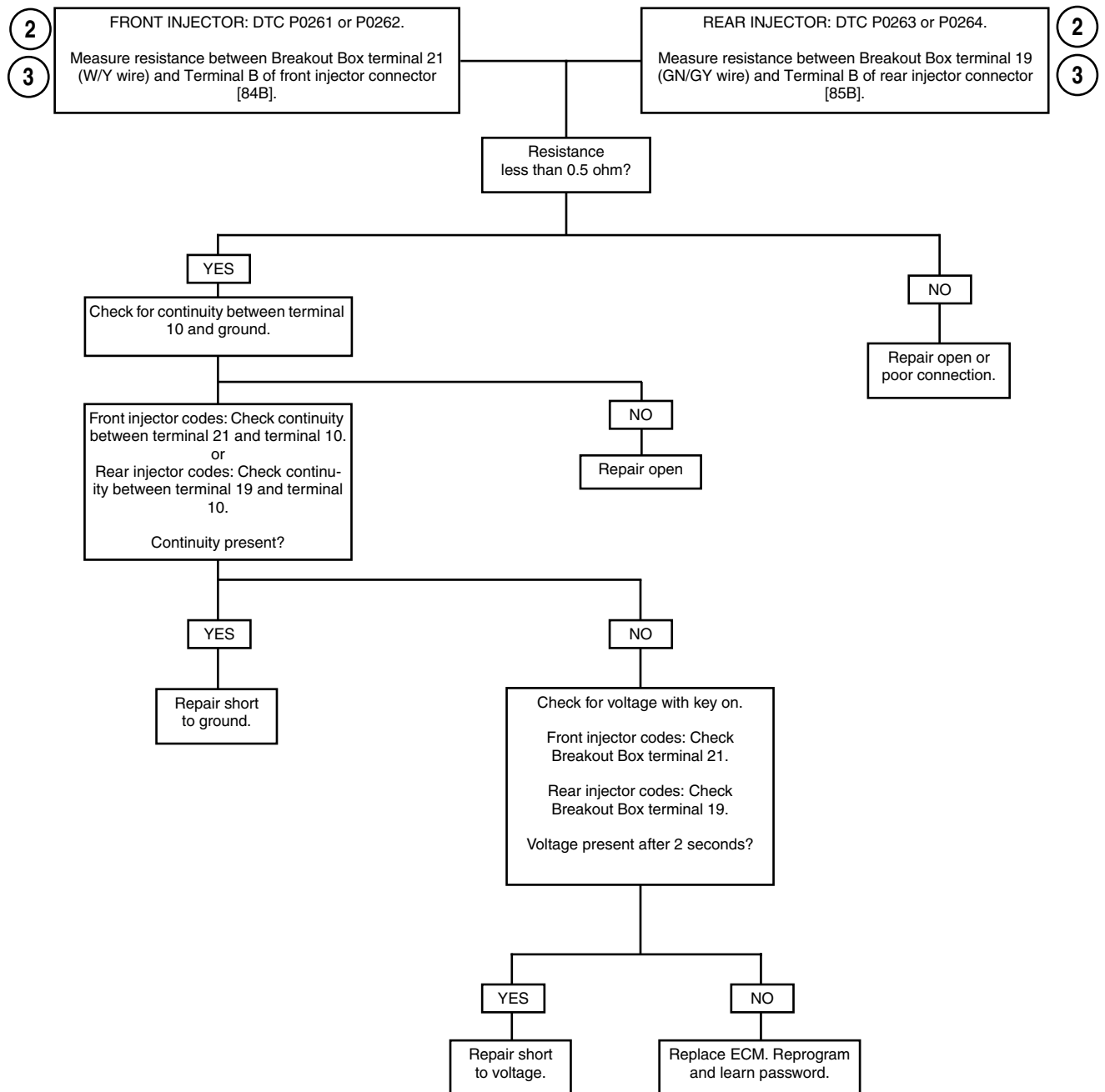
FUEL INJECTORS: DTC P0261, P0262, P0263, P0264



Clear codes using speedometer self diagnostics. See Section 5.6 SPEEDOMETER SELF DIAGNOSTICS. Confirm proper operation with no check engine lamp.

Test 5.23 (Part 2 of 3)

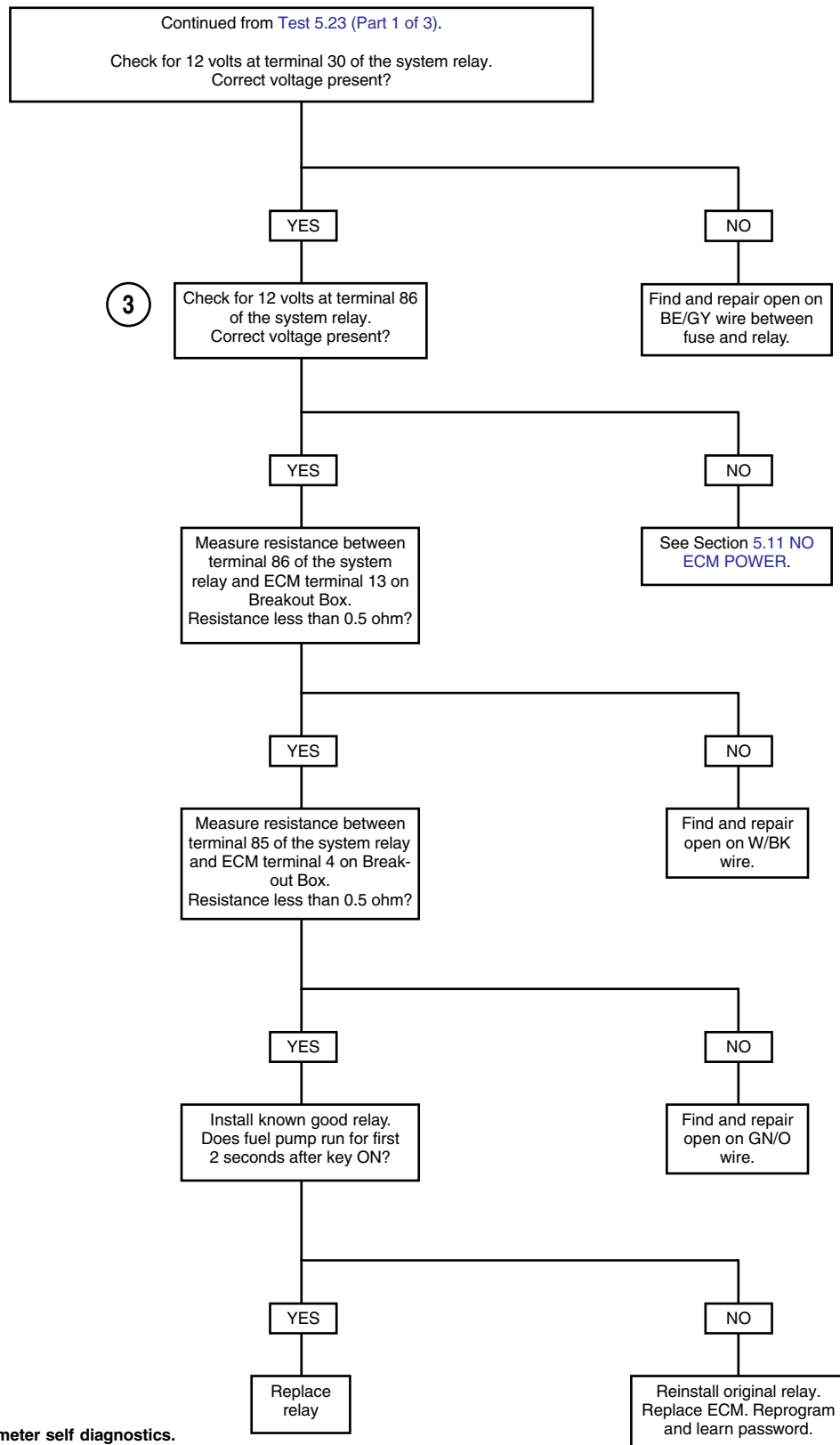
FUEL INJECTORS: DTC P0261, P0262, P0263, P0264



Clear codes using speedometer self diagnostics. See Section 5.6 **SPEEDOMETER SELF DIAGNOSTICS**. Confirm proper operation with no check engine lamp.

Test 5.23 (Part 3 of 3)

FUEL INJECTORS: DTC P0261, P0262, P0263, P0264



Clear codes using speedometer self diagnostics. See Section [5.6 SPEEDOMETER SELF DIAGNOSTICS](#). Confirm proper operation with no check engine lamp.

GENERAL

CKP Sensor

If the CKP sensor signal is weak or absent, DTC's P0373 or P0374 will be set.

NOTE

If signal is not detected or cannot synchronize (DTC P0374), engine will not start.

Table 5-39. Code Description

DTC	DESCRIPTION
P0373	CKP sensor intermittent
P0374	CKP sensor synch error

DIAGNOSTICS

Diagnostic Tips

- Engine must be cranked for more than five seconds without CKP signal to set code.

Diagnostic Notes

The reference numbers below correlate with the circled numbers on the Test 5.24 flow chart.

1. Connect BREAKOUT BOX (Part No. HD-43876) to ECM wire harness **only** (leave ECM disconnected). See Section 5.7 BREAKOUT BOX: EFI.
2. One megohm is very high resistance. Some meters will read ∞ , OL, etc.
3. Use HARNESS CONNECTOR TEST KIT (Part No. HD-41404A), brown socket probes and patch cords.
4. For testing purposes, install sensor without running wiring along normal path. Disconnect and route wiring properly if system is now OK.

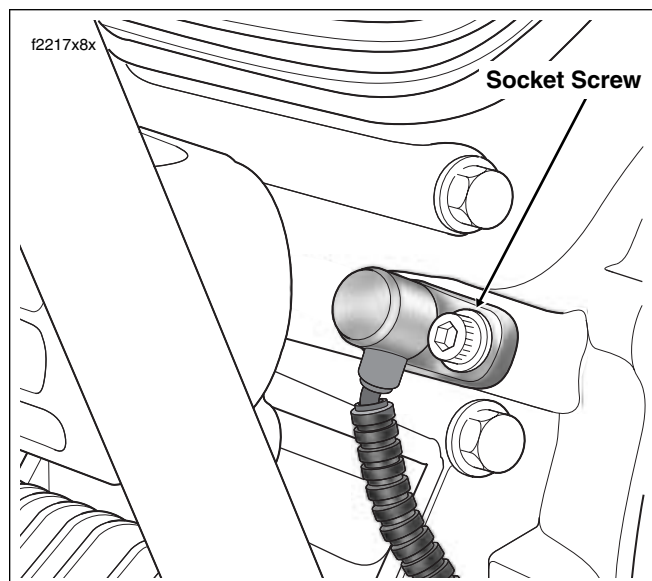


Figure 5-53. CKP Sensor

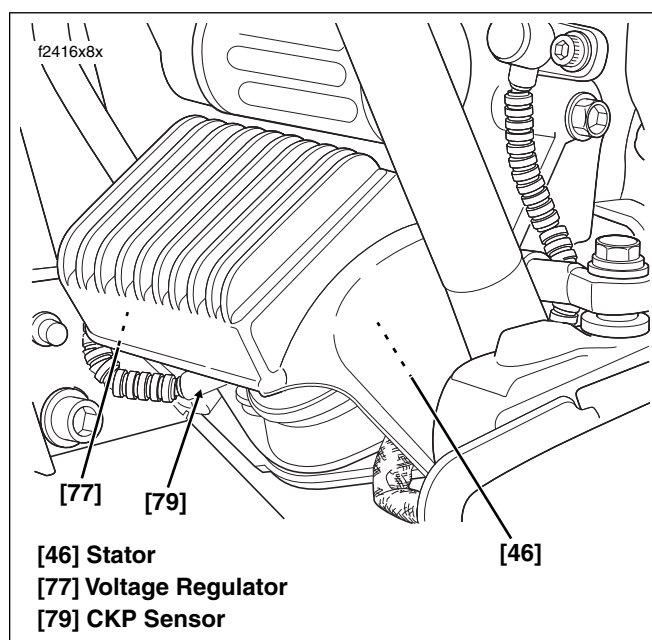


Figure 5-54. Voltage Regulator (Left Side View)

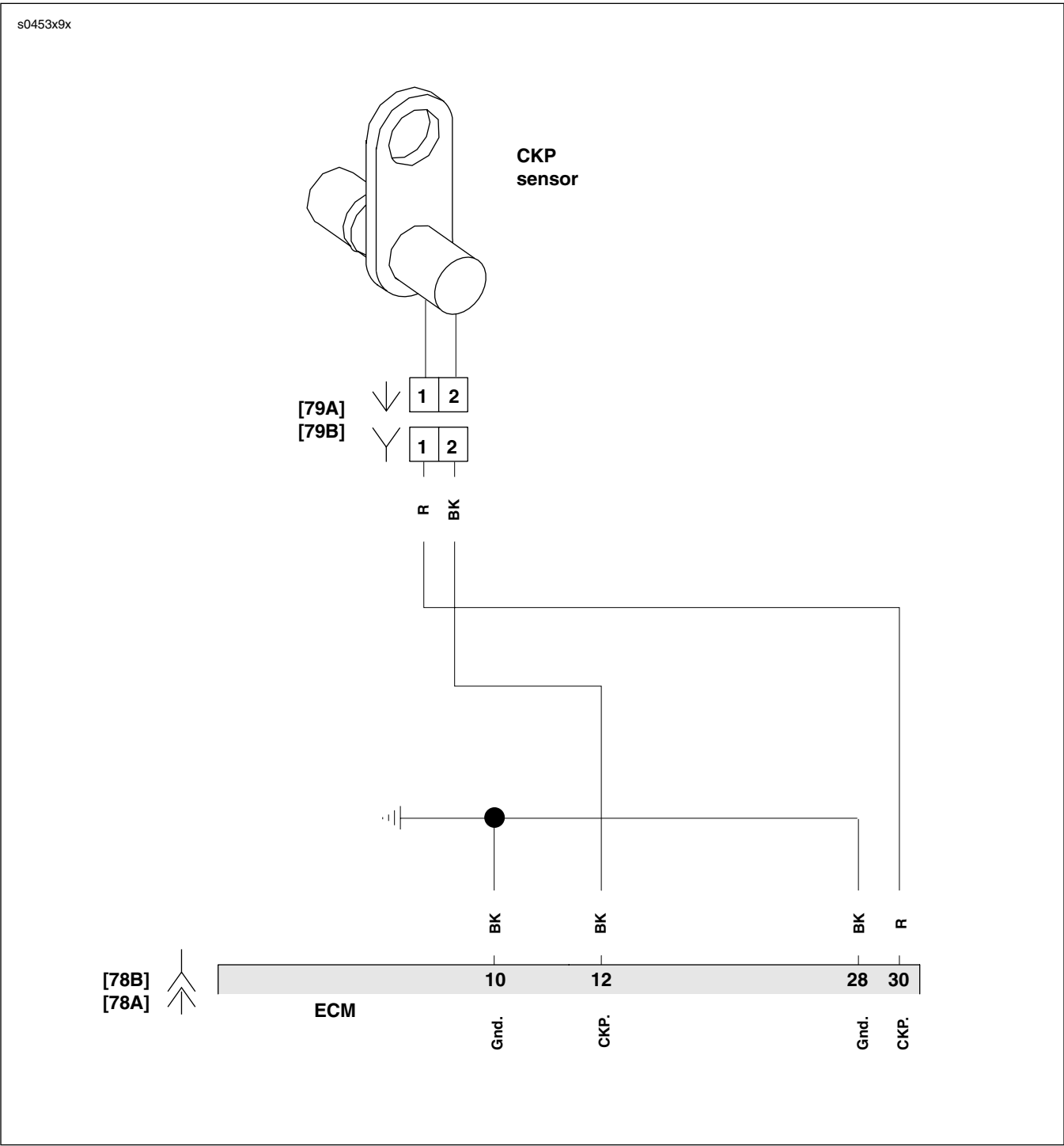


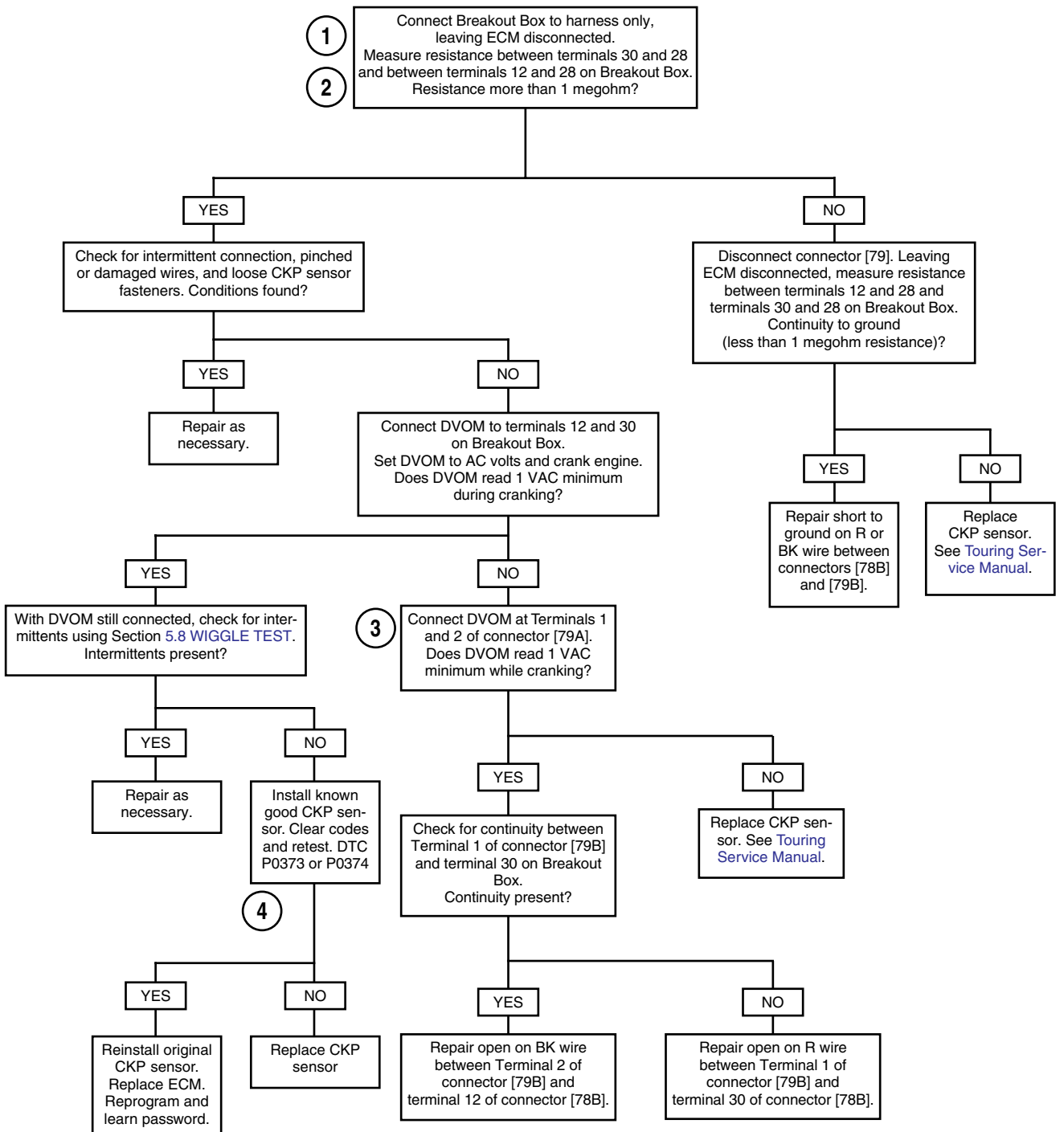
Figure 5-55. CKP Circuit

Table 5-40. Wire Harness Connectors in [Figure 5-55](#).

NO.	DESCRIPTION	TYPE	LOCATION
[78]	ECM	36-Place Packard	Under Right Side Cover
[79]	CKP Sensor	2-Place Mini-Deutsch	Bottom of Voltage Regulator

Test 5.24

CKP SENSOR: DTC P0373, P0374



Clear codes using speedometer self diagnostics. See Section 5.6 [SPEEDOMETER SELF DIAGNOSTICS](#). Confirm proper operation with no check engine lamp.

GENERAL

Vehicle Speed Sensor

See [Figure 5-56](#). The VSS is powered and monitored by the ECM. The ECM processes the vehicle speed signal and transmits this signal to the TSM/TSSM and speedometer through serial data.

NOTE

When the vehicle speed is greater than 0, the closed loop idle speed control is inhibited.

Table 5-41. Code Description

DTC	DESCRIPTION
P0501	VSS sensor low
P0502	VSS sensor high/open

DIAGNOSTICS

Diagnostic Notes

The reference numbers below correlate with the circled numbers on the Test 5.25 flow charts.

1. The speedometer has a built-in diagnostic mode. See [Section 2.3 SPEEDOMETER SELF DIAGNOSTICS](#).
2. Use HARNESS CONNECTOR TEST KIT (Part No. HD-41404A), black pin probe and patch cord.
3. Connect BREAKOUT BOX (Part No. HD-43876) between wire harness and ECM. See [Section 5.7 BREAKOUT BOX: EFI](#).

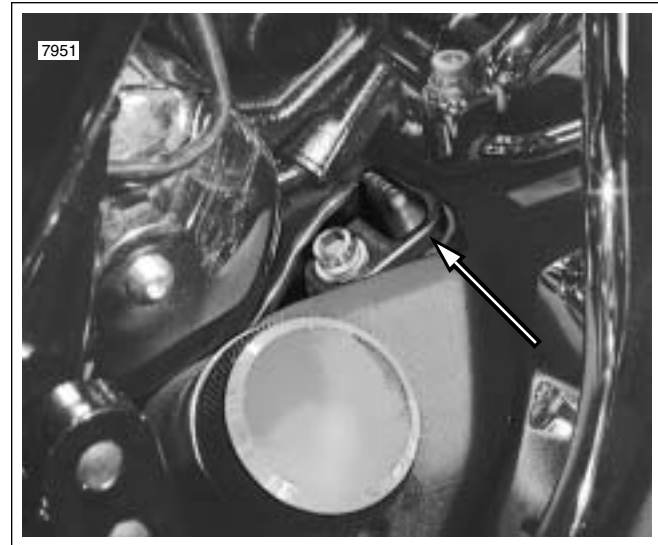


Figure 5-56. VSS

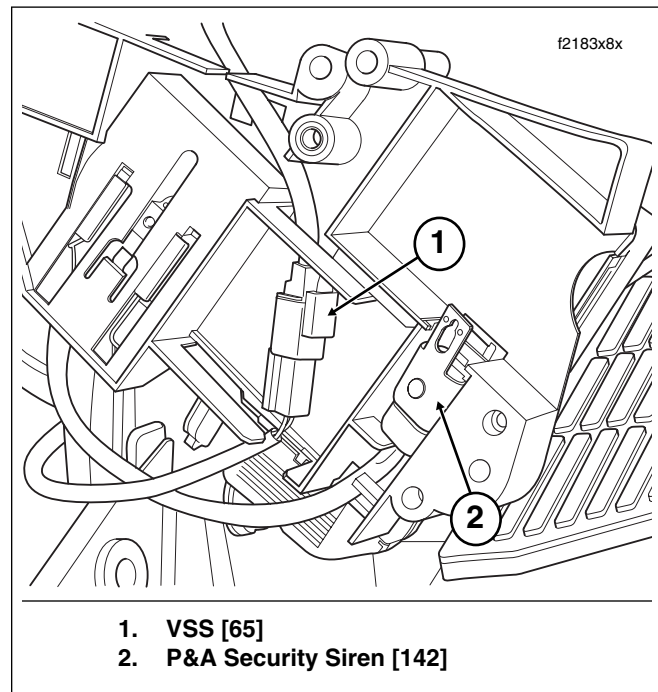


Figure 5-57. Electrical Bracket (Inboard Side)

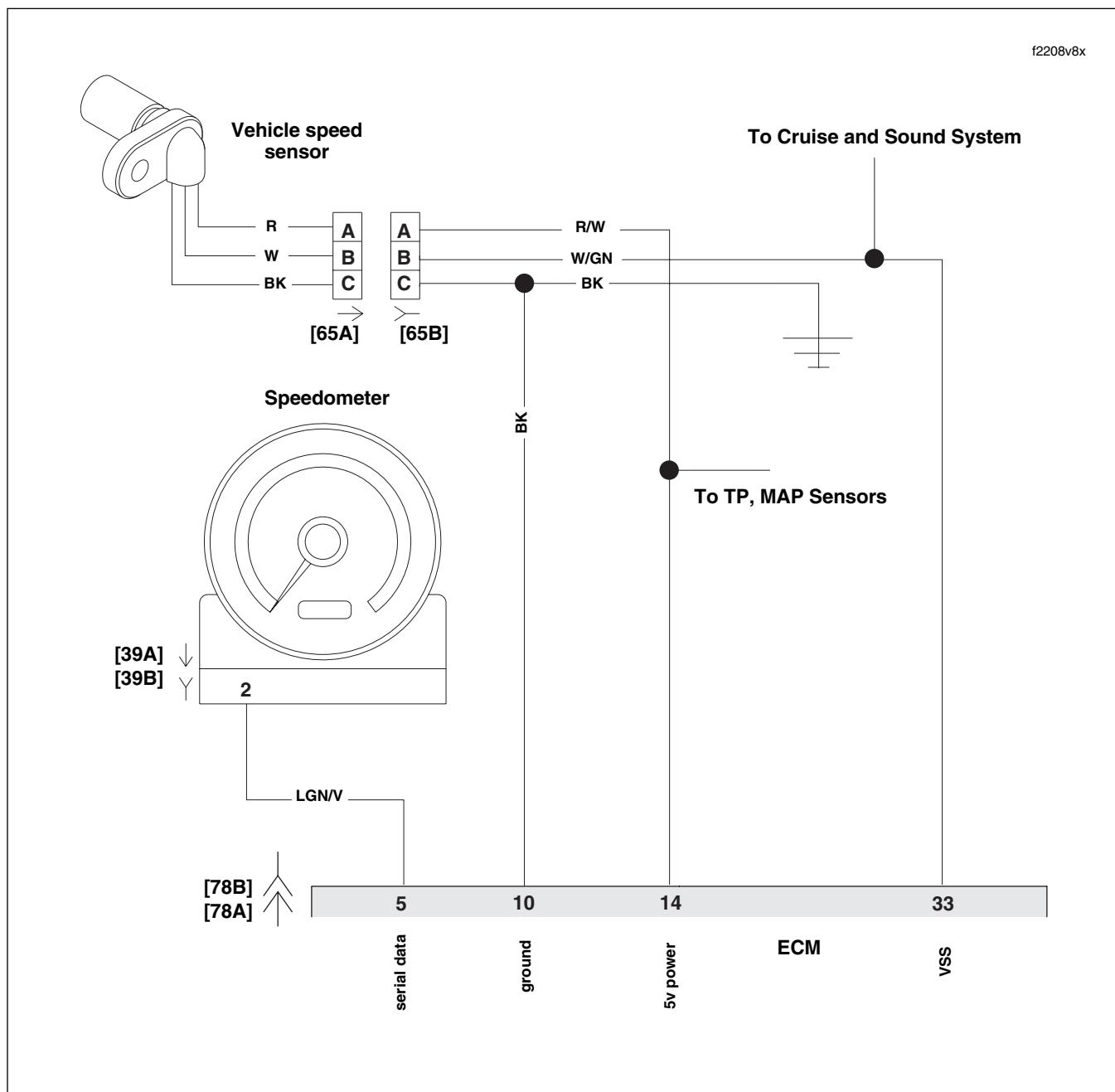


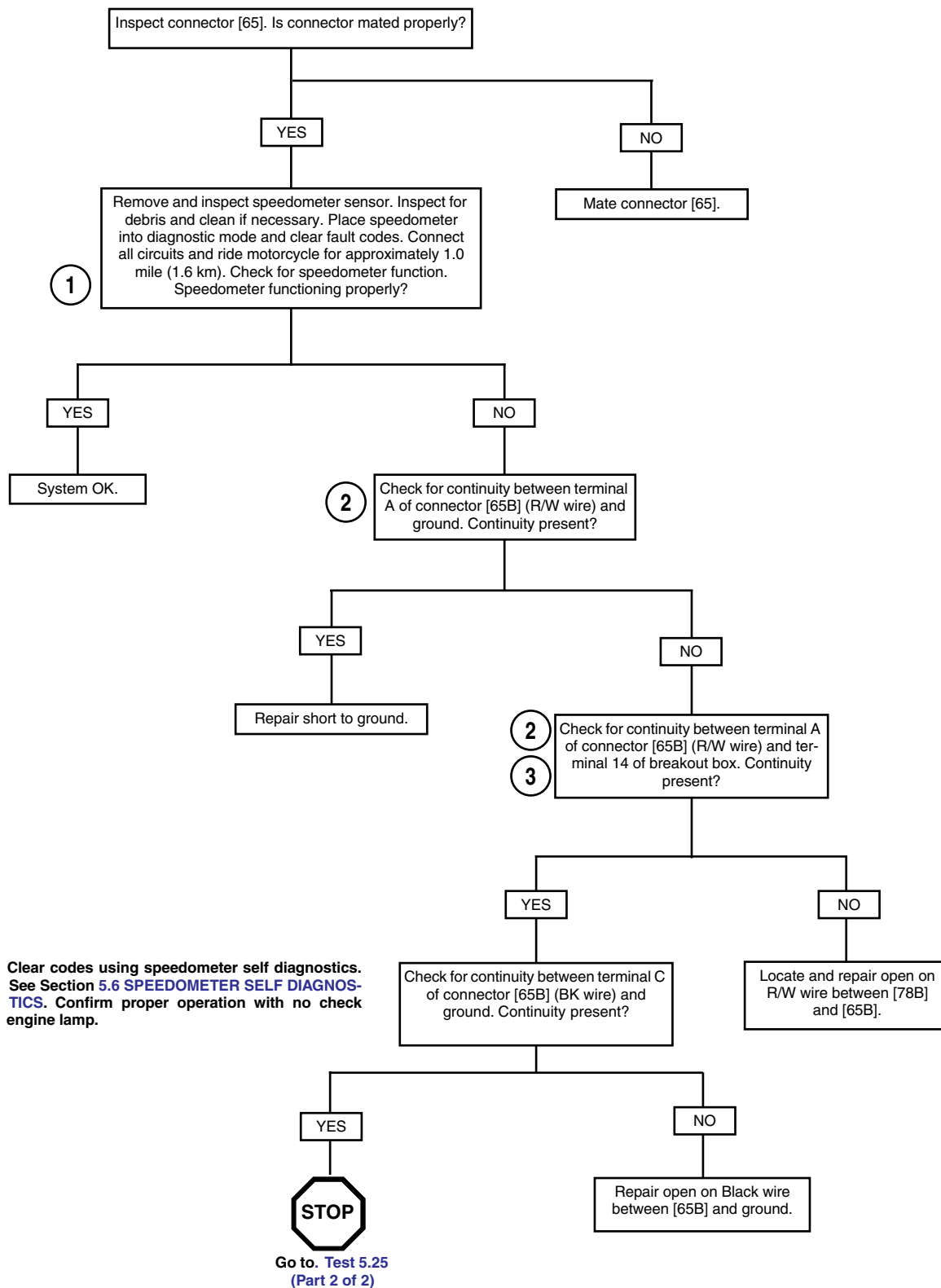
Figure 5-58. VSS Circuit

Table 5-42. Wire Harness Connectors in Figure 5-58.

NO.	DESCRIPTION	MODEL	TYPE	LOCATION
[39]	Speedometer	FLTR	12-Place Packard	Under Instrument Bezel (Back of Speedometer)
		FLHT/C/U	12-Place Packard	Inner Fairing (Back of Speedometer)
		FLHR/C/S	12-Place Packard	Back of Speedometer (Under Console)
[65]	VSS	All	3-Place Deutsch	Under Right Side Cover (Behind Electrical Bracket)
[78]	ECM	All	36-Place Packard	Under Right Side Cover

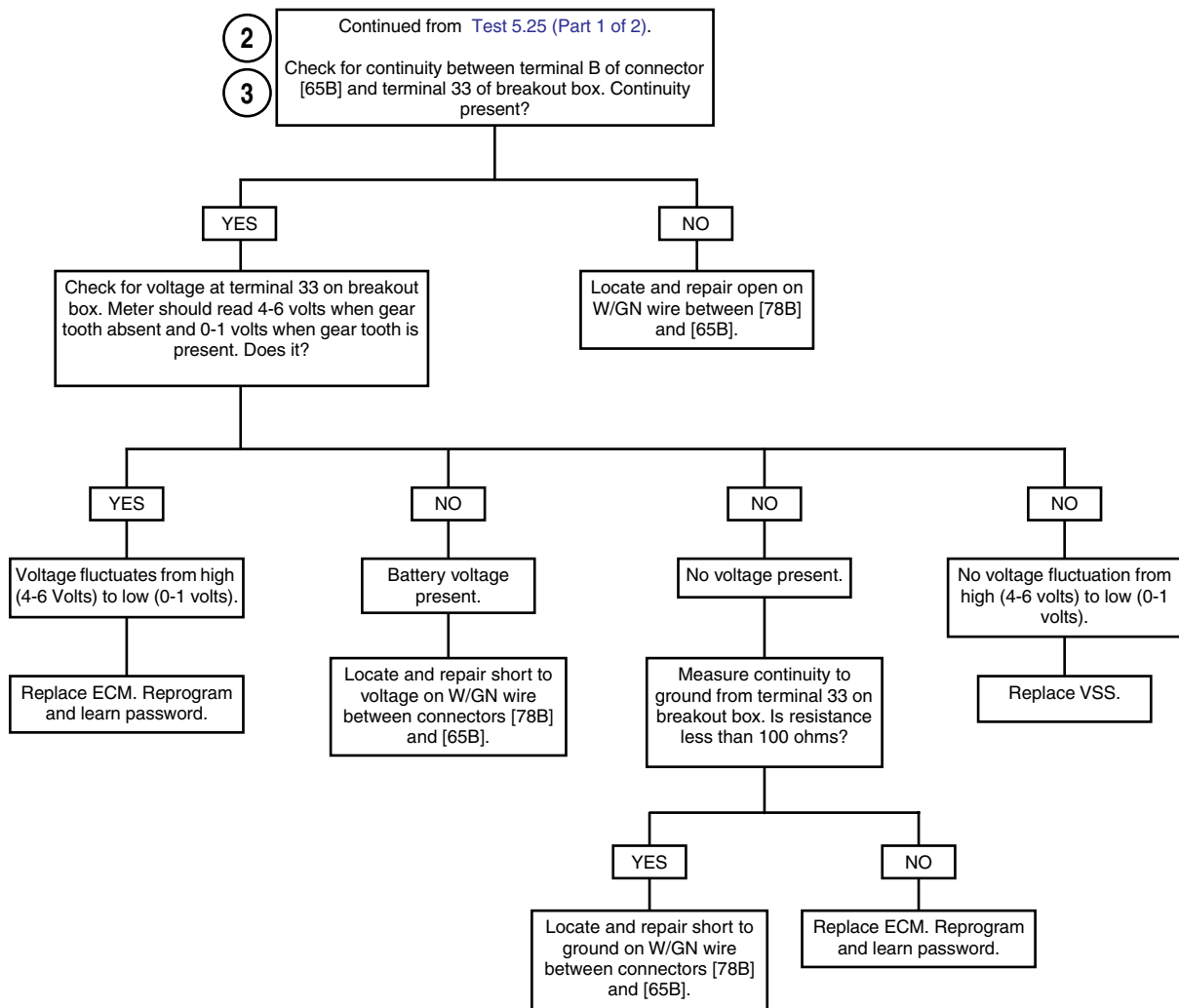
Test 5.25 (Part 1 of 2)

VEHICLE SPEED SENSOR: DTC P0501, P0502



Test 5.25 (Part 2 of 2)

VEHICLE SPEED SENSOR: DTC P0501, P0502



Clear codes using speedometer self diagnostics. See [Section 5.6 SPEEDOMETER SELF DIAGNOSTICS](#). Confirm proper operation with no check engine lamp.

GENERAL

Battery Voltage

Battery voltage is monitored by the ECM (terminal 13). If the battery voltage fails to meet normal operating parameters, a code is set.

- When battery voltage at low rpm (<1300 rpm) is less than 12.5 volts **and** battery voltage at high rpm (>2000 rpm) minus battery voltage at low rpm is less than 0.25 volts, then DTC P0562 is set after 100 counts (up to 15 seconds).
- Code P0563 is displayed when battery positive voltage is greater than 15.0 volts for more than 4 seconds.

NOTES

- Warm idle speed will be automatically increased if battery voltage is low at idle.
- TSSM problems may also set a code P0562 or P0563.

Table 5-43. Code Description

DTC	DESCRIPTION
P0562	Battery voltage low
P0563	Battery voltage high

DIAGNOSTICS

Diagnostic Tips

- Low voltage generally indicates a loose wire, corroded connections, battery and/or a charging system problem.
- A high voltage condition may be caused by a faulty voltage regulator.

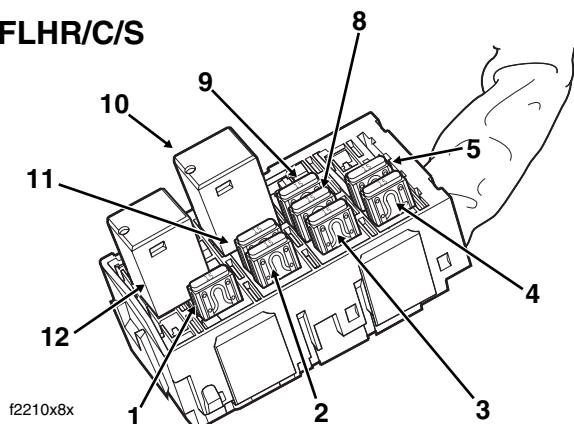
Diagnostic Notes

The reference numbers below correlate with the circled numbers on the Test 5.26 flow charts.

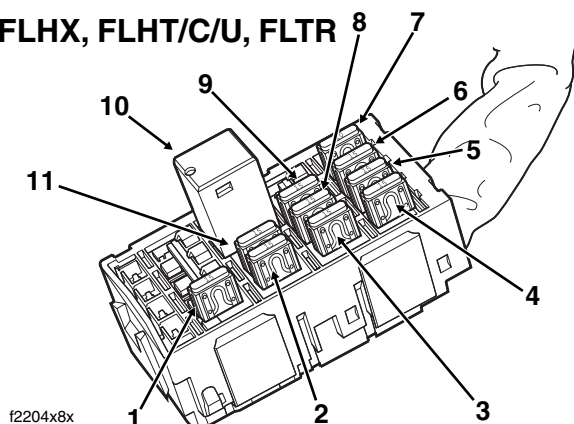
- Was battery allowed to discharge? Was battery drawn down by a starting problem?
 - Yes.** Charge battery.
 - No.** See charging system troubleshooting.
- Connect BREAKOUT BOX (Part No. HD-43876) between wire harness and ECM. See Section 5.7 BREA-KOUT BOX: EFI.
- Use DVOM with RPM Pick-up to check RPM on vehicles without tachometers.

System Fuse Block (Under Left Side Cover)

FLHR/C/S



FLHX, FLHT/C/U, FLTR



- | | |
|------------------|-----------------------|
| 1. Headlamp | 7. Radio Power |
| 2. Ignition | 8. Accessory |
| 3. Lighting | 9. Battery |
| 4. Instruments | 10. Brake Light Relay |
| 5. Brakes/Cruise | 11. P&A |
| 6. Radio Memory | 12. Starter Relay |

Figure 5-59. Fuse Locations

- This checks for voltage drops in the ECM circuit.
 - Place (+) probe to battery positive terminal.
 - Place (-) probe to W/BK terminal on Breakout Box.
- Problem is most likely the ground connection at the frame.
- Connect BREAKOUT BOX (Part No. HD-42682) to Connector [22]. FLHR/C/S models will also need HD-42962 adapters.

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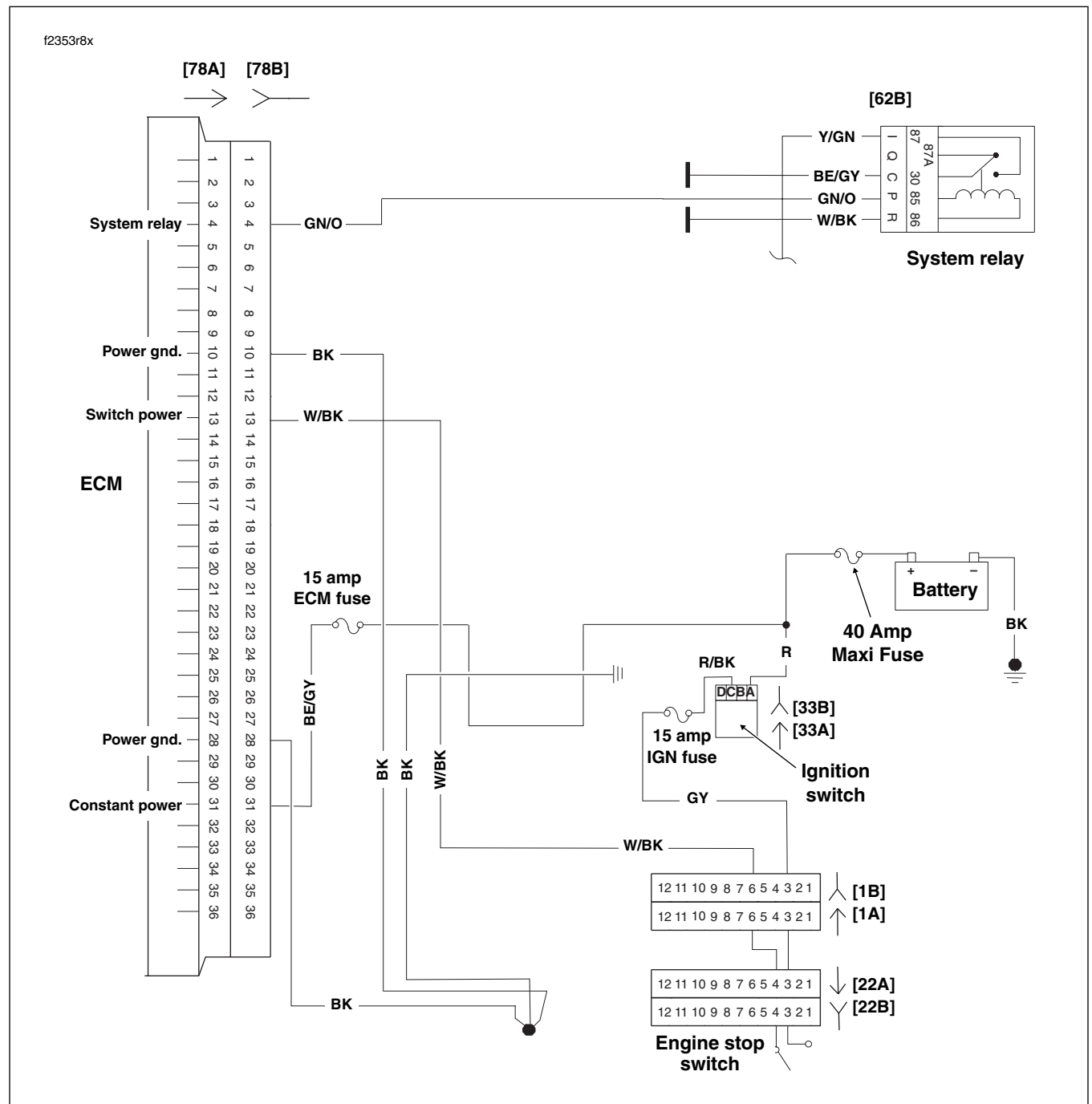


Figure 5-60. Battery Voltage Circuit (FLHX, FLHT/C/U, FLTR)

Table 5-44. Wire Harness Connectors in Figure 5-60.

NO.	DESCRIPTION	TYPE	LOCATION
[1]	Main to Interconnect Harness	12-Place Deutsch (Black)	Inner Fairing - Right Radio Support Bracket
[22]	Right Handlebar Switches	12-Place Deutsch (Black)	Inner Fairing (Fork Stem Nut Lock Plate)
[33]	Ignition/Light Key Switch	3-Place Packard	Inner Fairing -Under Radio
[78]	ECM	36-Place Packard	Under Right Side Cover

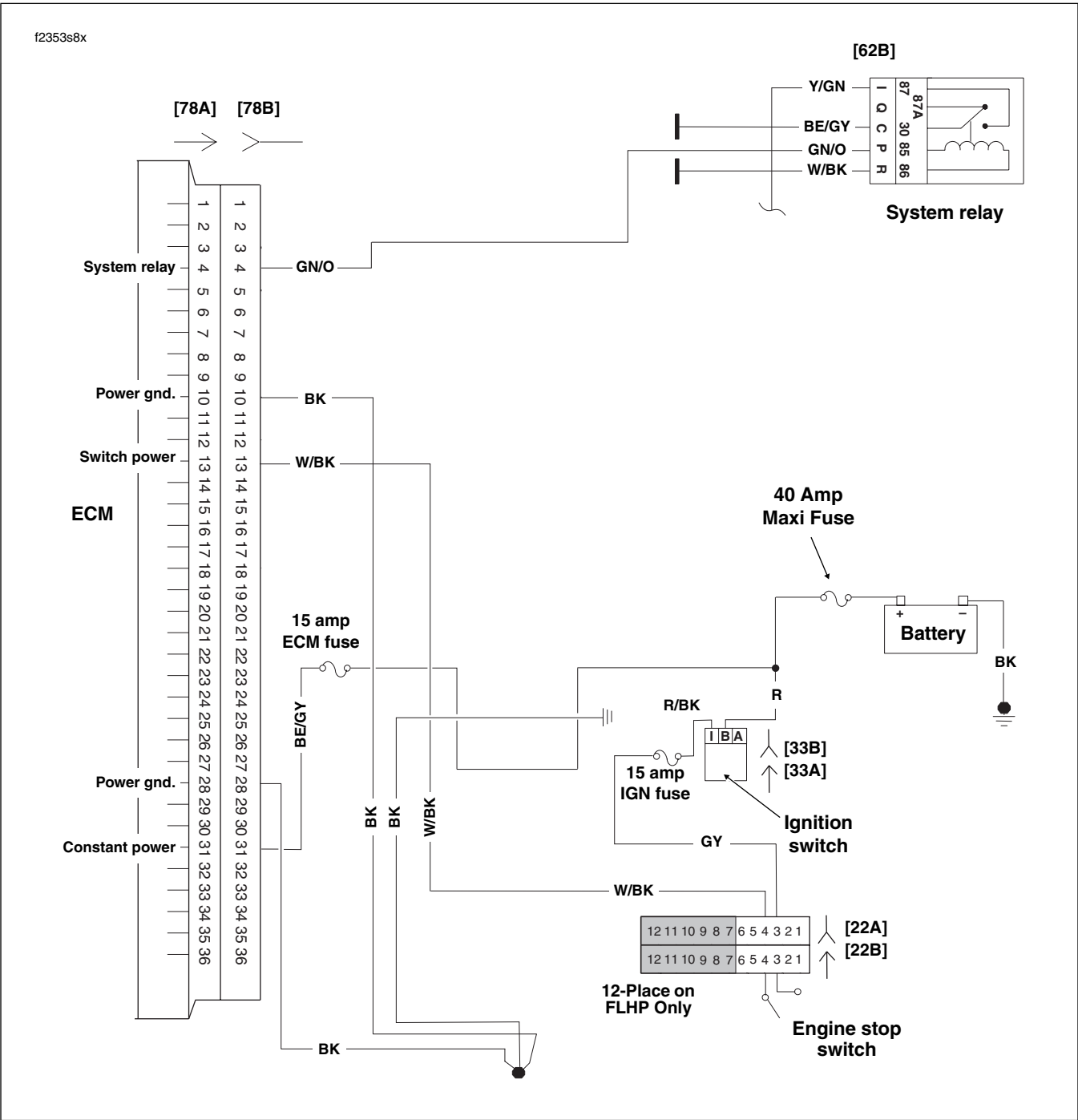
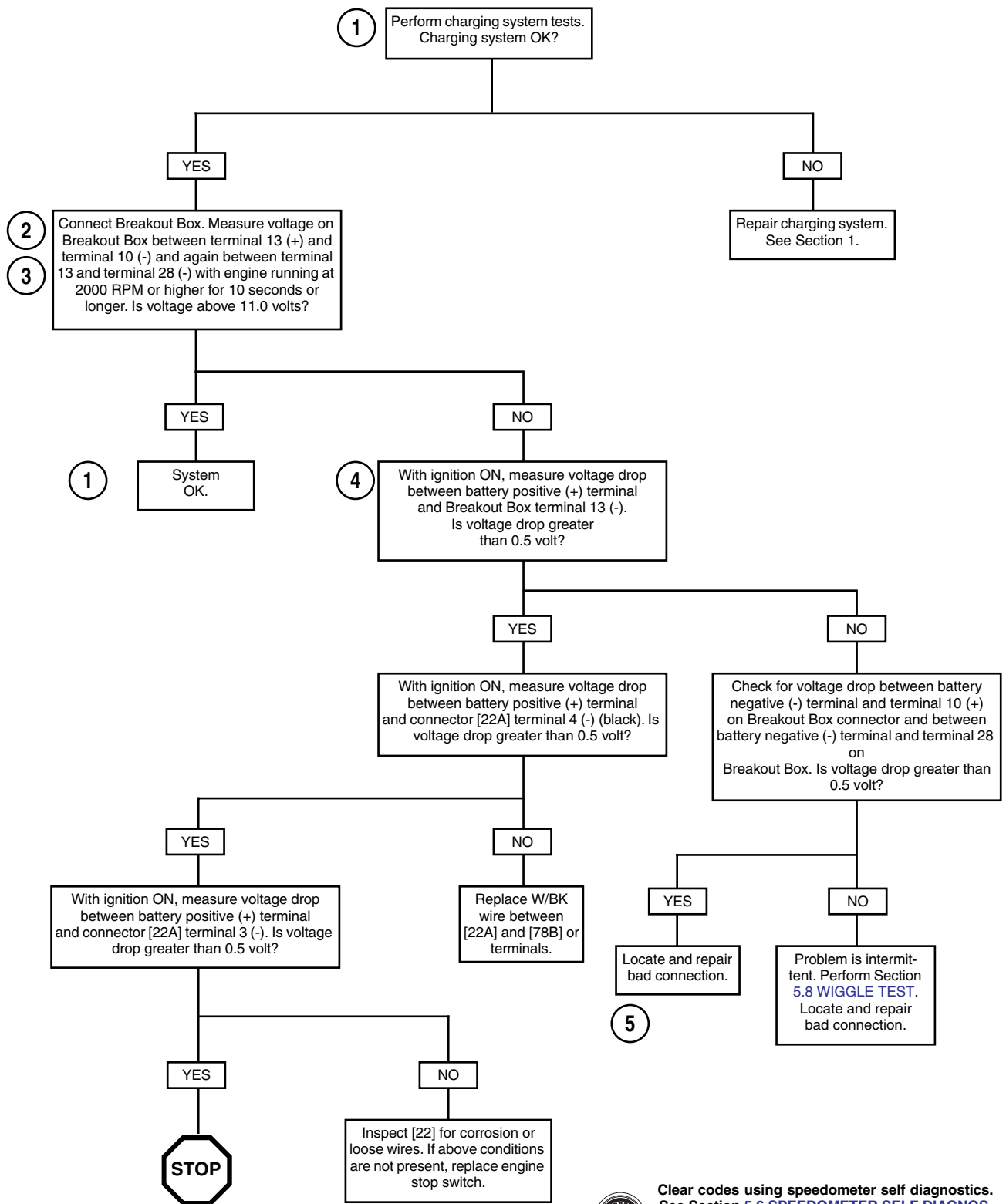


Figure 5-61. Battery Voltage Circuit (FLHR/C/S)

Table 5-45. Wire Harness Connectors in Figure 5-61.

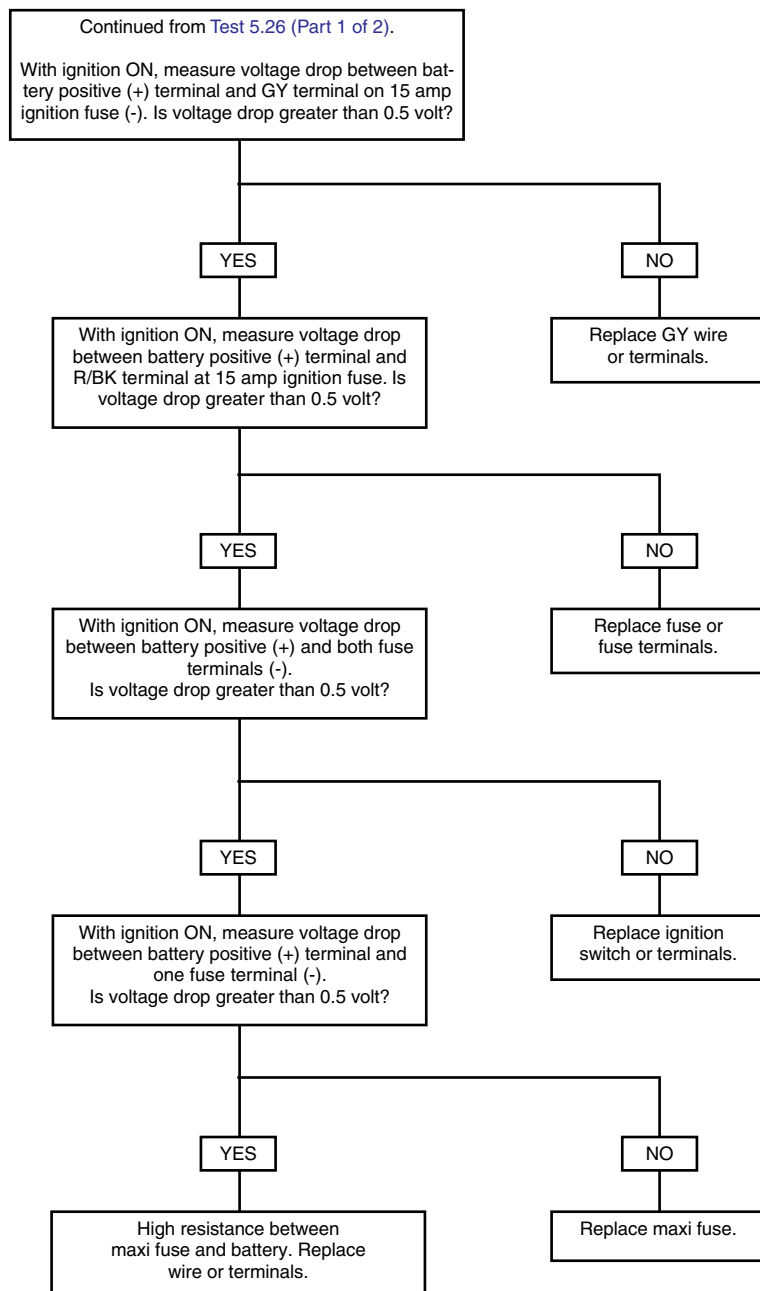
NO.	DESCRIPTION	TYPE	LOCATION
[22]	Right Handlebar Switches	12-Place Deutsch (Black)	Inside Headlamp Nacelle
[33]	Ignition/Light Key Switch	3-Place Packard	Under Console
[78]	ECM	36-Place Packard	Under Right Side Cover

Test 5.26 (Part 1 of 2)**BATTERY VOLTAGE: DTC P0562, P0563**

Clear codes using speedometer self diagnostics. See Section 5.6 **SPEEDOMETER SELF DIAGNOSTICS**. Confirm proper operation with no check engine lamp.

Test 5.26 (Part 2 of 2)

BATTERY VOLTAGE: DTC P0562, P0563



Clear codes using speedometer self diagnostics.
See Section [5.6 SPEEDOMETER SELF DIAGNOSTICS](#). Confirm proper operation with no check engine lamp.

GENERAL

ECM Failure

Refer to [Table 5-46](#). The codes listed indicate a failure which requires replacement of the ECM. See the Touring Service Manual for replacement information.

NOTE

After replacing ECM, perform password learning procedure and clear codes.

Table 5-46. Code Description

DTC	DESCRIPTION
P0603	ECM EEPROM error
P0605	ECM flash error

DIAGNOSTICS

NOTE

These codes are set under two conditions.

- *If DTC P0603 or P0605 occur during normal operation, replace ECM. Reprogram and learn password.*
- *If DTC P0603 or P0605 occur during or after reprogramming, perform the following:*

DTC P0603

1. Clear codes.
2. Power down the vehicle. Wait 10 seconds.
3. Turn ignition ON,
4. Replace ECM if codes reappear.

DTC P0605

1. Clear codes.
2. Power down the vehicle.
3. Attempt to reprogram ECM using correct calibration.
4. Restart vehicle. If code reappears, replace ECM.

GENERAL

Password Problem

The ECM, TSM/TSSM and speedometer exchange passwords during operation. An incorrect password or missing password will set a diagnostic code.

NOTE

If the TSM/TSSM is not connected to the wiring harness, the vehicle will not start.

Table 5-47. Code Description

DTC	DESCRIPTION
P1009	Incorrect password
P1010	Missing password

DIAGNOSTICS

Diagnostic Notes

The reference numbers below correlate with the circled numbers on the Test 5.28 flow charts.

1. DTC P1009 may be set if a recent ECM or TSM/TSSM replacement did not follow the correct password assignment procedure. See Section [3.24 PASSWORD LEARN](#) for details.
2. Use HARNESS CONNECTOR TEST KIT (Part No. HD-41404A), black socket probes and patch cord.
3. Connect BREAKOUT BOX (Part No. HD-43876) between wire harness and ECM. See Section [5.7 BREAKOUT BOX: EFI](#).
4. Historic codes DTC U1300 or DTC U1301 would also have been set. Clear codes.
5. See the Touring Service Manual for TSM/TSSM replacement. See [PASSWORD LEARNING](#) under Section [3.24 PASSWORD LEARN](#) for the password learning procedure.

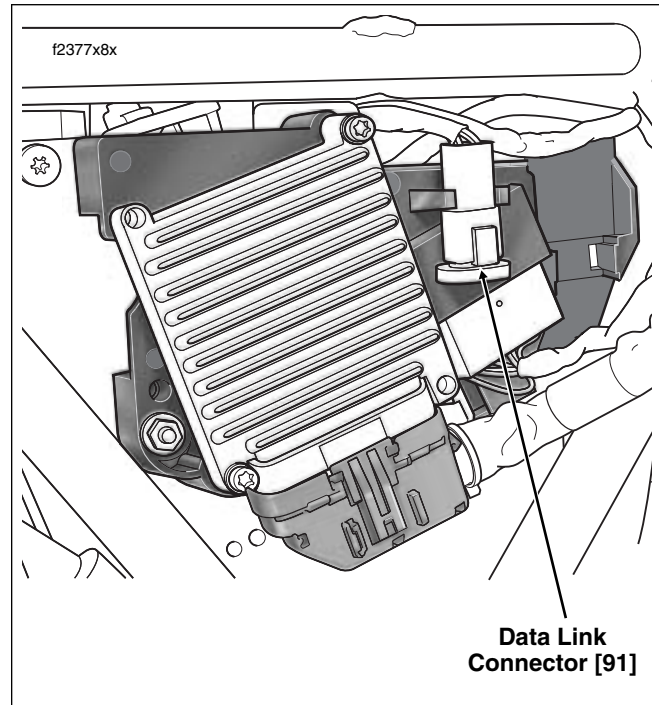


Figure 5-62. Electrical Bracket (Under Right Side Cover)

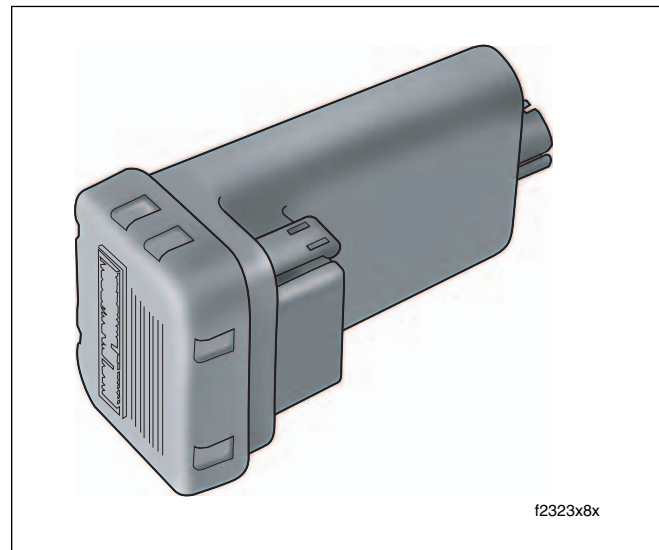


Figure 5-63. TSM/TSSM

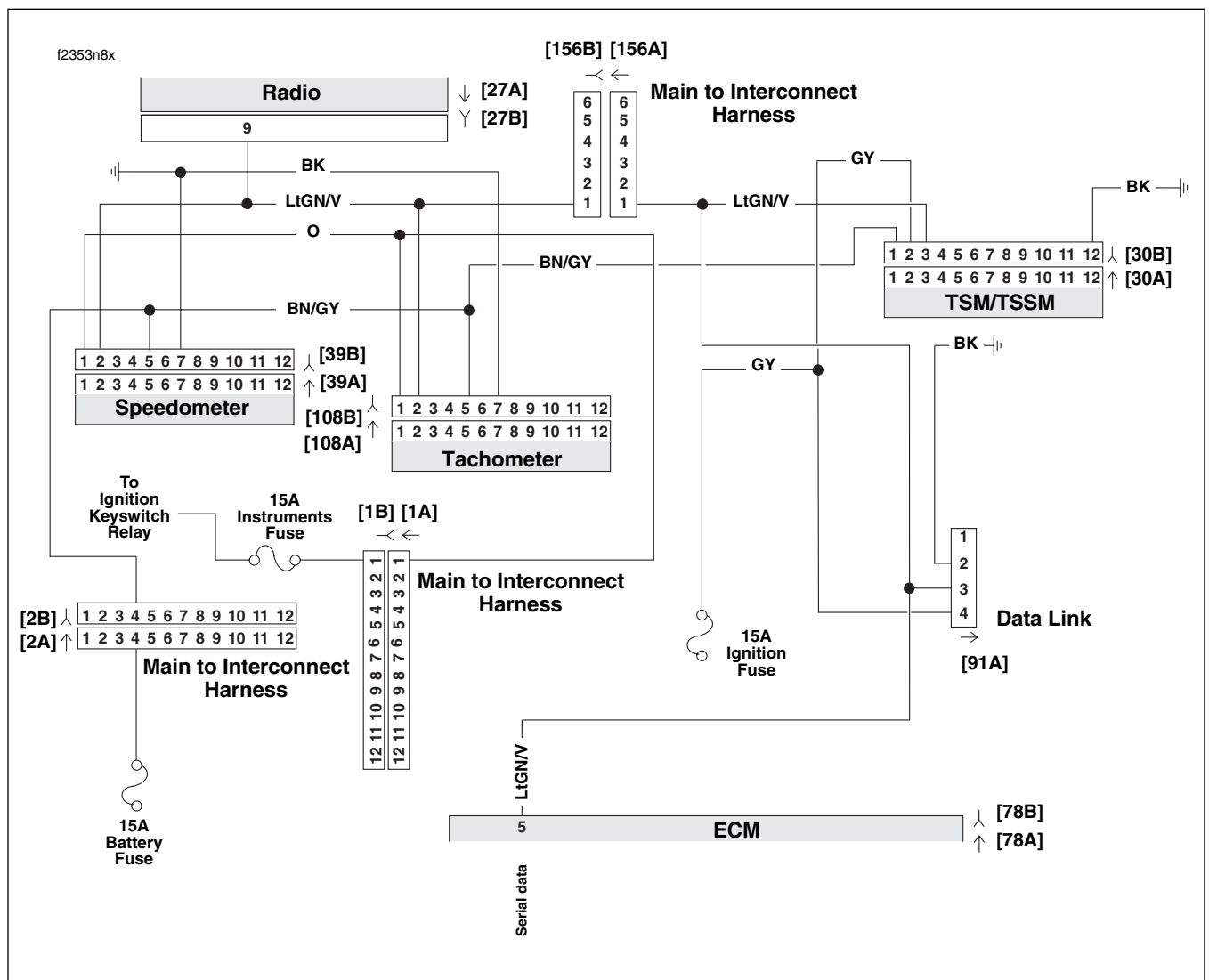


Figure 5-64. Serial Data Circuit (FLHX, FLHT/C/U, FLTR)

Table 5-48. Wire Harness Connectors in Figure 5-64.

NO.	DESCRIPTION	MODEL	TYPE	LOCATION
[1]	Main to Interconnect Harness	FLHT/C	12-Place Deutsch (Black)	Inner Fairing - Right Radio Support Bracket
		FLTR	12-Place Deutsch (Black)	Inner Fairing - Below Radio (Right Side)
[2]	Main to Interconnect Harness	FLHT/C	12-Place Deutsch (Gray)	Inner Fairing - Right Fairing Support Brace
		FLTR	12-Place Deutsch (Gray)	Inner Fairing - Below Radio (Right Side)
[27]	Radio	All	23-Place Amp	Inner Fairing - Back of Radio (Right Side)
[30]	TSM/TSSM	All	12-Place Deutsch	Cavity in Crossmember at Rear of Battery Box (Under Seat)
[39]	Speedometer	FLHT/C	12-Place Packard	Inner Fairing (Back of Speedometer)
		FLTR	12-Place Packard	Under Bezel (Back of Speedometer)
[78]	ECM	All	36-Place Packard	Under Right Side Cover
[91]	Data Link	All	4-Place Deutsch	Under Right Side Cover
[108]	Tachometer	FLHT/C	12-Place Packard	Inner Fairing (Back of Tachometer)
		FLTR	12-Place Packard	Under Bezel (Back of Tachometer)
[156]	Main to Interconnect Harness	FLHT/C	6-Place Deutsch	Inner Fairing - Right Fairing Support Brace
		FLTR	6-Place Deutsch	Inner Fairing - Below Radio (Right Side)

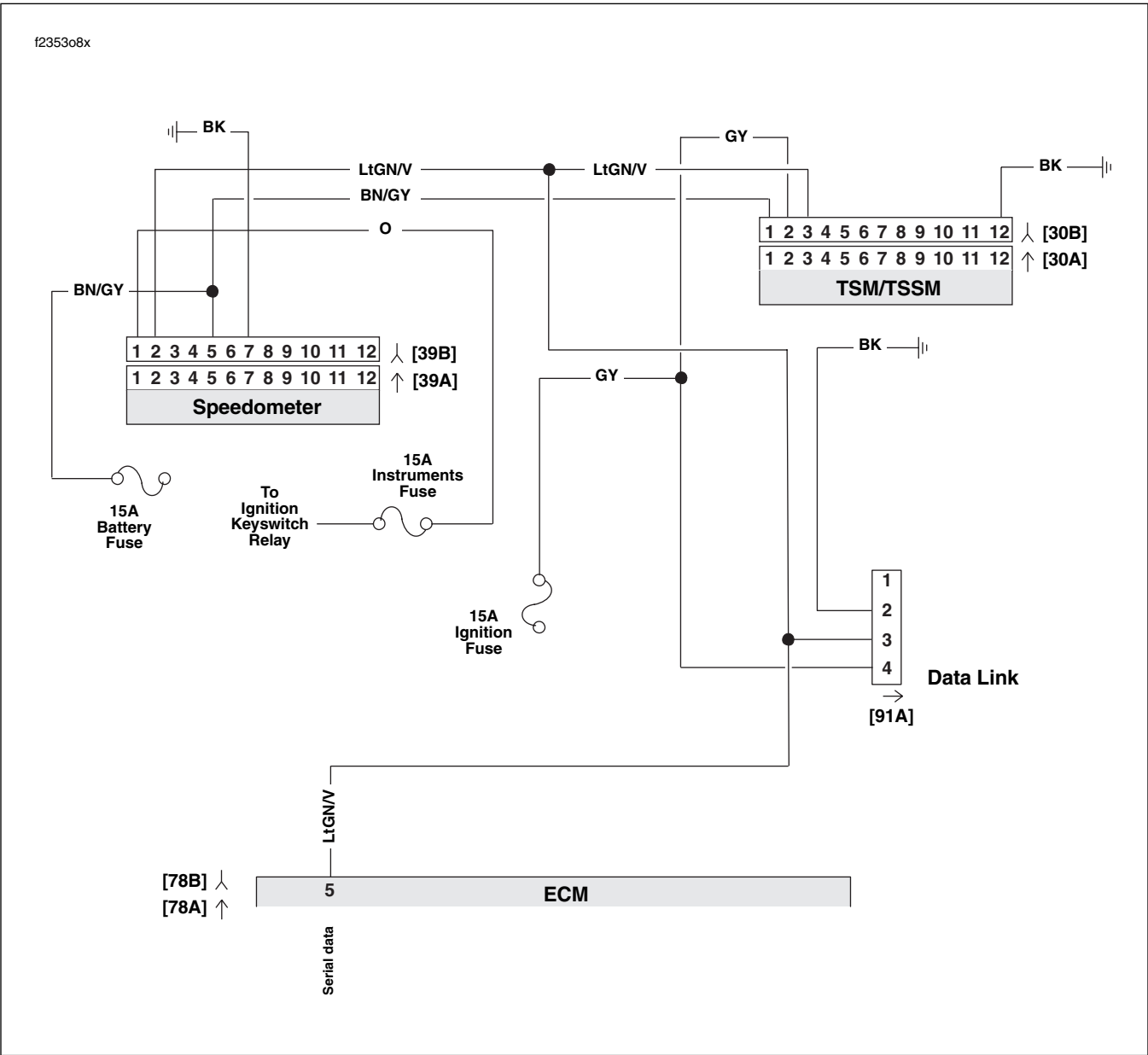


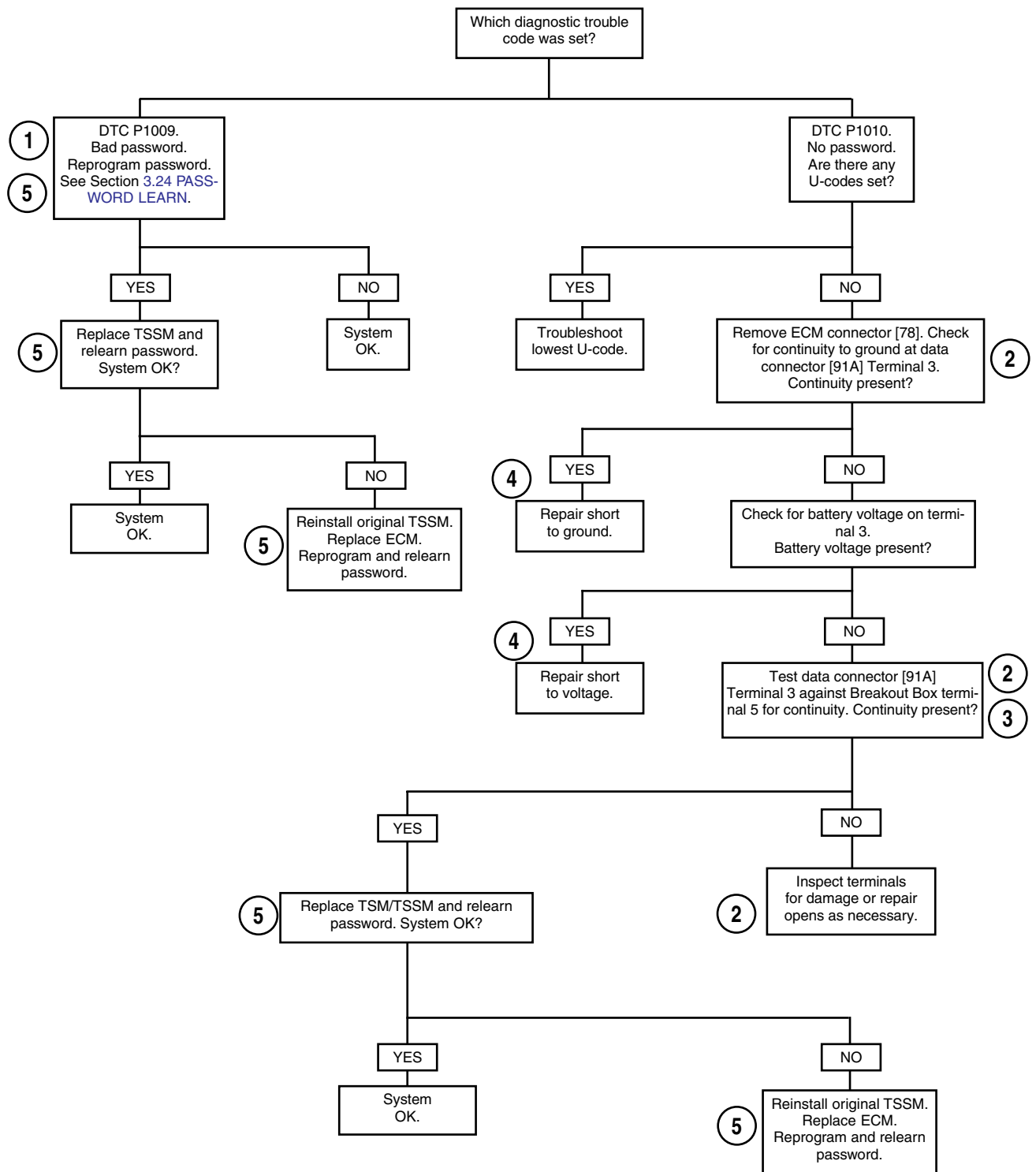
Figure 5-65. Serial Data Circuit (FLHR/C/S)

Table 5-49. Wire Harness Connectors in [Figure 5-65](#).

NO.	DESCRIPTION	TYPE	LOCATION
[30]	TSM/TSSM	12-Place Deutsch	Cavity in Crossmember at Rear of Battery Box (Under Seat)
[39]	Speedometer	12-Place Packard	Under Console (Back of Speedometer)
[78]	ECM	36-Place Packard	Under Right Side Cover
[91]	Data Link	4-Place Deutsch	Under Right Side Cover

Test 5.28

PASSWORD PROBLEM: DTC P1009, P1010



Clear codes using speedometer self diagnostics. See Section 5.6 SPEEDOMETER SELF DIAGNOSTICS. Confirm proper operation with no check engine lamp.

GENERAL

Ignition Coil

Ignition coil codes will set if the ignition coil primary voltage is out of range. This could occur if there is an open coil or loss of power to the coil. If front and rear codes are set simultaneously, it is likely a coil power failure or a coil failure.

The coil receives power from the system relay at the same time that the fuel pump and injectors are activated. The system relay is active for the first 2 seconds after the ignition is turned ON and then shuts off until RPM is detected from the CKP sensor, at which time it is reactivated. The ECM is responsible for turning on the system relay by providing the ground to activate the relay, which in turn powers the coil.

Table 5-50. Code Description

DTC	DESCRIPTION
P1351	Front ignition coil open/low
P1352	Front ignition coil high/shorted
P1354	Rear ignition coil open/low
P1355	Rear ignition coil high/shorted

DIAGNOSTICS

Diagnostic Notes

The reference numbers below correlate with the circled numbers on the Test 5.29 flow charts.

1. Use HARNESS CONNECTOR TEST KIT (Part No. HD-41404A), gray pin probes and patch cord.

CAUTION

Gently connect test lamp to connector [83B]. Forcefully inserting test lamp will result in ignition connector terminal damage.

2. See Figure 5-66. Plug IGNITION COIL CIRCUIT TEST ADAPTER (Part No. HD-44687) and FUEL INJECTOR TEST LAMP (Part No. HD-34730-2C) into Breakout Box. Note that cranking the engine with test lamp in place of the ignition coil can sometimes cause a DTC P1351, P1352, P1354 or P1355. This condition is normal and does not by itself indicate a malfunction. Codes must be cleared if this condition occurs.
3. Connect BREAKOUT BOX (Part No. HD-43876) between EFI wire harness and ECM. See Section 5.7 BREAKOUT BOX: EFI.



Figure 5-66. Ignition Coil Circuit Test

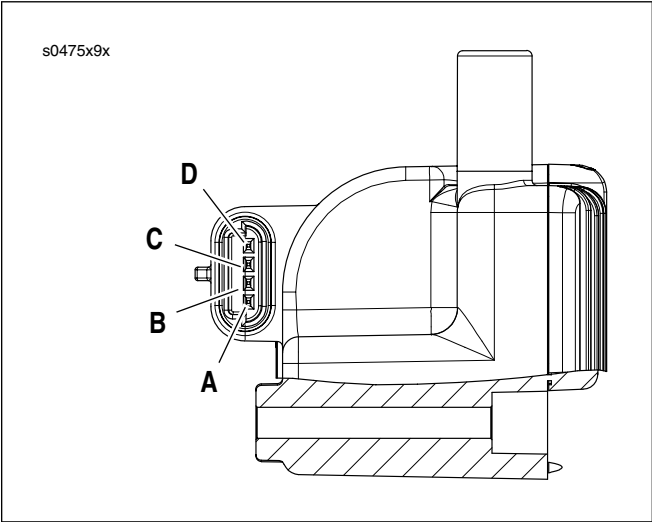


Figure 5-67. Ignition Coil Connector Terminals

Table 5-51. Coil Terminal Description

TERMINAL	DESCRIPTION
A	Power
B	Feedback signal pin
C	Rear coil
D	Front coil

4. Use HARNESS CONNECTOR TEST KIT (Part No. HD-41404A), gray socket probes and patch cord.

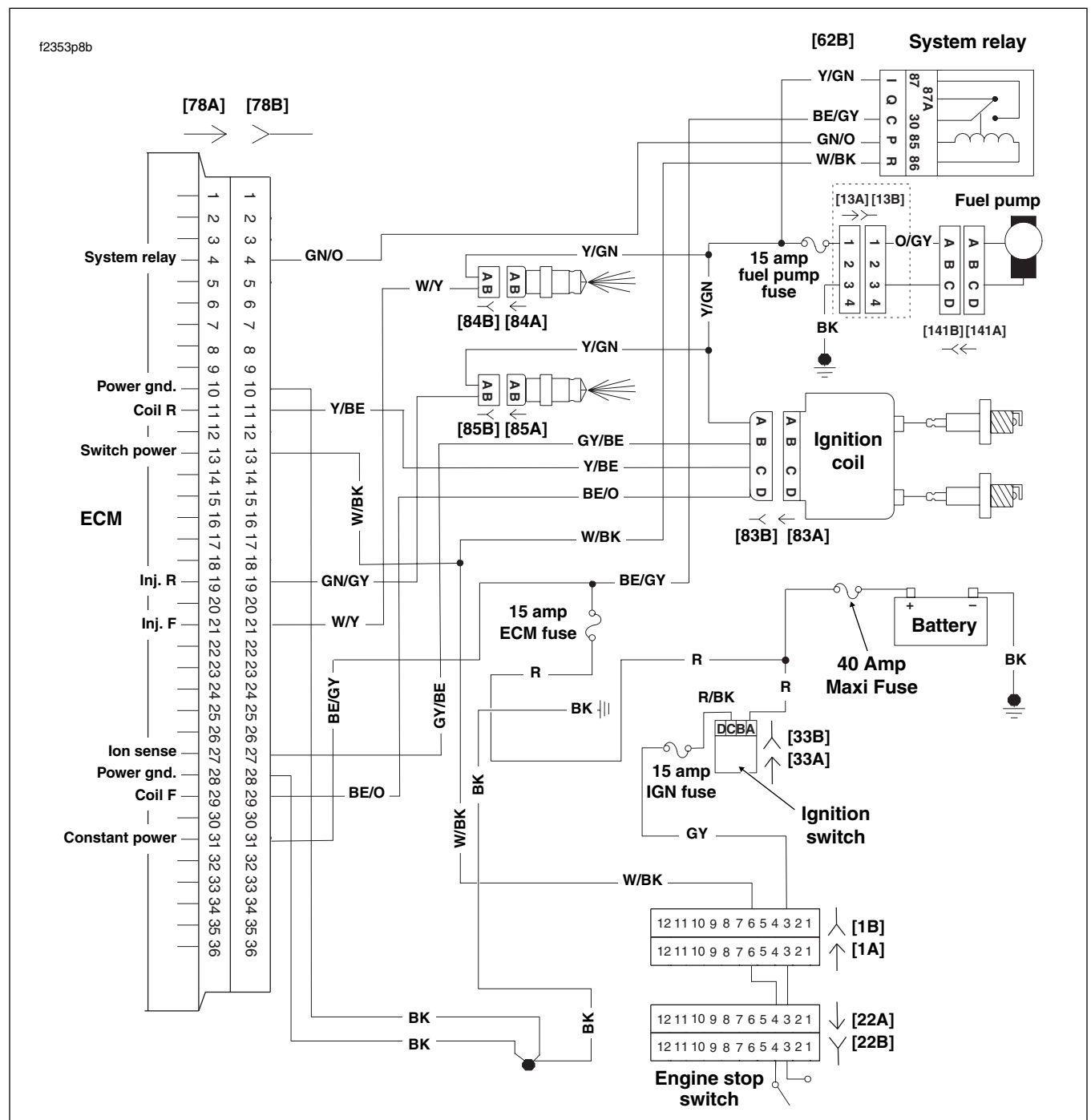


Figure 5-68. Battery Voltage Circuit (FLHX, FLHT/C/U, FLTR)

Table 5-52. Wire Harness Connectors in Figure 5-68.

NO.	DESCRIPTION	TYPE	LOCATION
[1]	Main to Interconnect Harness	12-Place Deutsch (Black)	Inner Fairing - Right Radio Support Bracket
[22]	Right Handlebar Switches	12-Place Deutsch (Black)	Inner Fairing (Fork Stem Nut Lock Plate)
[33]	Ignition/Light Key Switch	3-Place Packard	Inner Fairing -Under Radio
[78]	ECM	36-Place Packard	Under Right Side Cover
[83]	Ignition Coil	4-Place Delphi	Below Fuel Tank (Left Side)
[84]	Front Injector	2-Place Delphi	Below Fuel Tank (Left Side)
[85]	Rear Injector	2-Place Delphi	Below Fuel Tank (Left Side)

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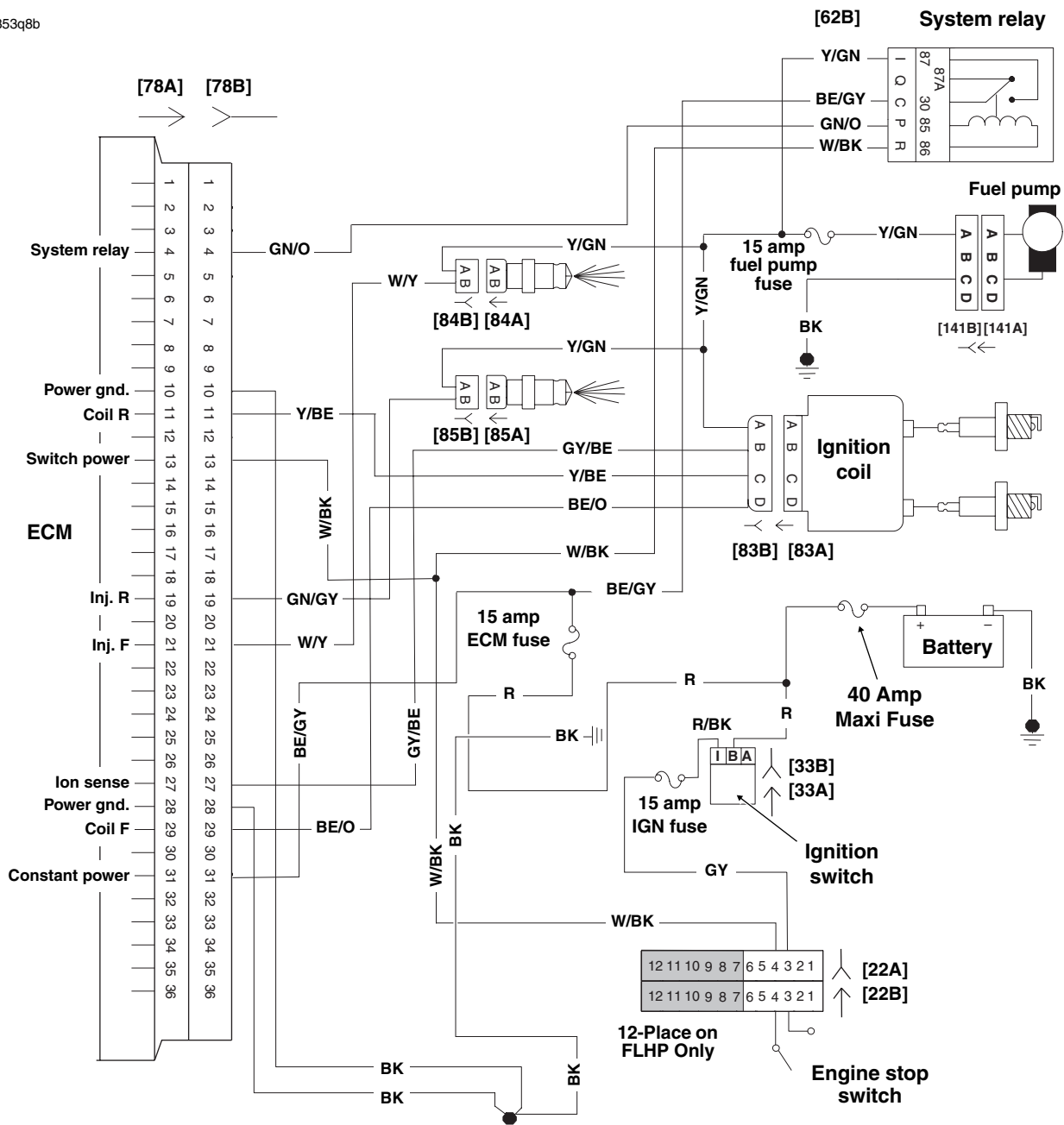


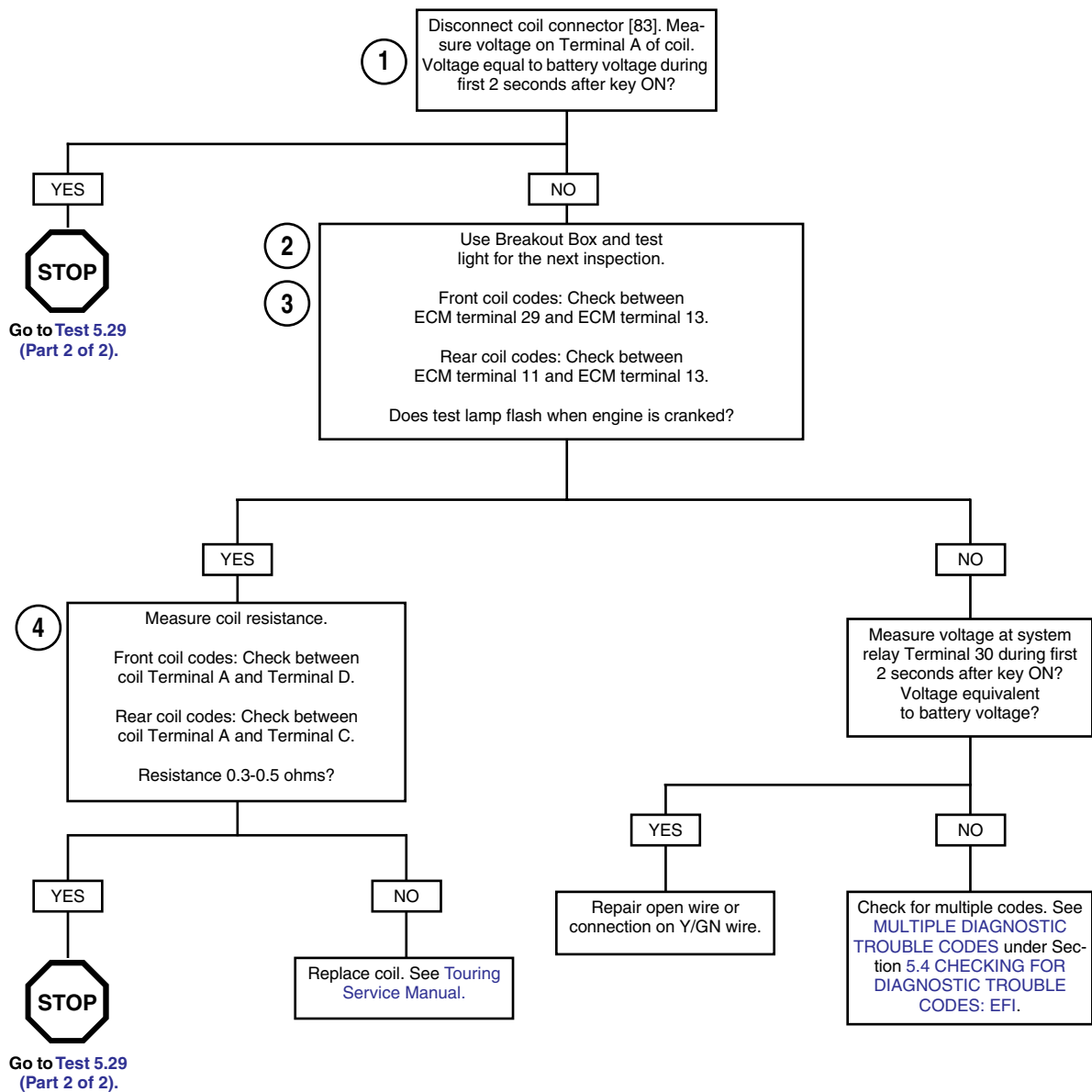
Figure 5-69. Battery Voltage Circuit (FLHR/C/S)

Table 5-53. Wire Harness Connectors in Figure 5-69.

NO.	DESCRIPTION	TYPE	LOCATION
[22]	Right Handlebar Switches	12-Place Deutsch (Black)	Inside Headlamp Nacelle
[33]	Ignition/Light Key Switch	3-Place Packard	Under Console
[78]	ECM	36-Place Packard	Under Right Side Cover
[83]	Ignition Coil	4-Place Delphi	Below Fuel Tank (Left Side)
[84]	Front Injector	2-Place Delphi	Below Fuel Tank (Left Side)
[85]	Rear Injector	2-Place Delphi	Below Fuel Tank (Left Side)

Test 5.29 (Part 1 of 2)

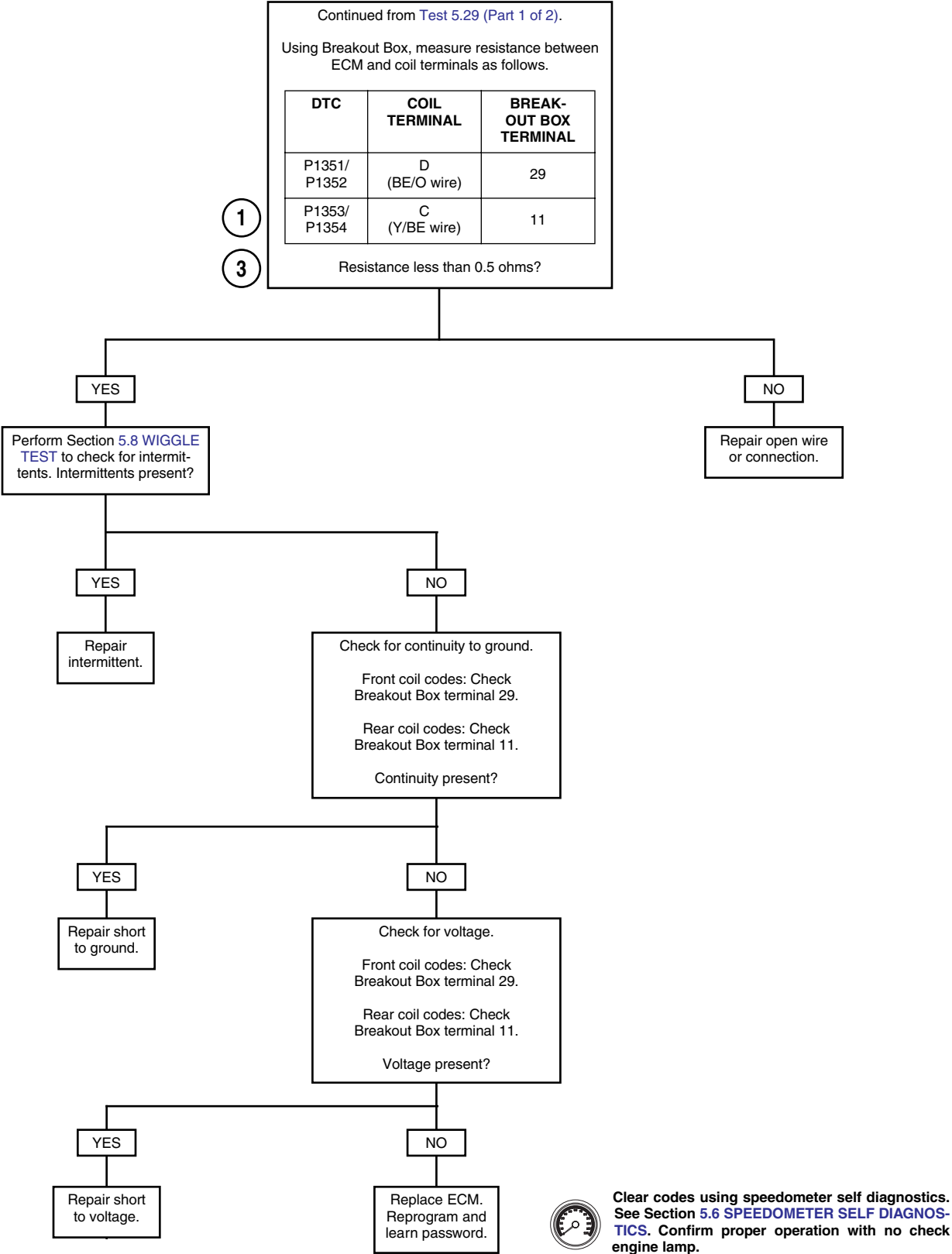
IGNITION COIL: DTC P1351, P1352, P1354, P1355



Clear codes using speedometer self diagnostics. See Section 5.6 [SPEEDOMETER SELF DIAGNOSTICS](#). Confirm proper operation with no check engine lamp.

Test 5.29 (Part 2 of 2)

IGNITION COIL: DTC P1351, P1352, P1354, P1355



GENERAL

Loss of TSM/TSSM Serial Data

The serial data connector provides a means for the ECM, TSM/TSSM and speedometer to communicate their current status. When all operating parameters on the serial data link are within specifications, a state of health message is sent between the components. A DTC U1255 (only reported by the TSM/TSSM or speedometer) indicates that no messages were present during power up of the current key cycle. A DTC U1064 indicates that there was communication on the data bus since power up, but was lost or interrupted during that key cycle.

Table 5-54. Code Description

DTC	DESCRIPTION
U1064	Loss of TSM/TSSM serial data
U1255	Serial data error/missing message

DIAGNOSTICS

Diagnostic Notes

The reference numbers below correlate with the circled numbers on the Test 5.30 flow chart.

1. Connect BREAKOUT BOX (Part No. HD-42682).
 - a. Mate gray socket housing on Breakout Box with TSM/TSSM connector [30A].
 - b. Mate gray pin housing on Breakout Box with harness connector [30B].
2. Connect BREAKOUT BOX (Part No. HD-43876).

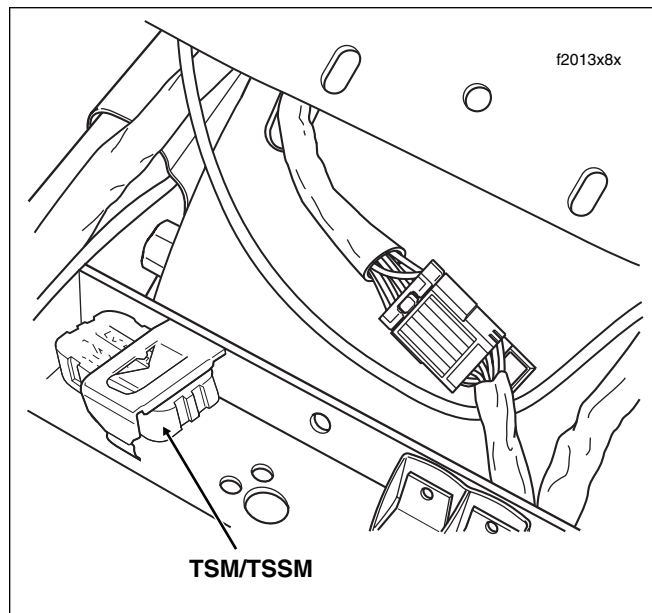


Figure 5-70. Remove Seat

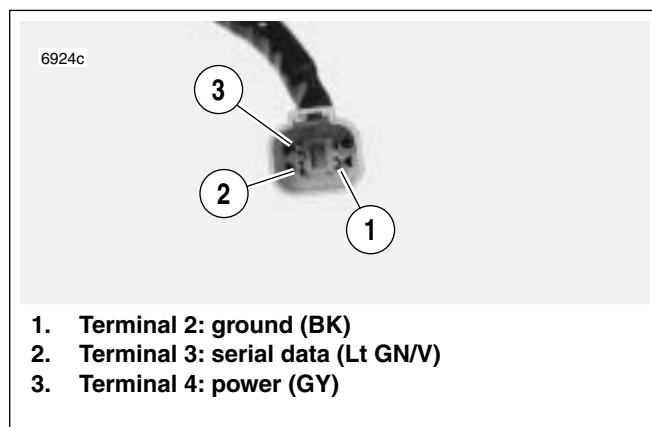


Figure 5-71. Data Link Connector

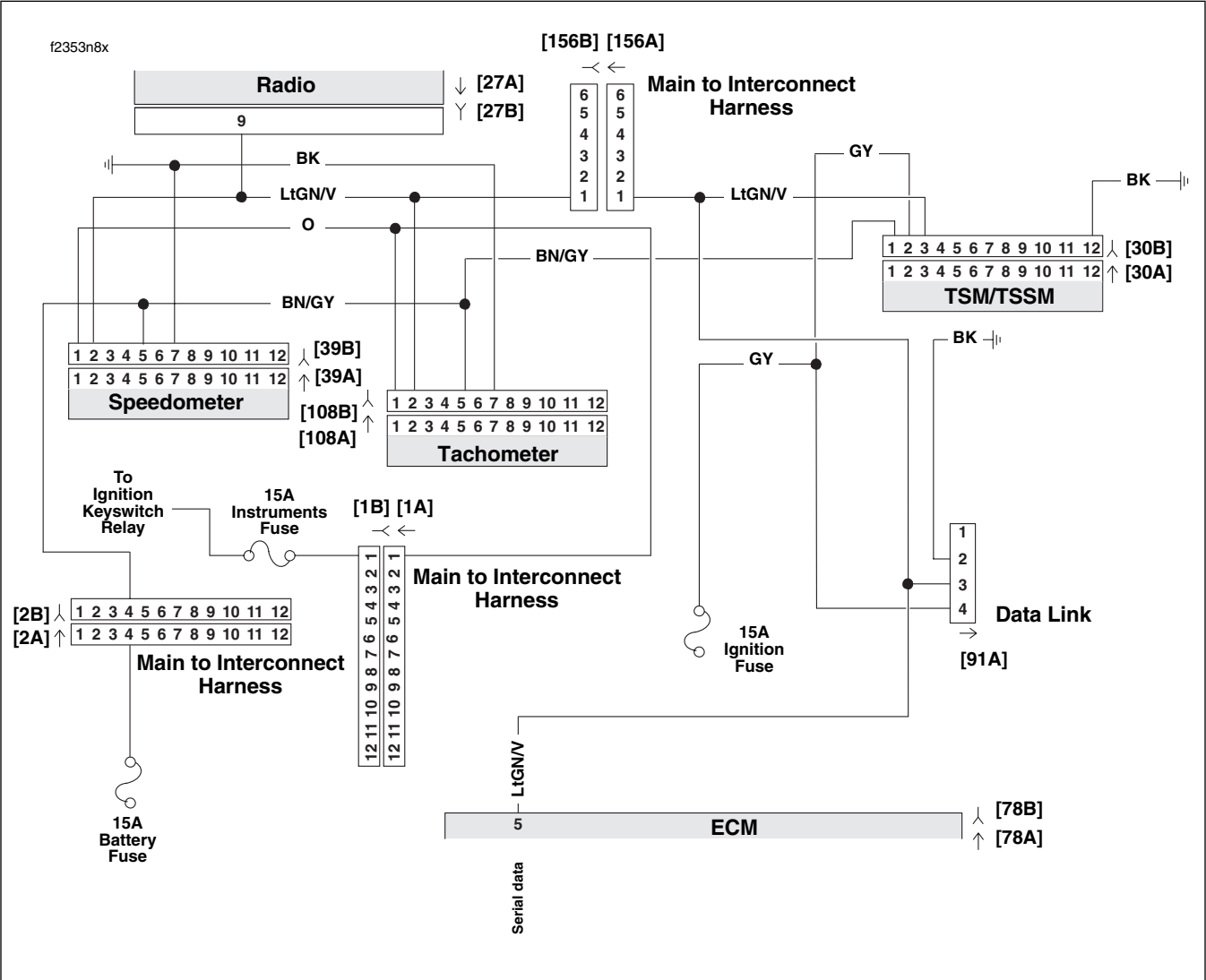


Figure 5-72. ECM and TSM/TSSM Circuit (FLHX, FLHT/C/U, FLTR)

Table 5-55. Wire Harness Connectors in Figure 5-72.

NO.	DESCRIPTION	MODEL	TYPE	LOCATION
[1]	Main to Interconnect Harness	FLHT/C	12-Place Deutsch (Black)	Inner Fairing - Right Radio Support Bracket
		FLTR	12-Place Deutsch (Black)	Inner Fairing - Below Radio (Right Side)
[2]	Main to Interconnect Harness	FLHT/C	12-Place Deutsch (Gray)	Inner Fairing - Right Fairing Support Brace
		FLTR	12-Place Deutsch (Gray)	Inner Fairing - Below Radio (Right Side)
[27]	Radio	All	23-Place Amp	Inner Fairing - Back of Radio (Right Side)
[30]	TSM/TSSM	All	12-Place Deutsch	Cavity in Crossmember at Rear of Battery Box (Under Seat)
[39]	Speedometer	FLHT/C	12-Place Packard	Inner Fairing (Back of Speedometer)
		FLTR	12-Place Packard	Under Bezel (Back of Speedometer)
[78]	ECM	All	36-Place Packard	Under Right Side Cover
[91]	Data Link	All	4-Place Deutsch	Under Right Side Cover
[108]	Tachometer	FLHT/C	12-Place Packard	Inner Fairing (Back of Tachometer)
		FLTR	12-Place Packard	Under Bezel (Back of Tachometer)
[156]	Main to Interconnect Harness	FLHT/C	6-Place Deutsch	Inner Fairing - Right Fairing Support Brace
		FLTR	6-Place Deutsch	Inner Fairing - Below Radio (Right Side)

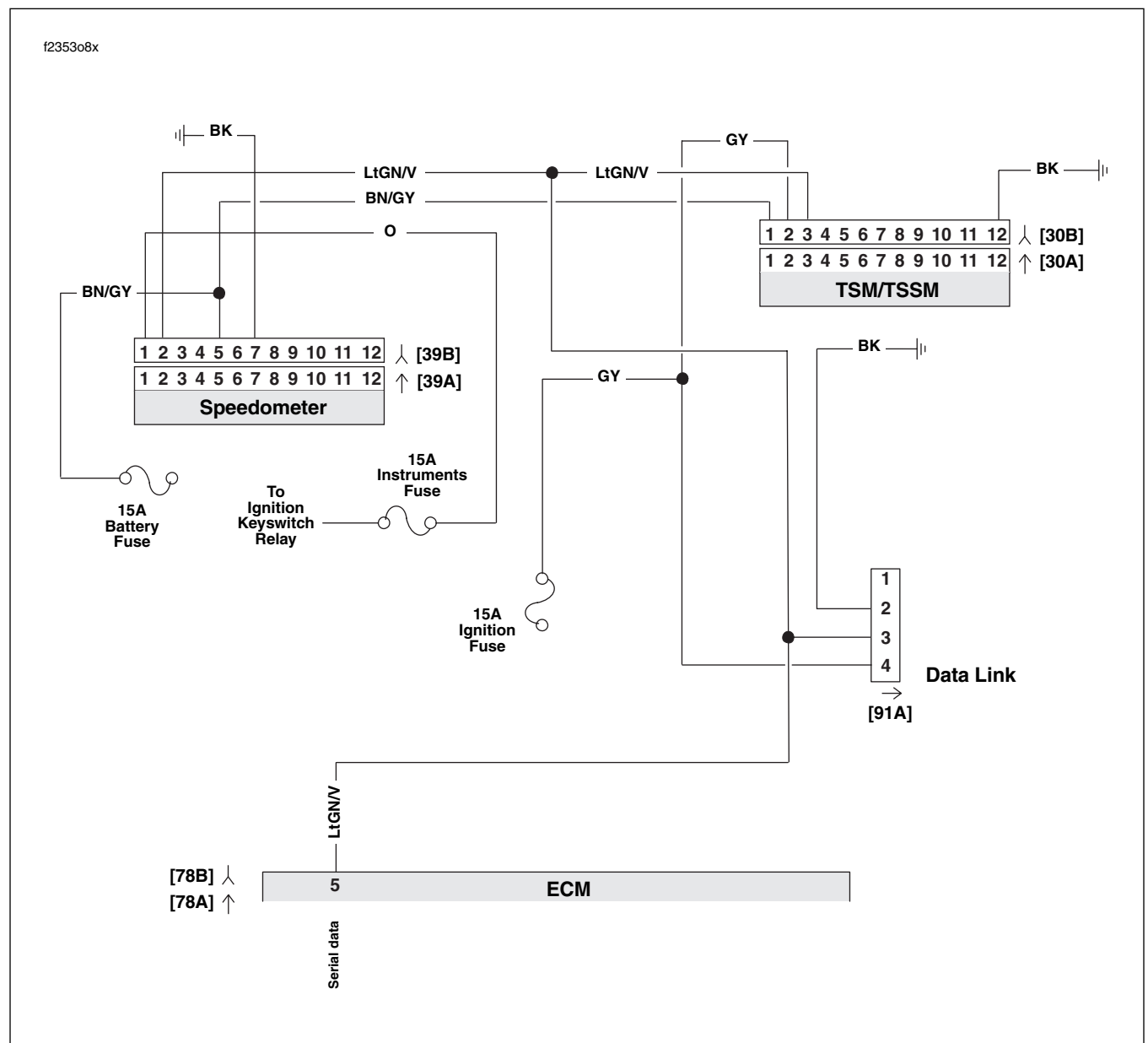


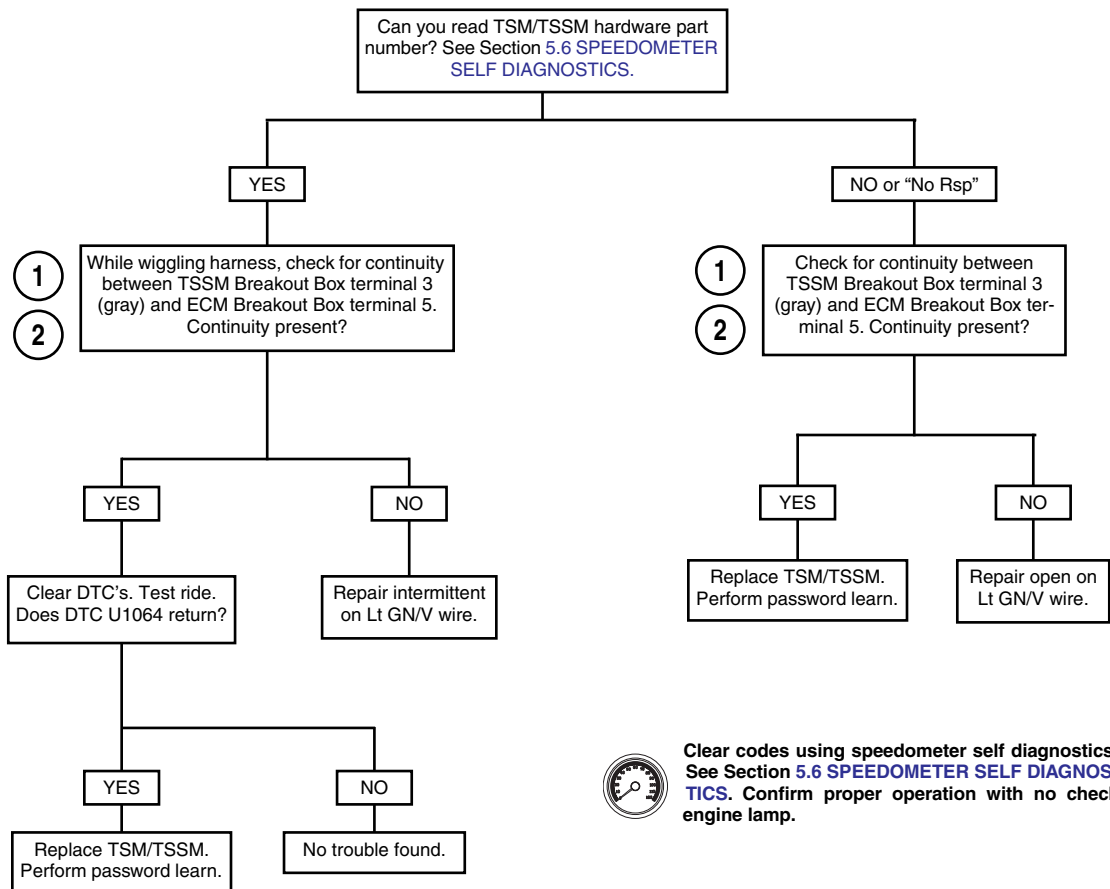
Figure 5-73. ECM and TSM/TSSM Circuit (FLHR/C/S)

Table 5-56. Wire Harness Connectors in Figure 5-73.

NO.	DESCRIPTION	TYPE	LOCATION
[30]	TSM/TSSM	12-Place Deutsch	Cavity in Crossmember at Rear of Battery Box (Under Seat)
[39]	Speedometer	12-Place Packard	Under Console (Back of Speedometer)
[78]	ECM	36-Place Packard	Under Right Side Cover
[91]	Data Link	4-Place Deutsch	Under Right Side Cover

Test 5.30

**LOSS OF TSM/TSSM SERIAL DATA: DTC U1064,
U1255**



Clear codes using speedometer self diagnostics. See Section 5.6 SPEEDOMETER SELF DIAGNOSTICS. Confirm proper operation with no check engine lamp.

GENERAL

Loss of Speedometer Serial Data

The serial data connector provides a means for the speedometer, ECM and TSM/TSSM to communicate their current status. When all operating parameters on the serial data link are within specifications, a state of health message is sent between the components. A DTC U1255 (only reported by the TSM/TSSM or speedometer) indicates that no messages were present during power up of the current key cycle. A DTC U1097 indicates that there was communication on the data bus since power up, but was lost or interrupted during that key cycle.

Table 5-57. Code Description

DTC	DESCRIPTION
U1097	Loss of all speedometer serial data (state of health)
U1255	Missing message at speedometer

DIAGNOSTICS

NOTE

If DTC is historic and not current, wiggle wire harness while performing voltage and continuity tests to identify intermittents.

Diagnostic Notes

The reference numbers below correlate with the circled numbers on the test 5.31 flow chart.

1. Mate black pin housing on breakout box with wire harness connector [39B] using INSTRUMENT HARNESS ADAPTERS (Part No. HD-46601). Leave speedometer connector [39A] disconnected.
2. Connect BREAKOUT BOX (Part No. HD-43876) to wire harness connector [78B]. Leave ECM connector [78A] disconnected. See Section 5.7 BREAKOUT BOX: EFI.

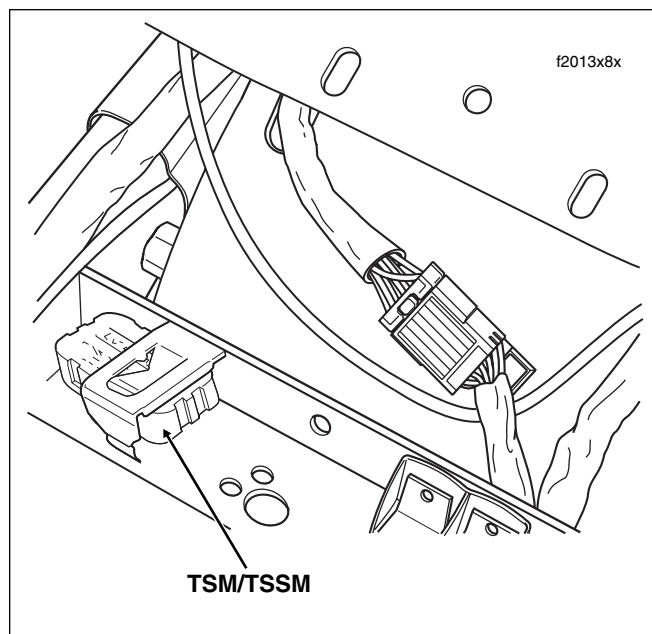
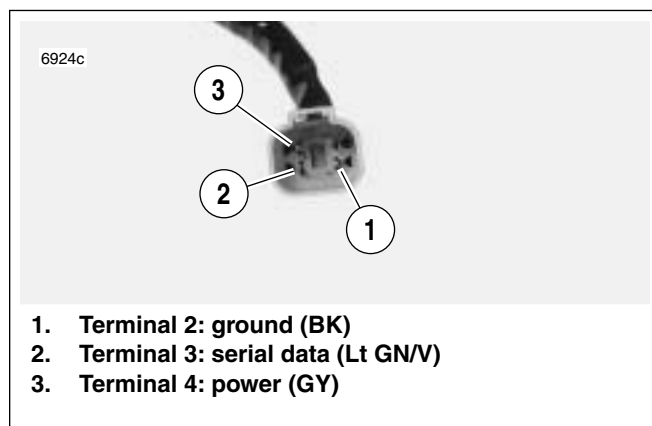


Figure 5-74. Remove Seat



1. Terminal 2: ground (BK)
2. Terminal 3: serial data (Lt GN/V)
3. Terminal 4: power (GY)

Figure 5-75. Data Link Connector

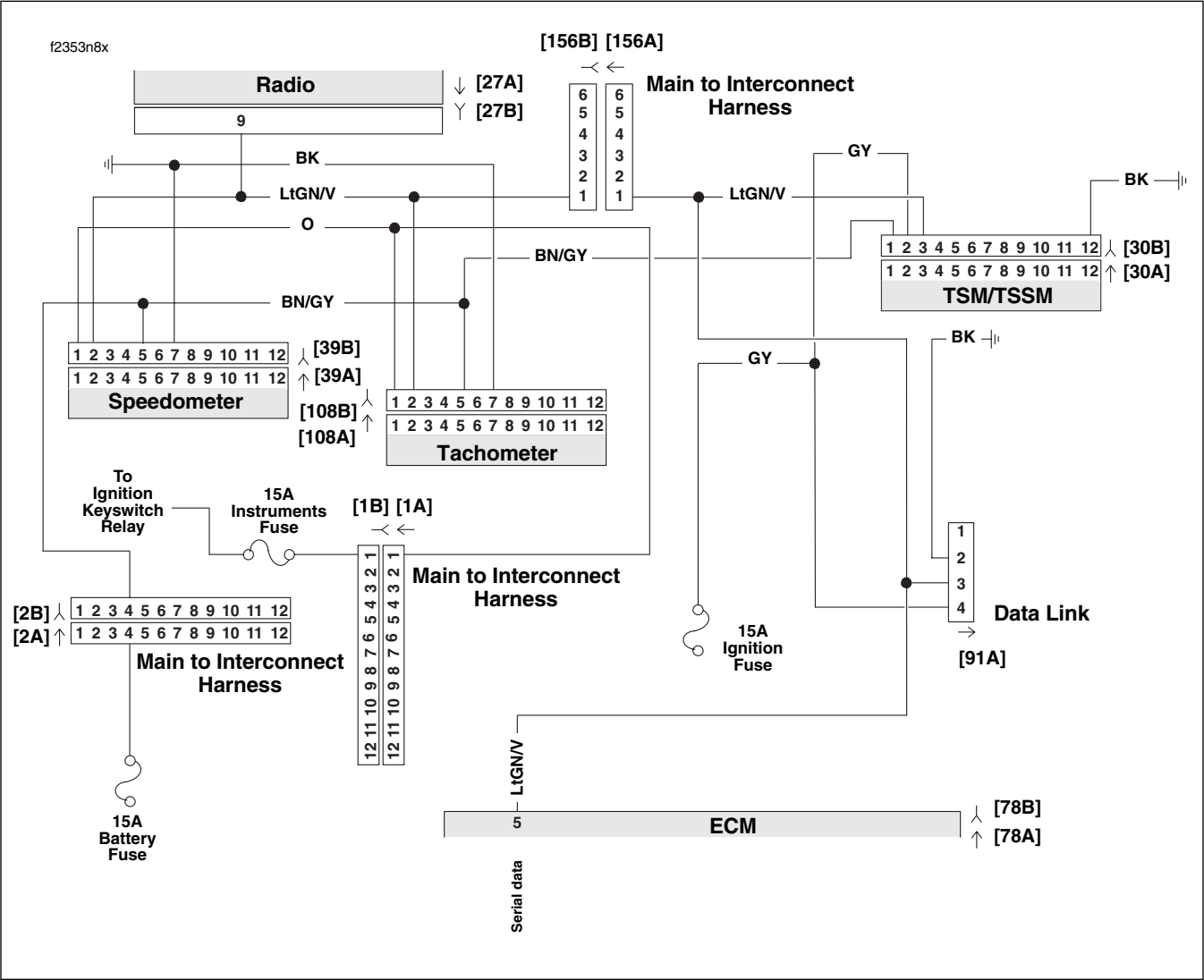


Figure 5-76. Serial Data Circuit (FLHX, FLHT/C/U, FLTR)

Table 5-58. Wire Harness Connectors in Figure 5-76.

NO.	DESCRIPTION	MODEL	TYPE	LOCATION
[1]	Main to Interconnect Harness	FLHT/C	12-Place Deutsch (Black)	Inner Fairing - Right Radio Support Bracket
		FLTR	12-Place Deutsch (Black)	Inner Fairing - Below Radio (Right Side)
[2]	Main to Interconnect Harness	FLHT/C	12-Place Deutsch (Gray)	Inner Fairing - Right Fairing Support Brace
		FLTR	12-Place Deutsch (Gray)	Inner Fairing - Below Radio (Right Side)
[27]	Radio	All	23-Place Amp	Inner Fairing - Back of Radio (Right Side)
[30]	TSM/TSSM	All	12-Place Deutsch	Cavity in Crossmember at Rear of Battery Box (Under Seat)
[39]	Speedometer	FLHT/C	12-Place Packard	Inner Fairing (Back of Speedometer)
		FLTR	12-Place Packard	Under Bezel (Back of Speedometer)
[78]	ECM	All	36-Place Packard	Under Right Side Cover
[91]	Data Link	All	4-Place Deutsch	Under Right Side Cover
[108]	Tachometer	FLHT/C	12-Place Packard	Inner Fairing (Back of Tachometer)
		FLTR	12-Place Packard	Under Bezel (Back of Tachometer)
[156]	Main to Interconnect Harness	FLHT/C	6-Place Deutsch	Inner Fairing - Right Fairing Support Brace
		FLTR	6-Place Deutsch	Inner Fairing - Below Radio (Right Side)

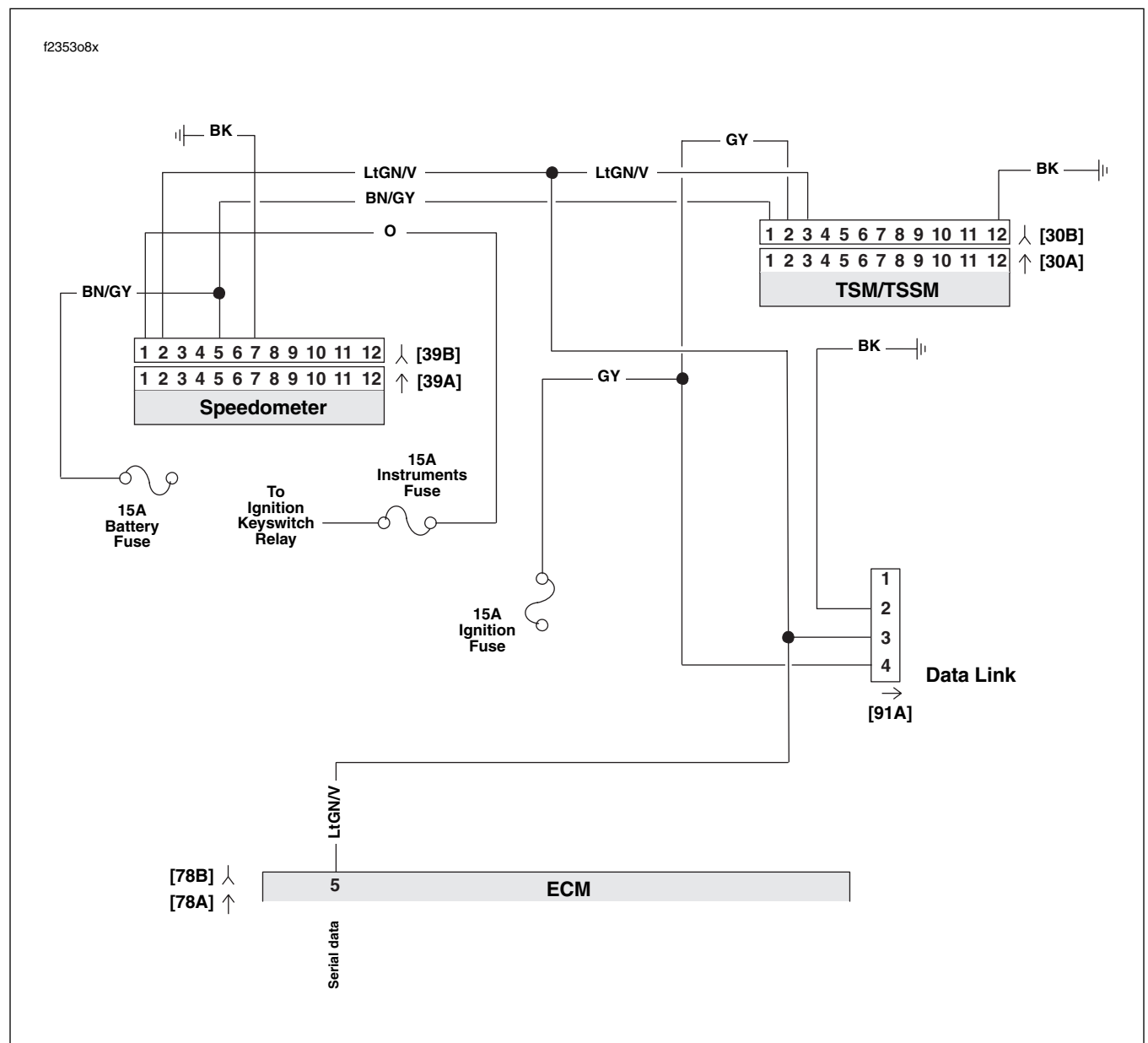


Figure 5-77. Serial Data Circuit (FLHR/C/S)

Table 5-59. Wire Harness Connectors in Figure 5-77.

NO.	DESCRIPTION	TYPE	LOCATION
[30]	TSM/TSSM	12-Place Deutsch	Cavity in Crossmember at Rear of Battery Box (Under Seat)
[39]	Speedometer	12-Place Packard	Under Console (Back of Speedometer)
[78]	ECM	36-Place Packard	Under Right Side Cover
[91]	Data Link	4-Place Deutsch	Under Right Side Cover

Test 5.31

LOSS OF SPEEDOMETER SERIAL DATA: DTC

U1097, U1255

