PCM®
marine engines

MY 2007 ECM Training Diagnostic Supplement

01/07

ECM DIAGNOSTIC TROUBLE CODES (DTC)

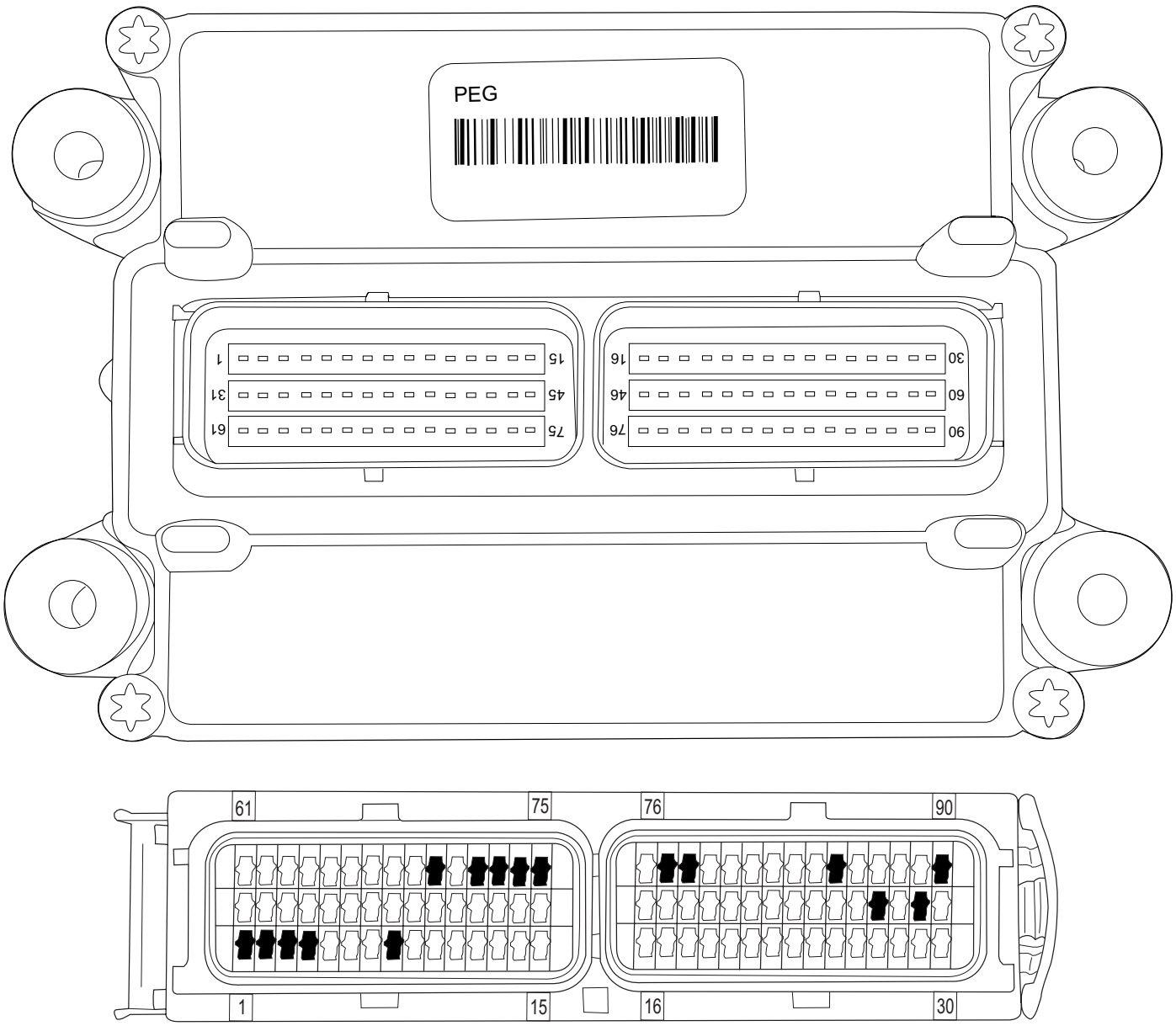
DTC 601 Flash Checksum Invalid
DTC 604 RAM Failure
DTC 606 Microprocessor Failure - COP
DTC 1612 RTI 1 Loss
DTC 1613 RTI 2 Loss
DTC 1614 RTI 3 Loss
DTC 1615 A/D Loss
DTC 1616 Invalid Interrupt
DTC 642 Sensor Supply Voltage 1 Low
DTC 643 Sensor Supply Voltage 1 High
DTC 652 Sensor Supply Voltage 2 Low
DTC 653 Sensor Supply Voltage 2 High
DTC 1611 Sensor Supply Voltage 1/2 Simultaneous Out Of Range
DTC 2618 Tach Output Ground Short
DTC 2619 Tach Output Short to Power
DTC 627 Fuel Pump Relay Coil Open
DTC 628 Fuel Pump Relay Control Ground Short
DTC 629 Fuel Pump Relay Coil Short to Power
DTC 685 Power Relay Coil Open
DTC 686 Power Relay Control Ground Short
DTC 687 Power Relay Coil Short to Power
DTC 341 Cam Input Signal Noise
DTC 342 Loss of Cam Input Signal
DTC 219 RPM Above Max Governor
DTC 1111 RPM Above Fuel Rev Limit
DTC 1112 RPM Above Spark Rev Limit
DTC 16 Never Crank Synced at Start
DTC 336 Crank Input Signal Noise
DTC 337 Crank Signal Loss
DTC 261 Injector 1 Open or Short to Ground
DTC 262 Injector 1 Coil Shorted
DTC 264 Injector 2 Open or Short to Ground
DTC 265 Injector 2 Coil Shorted
DTC 267 Injector 3 Open or Short to Ground
DTC 268 Injector 3 Coil Shorted
DTC 270 Injector 4 Open or Short to Ground
DTC 271 Injector 4 Coil Shorted
DTC 273 Injector 5 Open or Short to Ground
DTC 274 Injector 5 Coil Shorted
DTC 276 Injector 6 Open or Short to Ground
DTC 277 Injector 6 Coil Shorted

DTC 279 Injector 7 Open or Short to Ground
DTC 280 Injector 7 Coil Shorted
DTC 282 Injector 8 Open or Short to Ground
DTC 283 Injector 8 Coil Shorted
DTC 326 Knock Sensor 1/2 Excessive Signal
DTC 327 Knock Sensor 1/2 Sensor Open
DTC 107 MAP Voltage Low
DTC 108 MAP High Pressure
DTC 2229 BP High Pressure
DTC 129 BP Low Pressure
DTC 111 IAT Higher Than Expected Stage 1
DTC 112 IAT Voltage Low
DTC 113 IAT Voltage High
DTC 127 IAT Higher Than Expected Stage 2
DTC 521 Oil Pressure Sender High Pressure
DTC 522 Oil Pressure Sender Voltage Low
DTC 523 Oil Pressure Sender Voltage High
DTC 524 Oil Pressure Sender Low Pressure
DTC 116 ECT Higher Than Expected Stage 1
DTC 117 ECT Voltage Low
DTC 118 ECT Voltage High
DTC 217 ECT Higher Than Expected Stage 2
DTC 2428 EGT Temperature High
DTC 1542 Transmission Temperature High
DTC 2122 FPP1 Voltage High
DTC 2123 FPP1 Voltage Low
DTC 2127 FPP2 Voltage Low
DTC 2128 FPP2 Voltage High
DTC 2115 FPP1 Higher Than IVS
DTC 2139 FPP1 Lower than IVS
DTC 2116 FPP2 Higher Than IVS
DTC 2140 FPP2 Lower than IVS
DTC 2126 FPP1 Higher than FPP2
DTC 2121 FPP1 Lower than FPP2
DTC 2130 IVS Stuck at idle, FPP1/2 match
DTC 2131 IVS Stuck off idle, FPP1/2 match
DTC 1121 FPP1/2 simultaneous voltages out of range
DTC 2120 FPP1 invalid voltage and FPP2 disagrees with IVS
DTC 2125 FPP1 invalid voltage and FPP2 disagrees with IVS
DTC 1122 FPP1/2 do not match each other or the IVS

ECM DIAGNOSTIC TROUBLE CODES (DTC)

DTC 122 TPS1 Voltage Low
DTC 123 TPS1 Voltage High
DTC 222 TPS2 Voltage Low
DTC 223 TPS2 Voltage High
DTC 121 TPS1 Lower Than TPS2
DTC 221 TPS1 Higher Than TPS2
DTC 2111 Unable to reach Lower TPS
DTC 2112 Unable to reach Higher TPS
DTC 2135 TPS 1/2 Simultaneous Voltages Out Of Range
DTC 562 Battery Voltage Low
DTC 563 Battery Voltage High
DTC 9999 Road Speed Loss of Input

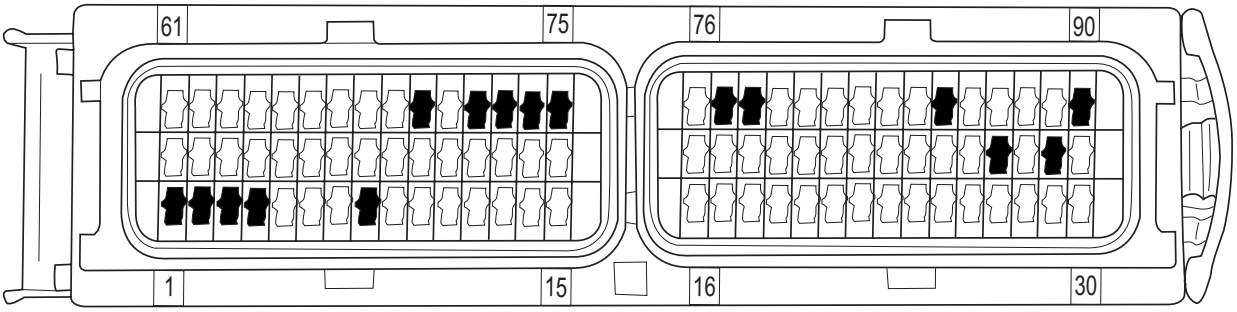
ECM Connector Pinout Identification (1 of 4)



ECM 90 WAY CONNECTOR

ECM PIN NUMBER	CKT(WIRE) NUMBER	CKT (WIRE) COLOR	CIRCUIT DESCRIPTION
1			(OPEN)
2			(OPEN)
3			(OPEN)
4			(OPEN)
5			Throttle Position Sensor (TPS) 1 Input
6			Throttle Position Sensor (TPS) 2 Input
7			MAP Sensor Input
8			(OPEN)
9			Throttle Control Position (TCP) Sensor 1 Input
10			Throttle Control Position (TCP) Sensor 2 Input
11			Master/Slave Input

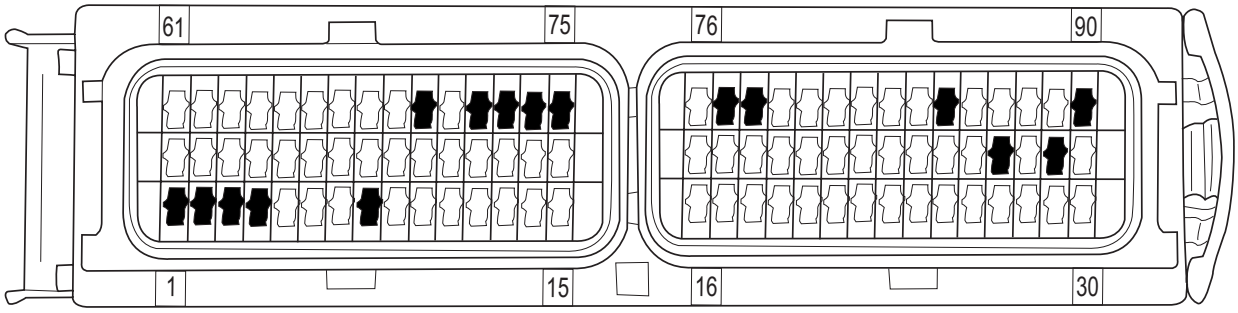
ECM Connector Pinout Identification (2 of 4)



J-1
ECM 90 WAY CONNECTOR

ECM PIN NUMBER	CKT(WIRE) NUMBER	CKT (WIRE) COLOR	CIRCUIT DESCRIPTION
12			Perfect Pass VGOV
13			CAN Bus 1 Termination
14			CAN Bus 1 (+)
15			CAN Bus 1 (-)
16			CAN Bus 2 (-)
17			CAN Bus 2 (+)
18			CAN Bus 2 Termination
19			Vref #1 (regulated 5.0 Vdc Output)
20			Ground Vref #1 (regulated 5.0Vdc Return)
21			Crankshaft Position Sensor (+)
22			Crankshaft Position Sensor (-)
23			Camshaft Position Sensor (+)
24			Camshaft Position Sensor (-)
25			Paddle Wheel (+)
26			Paddle Wheel (-)
27			Knock Sensor 1 (+)
28			Knock Sensor 1 (-)
29			Knock Sensor 2 (+)
30			Knock Sensor 2 (-)
31			Ignition Coil #1 (6.0/8.1L), (5.0/5.7L)
32			Ignition Coil #6 (6.0/8.1L)
33			Ignition Coil #8 (6.0/8.1L)
34			Ignition Coil #7 (6.0/8.1L)
35			Ignition Coil #5 (6.0/8.1L)
36			Ignition Coil #4 (6.0/8.1L)
37			Ignition Coil #2 (6.0/8.1L)
38			Ignition Coil #3 (6.0/8.1L)
39			Intake Air Temperature (IAT) Sensor Input
40			Engine Coolant Temperature (ECT) Sensor Input
41			Exhaust Gas Temperature (EGT) Switch
42			Throttle Control Position (TCP) Sensor Gain Select
43			Twin Engine Sync Select

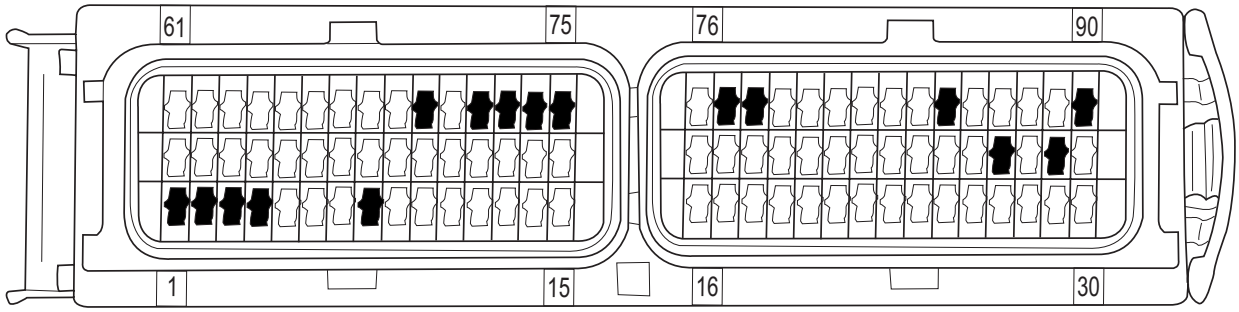
ECM Connector Pinout Identification (3 of 4)



J-1
ECM 90 WAY CONNECTOR

ECM PIN NUMBER	CKT(WIRE) NUMBER	CKT (WIRE) COLOR	CIRCUIT DESCRIPTION
44			MPH/RPM Mode Select
45			Switched Ignition Voltage
46			Fuel Level Input
47			Perfect Pass Request
48			Throttle Idle Validation Switch (IVS) Input
49			Vref #2 (regulated 5.0 Vdc Output)
50			Ground Vref #2 (regulated 5.0Vdc Return)
51			Engage/Resume Select
52			Speed Incrememnt/Decrement
53			Oil Pressure Sensor Input
54			Transmission Temperature Switch Input
55			RS232 Serial Data_TX
56			RS232 Serial Data_RX
57			(OPEN)
58			Tachometer Gauge (Output)
59			(OPEN)
60			Battery Feed
61			Injector #1 Control - Cylinder #1: 5.7/6.0/8.1L
62			Injector #2 Control - Cylinder #8: 5.7/6.0/8.1L
63			Injector #3 Control - Cylinder #4: 5.7L; Cylinder #7: 6.0/8.1L
64			Injector #4 Control - Cylinder #3: 5.7L; Cylinder #2: 6.0/8.1L
65			Injector #5 Control - Cylinder #6: 5.7/6.0/8.1L
66			Injector #6 Control - Cylinder #5: 5.7/6.0/8.1L
67			Injector #7 Control - Cylinder #7: 5.7L; Cylinder #4: 6.0/8.1L
68			Injector #8 Control - Cylinder #2: 5.7L; Cylinder #3: 6.0/8.1L
69			Ground
70			(OPEN)
71			Ignition Relay Enable
72			(OPEN)
73			(OPEN)
74			(OPEN)
75			(OPEN)

ECM Connector Pinout Identification (4 of 4)



J-1
ECM 90 WAY CONNECTOR

ECM PIN NUMBER	CKT(WIRE) NUMBER	CKT (WIRE) COLOR	CIRCUIT DESCRIPTION
76			Buzzer
77			(OPEN)
78			(OPEN)
79			Battery Feed
80			Malfunction Indicator Lamp (MIL) Output
81			Ground
82			Drive-By-Wire (DBW) (+)
83			Drive-By-Wire (DBW) (-)
84			Fuel Pump Relay Enable
85			(OPEN)
86			Perfect Pass Status Lamp
87			Engine Coolant Temperature Gauge
88			Engine Oil Pressure Gauge
89			Sync Status Lamp
90			(OPEN)

ECM DIAGNOSTIC TROUBLE CODES

The following are ECM Internal Processor Diagnostic trouble codes. Should one or more of these codes be present; clear the codes, remove power from the ECM by disconnecting the battery power to the engine for at least 30 seconds, reconnect the battery and re-test. If the code returns replace the ECM. Any ECM failure code will result in a reduced throttle condition. The engine will not operate above 800 RPM. If equipped with a buzzer, the buzzer will sound for .5 sec then be off for .25 sec.

DTC 601 Flash Checksum Invalid

DTC 604 RAM Failure

DTC 606 Microprocessor Failure - COP

DTC 1612 RTI 1 Loss

DTC 1613 RTI 2 Loss

DTC 1614 RTI 3 Loss

DTC 1615 A/D Loss

DTC 1616 Invalid Interrupt

The following are ECM 5 Volt Reference Supply trouble codes. The 5 Volt Reference Supply provides the required operating voltage for the various sensors located on the engine. These codes may be present with various sensor codes also. Always verify that VREF #1 and #2 voltages and circuits are correct before troubleshooting the sensor code. If VREF #2 fails, the operator will have Idle Only operation of the throttle. Also, if equipped with a buzzer, the buzzer will sound for .5 sec and be off for .25 sec.

DTC 642 Sensor Supply Voltage 1 Low - Sensor voltage output is less than 4.6 Vdc.

DTC 643 Sensor Supply Voltage 1 High - Sensor voltage output is greater than 5.4 Vdc.

DTC 652 Sensor Supply Voltage 2 Low - Sensor voltage output is less than 4.6 Vdc.

DTC 653 Sensor Supply Voltage 2 High - Sensor voltage output is greater than 5.4 Vdc.

DTC 1611 Sensor Supply Voltage 1/2 Simultaneous Out Of Range - Uses the same parameters as stated above.

ECM 5V REFERENCE SUPPLY

Wire Color	ECM Pin No.	Function
Lt Grn/Red	19	VREF #1 (5.0 Vdc)
Blk/Lt Grn	20	VREF #1 (return)
Lt Grn/Pur	49	VREF #2 (5.0 Vdc)
Lt Grn/Blk	50	VREF #2 (return)

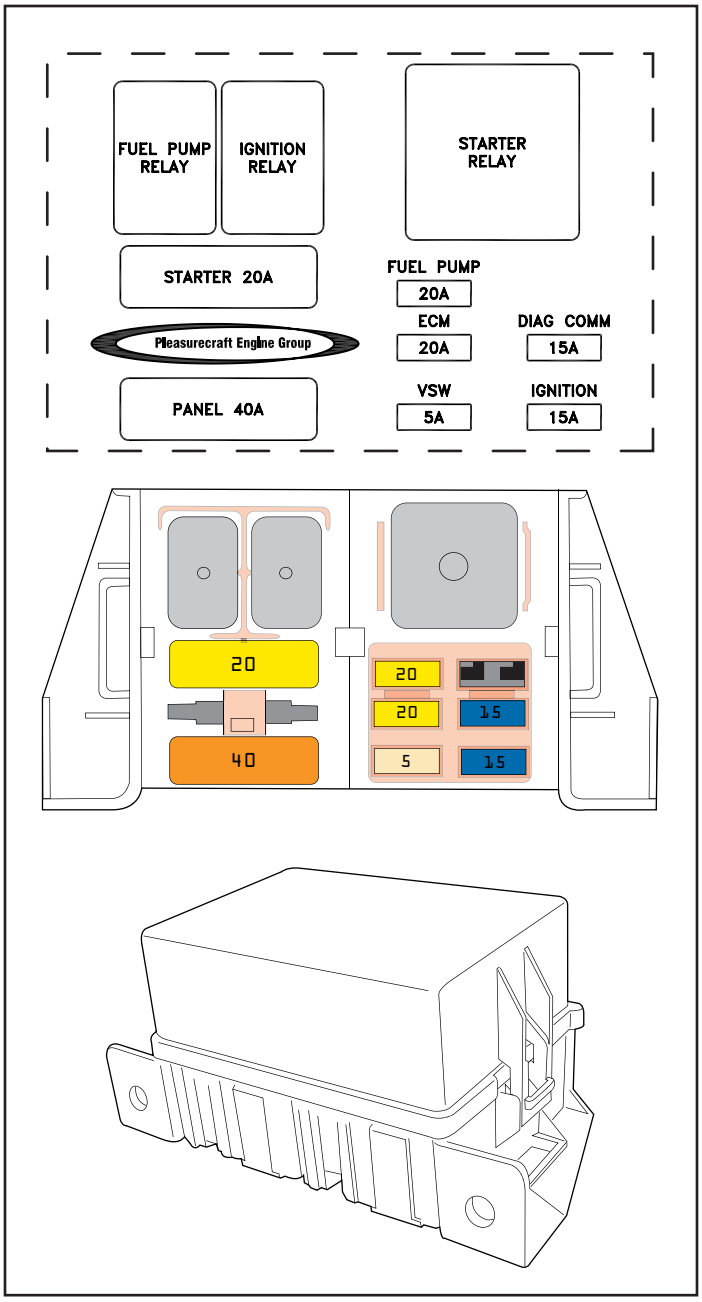
SENSOR	VREF #1	VREF #2
MAP/IAT	X	
OIL PRES.	X	
CRANK	X	
CAM	X	
ECT	X	
TPS	X	
TCP	X	X

ECM DIAGNOSTIC TROUBLE CODES

The following are ECM Diagnostic trouble codes for the Tach Output, ECM Pin 58. The Tach output is used by an instrument panel analog gauge or by the Perfect Pass speed control system (optional). Should one of these codes be present; clear the codes and one at a time, isolate the boat's Tach gauge, then Perfect Pass System, from the engine harness and retest if the code returns troubleshoot the engine harness for a short to ground or power, if no wiring problem is present replace the ECM.

DTC 2618 Tach Output Ground Short

DTC 2619 Tach Output Short to Power



Electrical System Relay and Fuse Block

FUEL PUMP RELAY: Controlled by the ECM (Pin 84). When it is energized, the fuel pumps will run. At initial Key ON, the ECM will energize the relay for 2-4 seconds to prime the fuel system. Once the ECM recognizes the Crank Position Sensor signal the fuel pumps will remain on while the engine is running or until Key OFF.

ECM DIAGNOSTIC TROUBLE CODES

DTC 627 Fuel Pump Relay Coil Open

DTC 628 Fuel Pump Relay Control Ground Short

DTC 629 Fuel Pump Relay Coil Short to Power

Troubleshoot wiring between relay socket pin 85 and ECM pin 84. Troubleshoot relay socket wiring for any shorts to ground or power, broken, pushed, or shorted pins. Replace Fuel Pump Relay.

IGNITION RELAY: Controlled by the ECM (Pin 71). When it is energized, battery power will be supplied to the Ignition Module(s), Ignition Coil(s), and all eight Fuel Injectors. If the ignition switch is left in the Key-ON-Engine OFF position for more than 15 seconds without trying to start the engine, the ECM will de-energize the Ignition Relay. Cycle the Ignition Switch OFF to ON or to Start Position to energize the Ignition Relay, again.

ECM DIAGNOSTIC TROUBLE CODES

DTC 685 Power Relay Coil Open

DTC 686 Power Relay Control Ground Short

DTC 687 Power Relay Coil Short to Power

Troubleshoot wiring between relay socket pin 85 and ECM pin 71. Troubleshoot relay socket wiring for any shorts to ground or power, broken, pushed, or shorted pins. Replace Ignition Relay.

STARTER RELAY: Controlled by the boat's start circuit (Pin 7 of the 8-Pin Boat Interface Connector). When the Key is in the START position this relay will energize and apply battery voltage to the Starter Solenoid to enable the starter and crank the engine.

STARTER FUSE - 20 AMP MAXI: Provides protection to the Starter Solenoid circuit. If the Starter Solenoid draws too much current or is shorted to ground this fuse will open. Note: The Starter Relay will still energize when the Key is in the START position when this fuse is open.

PANEL FUSE - 40 AMP MAXI: Provides overload protection for the Boat Accessory devices that may be using this battery feed circuit (Pin 1 of the 2-Pin Boat Interface Connector). If this fuse is open, you may have a no start/no run condition if this battery feed is used to power the boat's ignition key switch. However, many boats are wired such that when this fuse is open, it will only affect boat accessory device operation and the engine will continue to operate normally.

FUEL PUMP FUSE - 20 AMP: This fuse provides overload protection for the Fuel Pump Relay, High Pressure Fuel Pump, Low Pressure Fuel Pump, and Remote Electric Fuel Solenoid (if equipped).

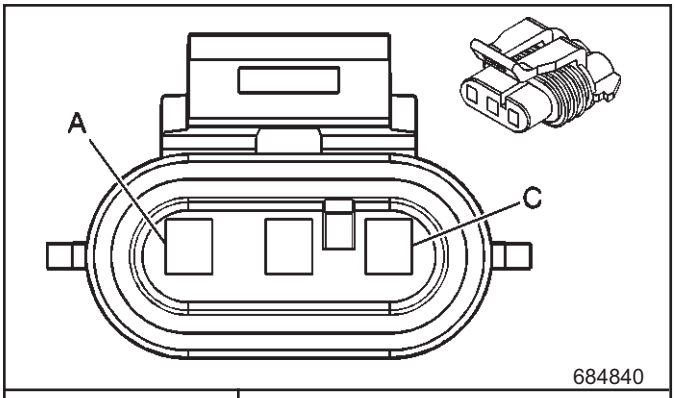
ECM FUSE - 20 AMP: Provides overload protection for the ECM battery feed circuits; ECM pins 60 and 79.

VSW - 5 AMP: Provides overload protection for the ECM Voltage Switched (Ignition voltage) circuit; ECM pin 45 (from pin 5 of the 8-Pin Boat Interface Connector).

DIAGNOSTIC CONNECTOR - 15 AMP: Provides overload protection of the battery feed circuit (pin A of the Calibration Tool Connector and pin E of the Diagnostic Tool Connector) when a Diagnostic Scan/Calibration Tool is connected.

IGNITION - 15 AMP: Provides overload protection for the Ignition Module(s), Ignition Coil(s), Fuel Injectors, and the Alternator's regulator circuit Sense Input.

Camshaft Position (CMP) Sensor (8.1L)



Connector Part Information	• **12129946** • **3-Way F Metri-Pack 150 Series Sealed**

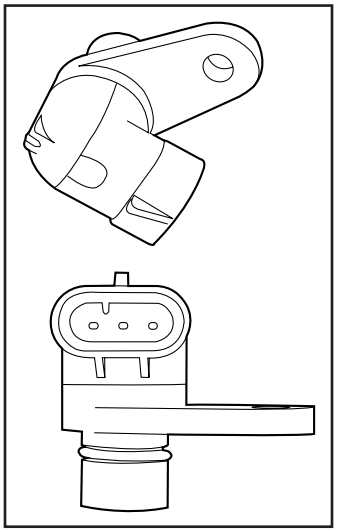
Pin	Wire Color	ECM Pin No.	Function
A		19	VREF #1 (5.0 Vdc)
B		24	CMP (-)
C		23	CMP (+)

Camshaft Position (CMP) Sensor (6.0L)

Pin	Wire Color	ECM Pin No.	Function
A	Gry/Brn	23	CMP (+)
B	Blk/Lt Grn	24	CMP (-)
C	Lt Grn/Red	19	VREF #1 (5.0 Vdc)

Camshaft Position (CMP) Sensor (5.7L)

Pin	Wire Color	ECM Pin No.	Function
A	Pur/Orn	24	CMP (-)
B	Gry/Brn	23	CMP (+)
C	Lt Grn/Red	19	VREF #1 (5.0 Vdc)



Camshaft Position (CMP) Sensor (8.1L)

ECM DIAGNOSTIC TROUBLE CODES

Typically, with a Cam Position Sensor failure, you will have a no start condition. If the sensor fails while the engine is running, the MIL will be lit and engine operation will be normal until the engine is shut off, then it will not restart.

DTC 341 Cam Input Signal Noise - ECM detects more than 1 re-sync or invalid cam signal within a 700 ms period of a cranking cycle. Possible loose or broken connection at the ECM or CMP or short to battery power on any of the CMP wiring. Verify wiring, connections at CMP and ECM - repair as required. Replace CMP.

DTC 342 Loss of Cam Input Signal - ECM detects no CAM pulses above 100 RPM. Possible open, short to ground, or short to battery power on the CMP (+) signal path. Also, possible short to battery power on the CMP (-) signal path. Verify wiring, connections at CMP and ECM - repair as required. Replace CMP.

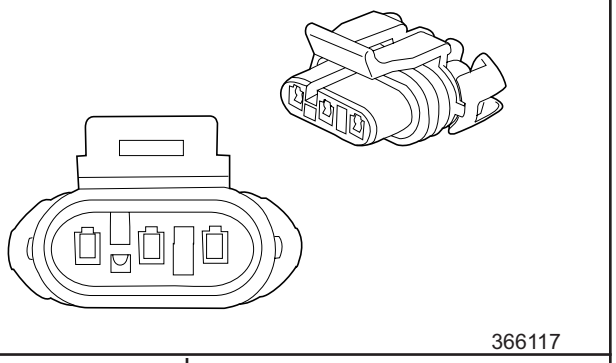
ADDITIONAL FAULTS THAT MAY BE ASSOCIATED WITH A DEFECTIVE CMP SENSOR OR SENSOR CIRCUIT

DTC 219 RPM Above Max Governor - ECM detects RPM above Max Governor. Typically this code will be accompanied by other codes, troubleshoot the other codes first, if this code remains, replace the ECM.

DTC 1111 RPM Above Fuel Rev Limit - ECM detects RPM above Max Governor. Fuel will be shut off to the engine. Typically this code will be accompanied by other codes, troubleshoot the other codes first, if this code remains, replace the ECM.

DTC 1112 RPM Above Spark Rev Limit - ECM detects RPM above Max Governor. Spark will be shut off to the engine. Typically this code will be accompanied by other codes, troubleshoot the other codes first, if this code remains, replace the ECM.

Crankshaft Position (CKP) Sensor (8.1L)



Connector Part Information	• **15324165** • **3-Way F Metri-Pack 150 Series Sealed**

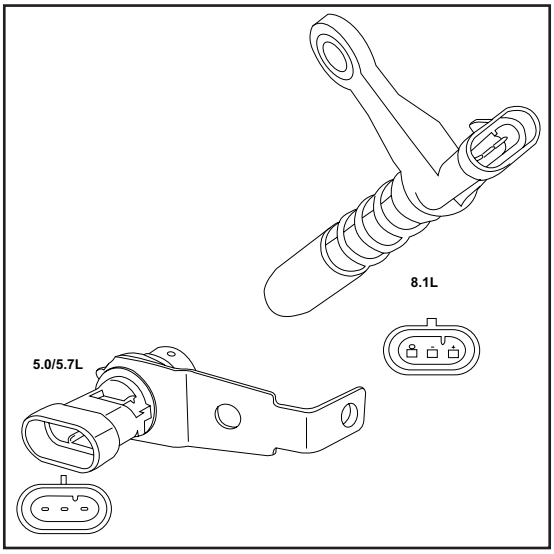
Pin	Wire Color	ECM Pin No.	Function
A	Lt Grn/Red	19	VREF #1 (5.0 Vdc)
B		22	CKP (-)
C		21	CKP (+)

Crankshaft Position (CKP) Sensor (6.0L)

Pin	Wire Color	ECM Pin No.	Function
A	Pur/Wht	21	CKP (+)
B	Blk/Lt Grn	22	CKP (-)
C	Lt Grn/Red	19	VREF #1 (5.0 Vdc)

Crankshaft Position (CKP) Sensor (5.7L)

Pin	Wire Color	ECM Pin No.	Function
A	Lt Grn/Red	19	VREF #1 (5.0 Vdc)
B	Wht/Pur	22	CKP (-)
C	Pur/Wht	21	CKP (+)



Crankshaft Position (CKP) Sensors

ECM DIAGNOSTIC TROUBLE CODES

Typically, with a Crank Position Sensor failure, you will have a no start condition. Crank the engine for 20 seconds to verify that one of the following codes set. If the sensor fails while the engine is running, the engine will shut off and not restart.

DTC 16 Never Crank Synced at Start - ECM detects 4 cranking revolutions without sync and cranking RPM is less than 90. Possible starter or engine problem. Normal starter cranking RPM is 150-200. Verify electrical system, verify no engine mechanical problem - fluid in the cylinders, etc., verify starter. Verify wiring, connections at CKP and ECM - repair as required. Replace CKP.

DTC 336 Crank Input Signal Noise - ECM detects more than 1 re-sync or invalid crank signal within an 800 ms period of a cranking cycle. Possible loose or broken connection at the ECM or CKP or short to battery power on any of the CKP wiring. Verify wiring, connections at CKP and ECM - repair as required. Replace CKP.

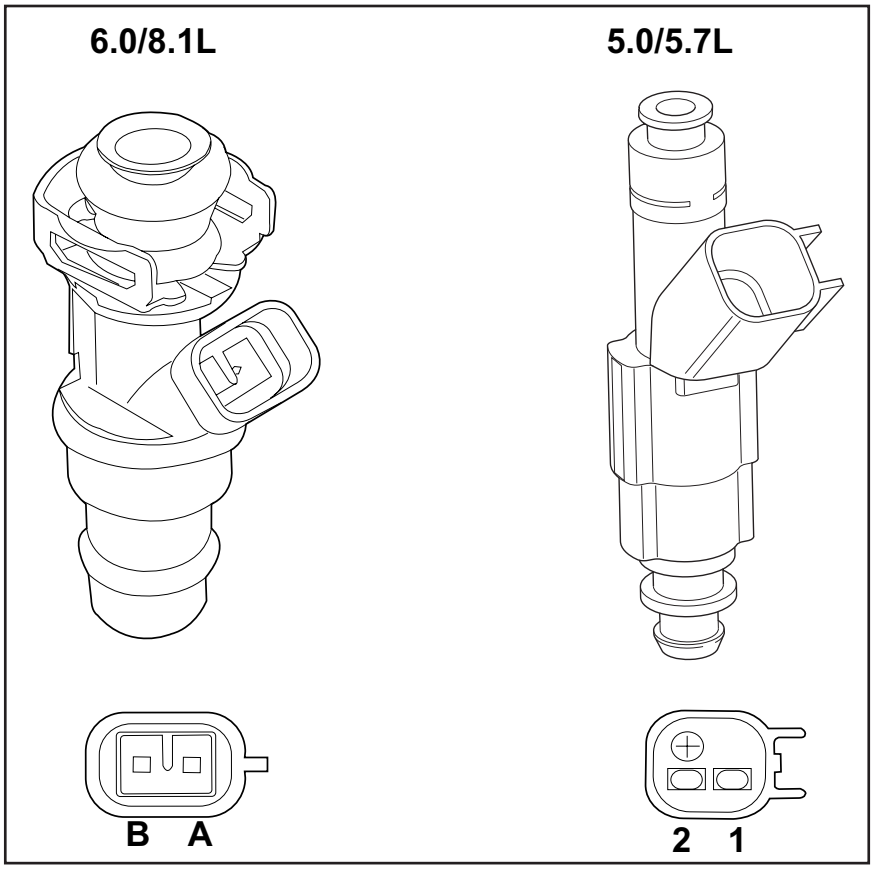
DTC 337 Crank Signal Loss - ECM detects CAM pulses without crank sensor activity. Possible open, short to ground, or short to battery power on the CKP (+) signal path. Also, possible short to battery power on the CKP (-) signal path. Verify wiring, connections at CKP and ECM - repair as required. Replace CKP.

ADDITIONAL FAULTS THAT MAY BE ASSOCIATED WITH A DEFECTIVE CKP SENSOR OR SENSOR CIRCUIT

DTC 219 RPM Above Max Governor - ECM detects RPM above Max Governor. Typically this code will be accompanied by other codes, troubleshoot the other codes first, if this code remains, replace the ECM.

DTC 1111 RPM Above Fuel Rev Limit - ECM detects RPM above Max Governor. Fuel will be shut off to the engine. Typically this code will be accompanied by other codes, troubleshoot the other codes first, if this code remains, replace the ECM.

DTC 1112 RPM Above Spark Rev Limit - ECM detects RPM above Max Governor. Spark will be shut off to the engine. Typically this code will be accompanied by other codes, troubleshoot the other codes first, if this code remains, replace the ECM.



Fuel Injector Typical

ECM DIAGNOSTIC TROUBLE CODES

The DTC generated for a failed injector identifies the injector control circuit, not the cylinder the injector is in. Use the injector connector data, on the following pages to troubleshoot the wiring and circuit when one of the following codes are present.

DTC 261 Injector 1 Open or Short to Ground - Cylinder #1 - 5.0/5.7/6.0/8.1L
DTC 262 Injector 1 Coil Shorted

DTC 264 Injector 2 Open or Short to Ground - Cylinder #8 - 5.0/5.7/6.0/8.1L
DTC 265 Injector 2 Coil Shorted

DTC 267 Injector 3 Open or Short to Ground - Cylinder #7 - 6.0/8.1L; Cylinder #4 - 5.0/5.7L
DTC 268 Injector 3 Coil Shorted

DTC 270 Injector 4 Open or Short to Ground - Cylinder #2 - 6.0/8.1L; Cylinder #3 - 5.0/5.7L
DTC 271 Injector 4 Coil Shorted

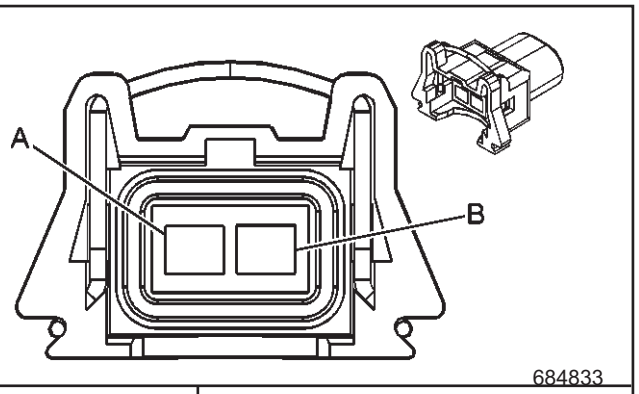
DTC 273 Injector 5 Open or Short to Ground - Cylinder #6 - 5.0/5.7/6.0/8.1L
DTC 274 Injector 5 Coil Shorted

DTC 276 Injector 6 Open or Short to Ground - Cylinder #5 - 5.0/5.7/6.0/8.1L
DTC 277 Injector 6 Coil Shorted

DTC 279 Injector 7 Open or Short to Ground - Cylinder #4 - 6.0/8.1L; Cylinder #7 - 5.0/5.7L
DTC 280 Injector 7 Coil Shorted

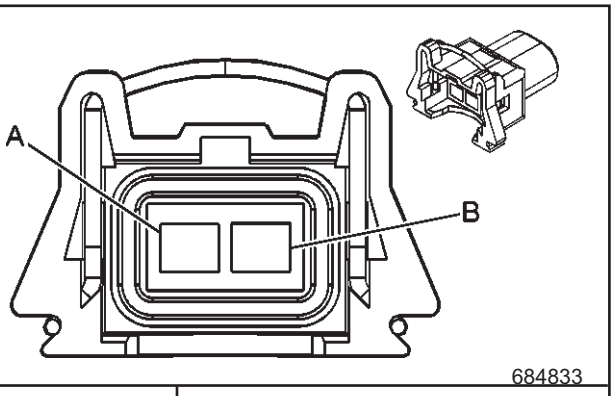
DTC 282 Injector 8 Open or Short to Ground - Cylinder #3 - 6.0/8.1L; Cylinder #2 - 5.0/5.7L
DTC 283 Injector 8 Coil Shorted

Fuel Injector Cylinder #1 (6.0/8.1L)



Connector Part Information	• 12129140 • 2-Way F Metri-Pack 280.1 P2S (BLK)		
Pin	**Wire Color**	**ECM Pin No.**	**Function**
A	Tan/Blu	61	Fuel Injector 1 Control
B	Pnk/Grn		Pin 87 Ignition Relay

Fuel Injector Cylinder #2 (6.0/8.1L)



Connector Part Information	• 12129140 • 2-Way F Metri-Pack 280.1 P2S (BLK)		
Pin	**Wire Color**	**ECM Pin No.**	**Function**
A	Gry/Orn	64	Fuel Injector 4 Control
B	Pnk/Grn		Pin 87 Ignition Relay

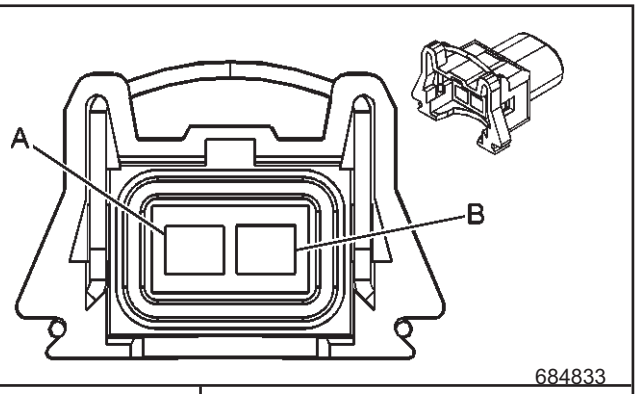
Fuel Injector Cylinder #1 (5.7L)

Pin	Wire Color	ECM Pin No.	Function
1	Tan/Blu	61	Fuel Injector 1 Control
2	Pnk/Grn		Pin 87 Ignition Relay

Fuel Injector Cylinder #2 (5.7L)

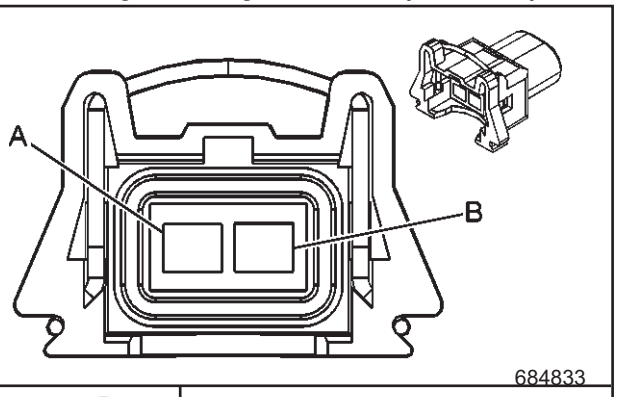
Pin	Wire Color	ECM Pin No.	Function
1	Gry/Orn	68	Fuel Injector 8 Control
2	Pnk/Grn		Pin 87 Ignition Relay

Fuel Injector Cylinder #3 (6.0/8.1L)



Connector Part Information	• 12129140 • 2-Way F Metri-Pack 280.1 P2S (BLK)		
Pin	**Wire Color**	**ECM Pin No.**	**Function**
A	Tan/Yel	68	Fuel Injector 8 Control
B	Pnk/Grn		Pin 87 Ignition Relay

Fuel Injector Cylinder #4 (6.0/8.1L)



Connector Part Information	• 12129140 • 2-Way F Metri-Pack 280.1 P2S (BLK)		
Pin	**Wire Color**	**ECM Pin No.**	**Function**
A	Gry/Wht	67	Fuel Injector 7 Control
B	Pnk/Grn		Pin 87 Ignition Relay

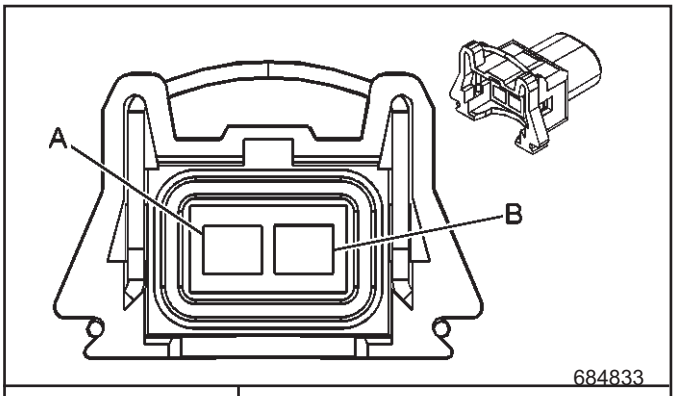
Fuel Injector Cylinder #3 (5.7L)

Pin	Wire Color	ECM Pin No.	Function
1	Tan/Yel	64	Fuel Injector 4 Control
2	Pnk/Grn		Pin 87 Ignition Relay

Fuel Injector Cylinder #4 (5.7L)

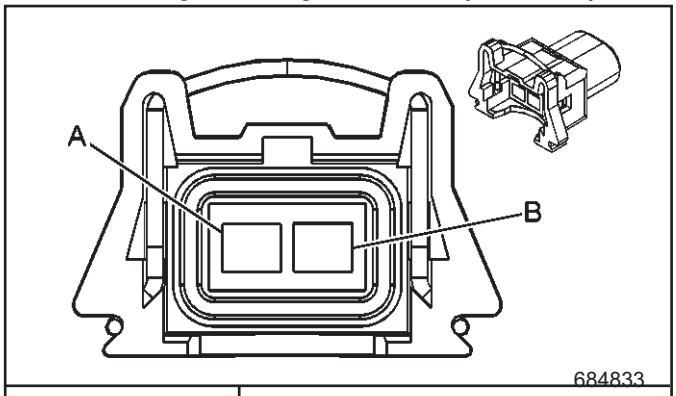
Pin	Wire Color	ECM Pin No.	Function
1	Gry/Wht	63	Fuel Injector 3 Control
2	Pnk/Grn		Pin 87 Ignition Relay

Fuel Injector Cylinder #5 (6.0/8.1L)



Connector Part Information	• 12129140 • 2-Way F Metri-Pack 280.1 P2S (BLK)		
Pin	**Wire Color**	**ECM Pin No.**	**Function**
A	Tan/Brn	66	Fuel Injector 6 Control
B	Pnk/Grn		Pin 87 Ignition Relay

Fuel Injector Cylinder #6 (6.0/8.1L)



Connector Part Information	• 12129140 • 2-Way F Metri-Pack 280.1 P2S (BLK)		
Pin	**Wire Color**	**ECM Pin No.**	**Function**
A	Gry/Yel	65	Fuel Injector 5 Control
B	Pnk/Grn		Pin 87 Ignition Relay

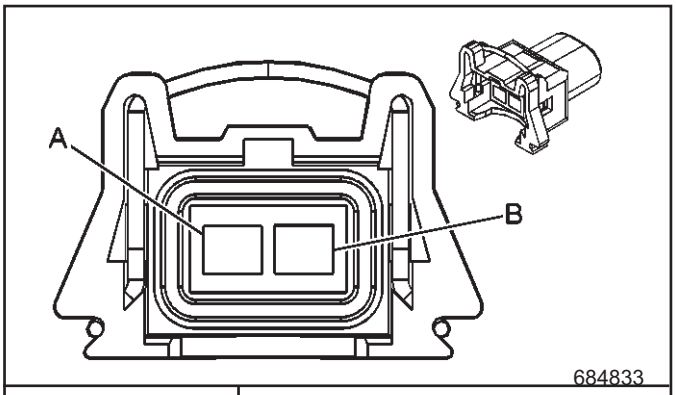
Fuel Injector Cylinder #5 (5.7L)

Pin	Wire Color	ECM Pin No.	Function
1	Tan/Brn	66	Fuel Injector 6 Control
2	Pnk/Grn		Pin 87 Ignition Relay

Fuel Injector Cylinder #6 (5.7L)

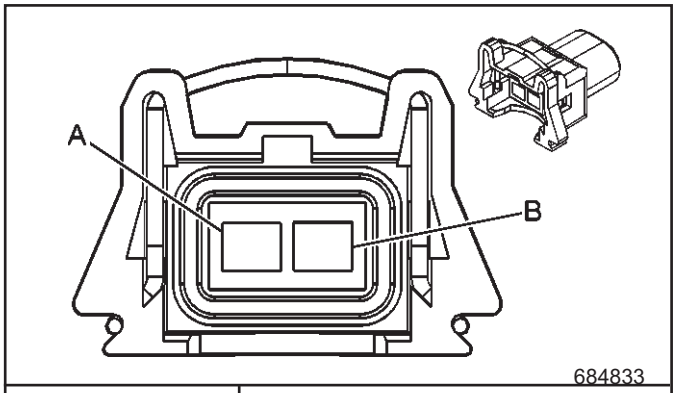
Pin	Wire Color	ECM Pin No.	Function
1	Gry/Yel	65	Fuel Injector 5 Control
2	Pnk/Grn		Pin 87 Ignition Relay

Fuel Injector Cylinder #7 (6.0/8.1L)



Connector Part Information	• 12129140 • 2-Way F Metri-Pack 280.1 P2S (BLK)		
Pin	**Wire Color**	**ECM Pin No.**	**Function**
A	Tan/Grn	63	Fuel Injector 3 Control
B	Pnk/Grn		Pin 87 Ignition Relay

Fuel Injector Cylinder #8 (6.0/8.1L)



Connector Part Information	• 12129140 • 2-Way F Metri-Pack 280.1 P2S (BLK)		
Pin	**Wire Color**	**ECM Pin No.**	**Function**
A	Gry/Blu	62	Fuel Injector 2 Control
B	Pnk/Grn		Pin 87 Ignition Relay

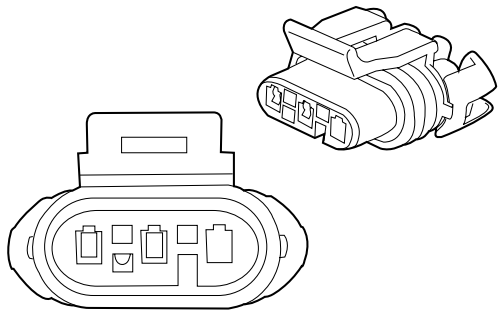
Fuel Injector Cylinder #7 (5.7L)

Pin	Wire Color	ECM Pin No.	Function
1	Tan/Grn	67	Fuel Injector 7 Control
2	Pnk/Grn		Pin 87 Ignition Relay

Fuel Injector Cylinder #8 (5.7L)

Pin	Wire Color	ECM Pin No.	Function
1	Gry/Blu	62	Fuel Injector 2 Control
2	Pnk/Grn		Pin 87 Ignition Relay

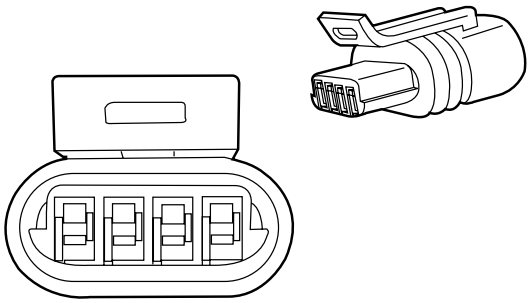
Ignition Module (5.7L)



Connector Part Information	• •

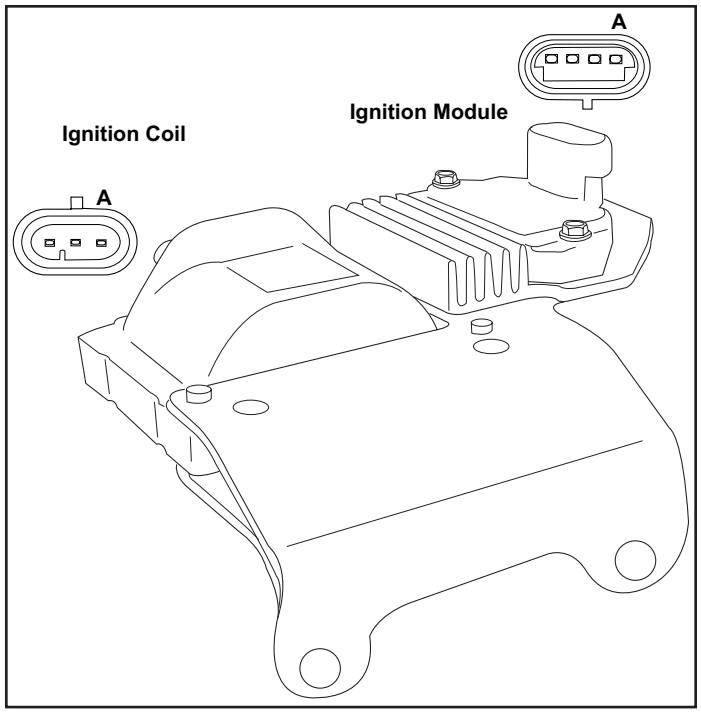
Pin	Wire Color	ECM Pin No.	Function
A	Pnk/Grn		Pin 87 Ignition Relay
B	Yellow	31	Ignition Coil #1 Control
C	Black		Ground
D	Yel/Blk		Pin B of Ignition Coil

Ignition Coil (5.7L)



Connector Part Information	• •

Pin	Wire Color	ECM Pin No.	Function
A	Pnk/Grn		Pin 87 Ignition Relay
B	Yel/Blk		Pin D of Ignition Module
C	Plug		

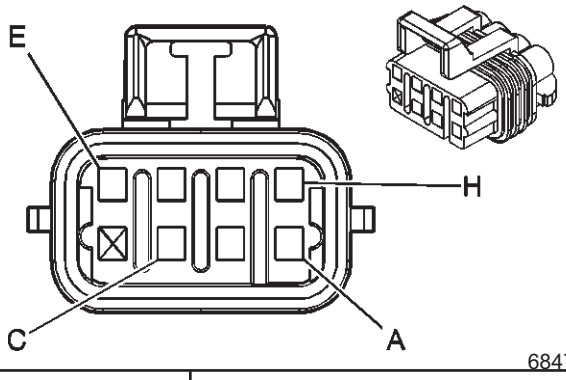


Ignition Coil/Module Assembly (5.7L)

ECM DIAGNOSTIC TROUBLE CODES

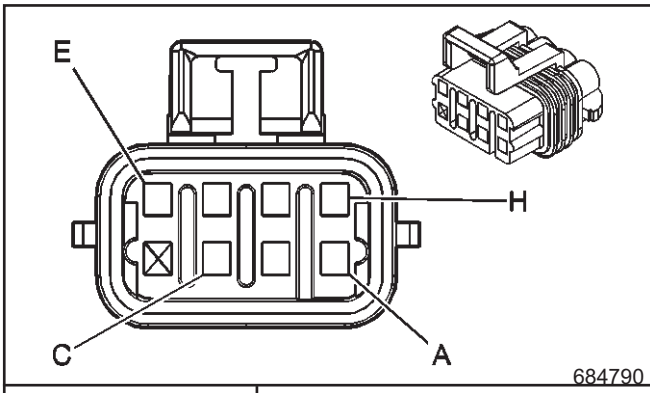
The ECM <u>does not</u> set any codes for Ignition Module/ Coil problems. For suspected spark related problems, utilize the Diacom Power Balance Test to isolate the problem to a specific cylinder. Then troubleshoot and repair shorted or open wiring, including the spark plug wires. Perform a compression test to determine if the problem is mechanical or electrical. If the problem is still not corrected replace the coil or module of the bad cylinder.

Ignition Coils - Port (Engine Harness Connector - 6.0/8.1L)



Connector Part Information	• 12047938 • 7-Way F Metri-Pack 150 Series Sealed (LT GRY)		
Pin	**Wire Color**	**ECM Pin No.**	**Function**
A	Black		Ground
B	Yel/Wht	34	IC 7 Control
C	Yel/Grn	35	IC 5 Control
D	Plug		
E	Blk/Grn		Low Reference
F	Yel/Blu	38	IC 3 Control
G	Yellow	31	IC 1 Control
H	Pnk/Grn		Pin 87 Ignition Relay

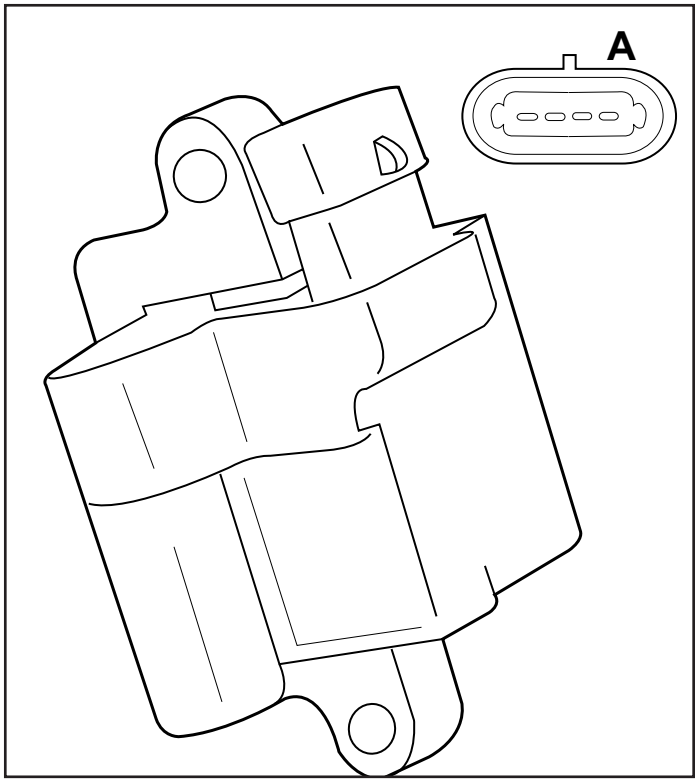
Ignition Coils - Starboard (Engine Harness Connector-6.0/8.1L)



Connector Part Information	• 12047938 • 7-Way F Metri-Pack 150 Series Sealed (LT GRY)		
Pin	**Wire Color**	**ECM Pin No.**	**Function**
A	Black		Ground
B	Wht/Tan	37	IC 2 Control
C	Wht/Blk	36	IC 4 Control
D	Plug		
E	Blk/Lt Grn		Low Reference
F	Wht/Red	32	IC 6 Control
G	Wht/Grn	33	IC 8 Control
H	Pnk/Grn		Pin 87 Ignition Relay

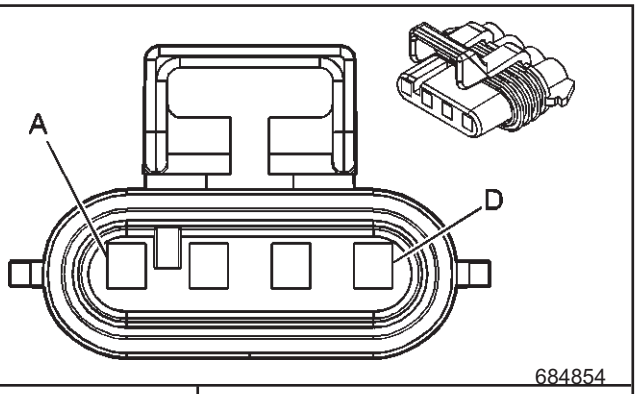
ECM DIAGNOSTIC TROUBLE CODES

The ECM <u>does not</u> set any codes for Ignition Module/ Coil problems. For suspected spark related problems, utilize the Diacom Power Balance Test to isolate the problem to a specific cylinder. Then troubleshoot and repair shorted or open wiring, including the spark plug wires. Perform a compression test to determine if the problem is mechanical or electrical. If the problem is still not corrected replace the coil or module of the bad cylinder.



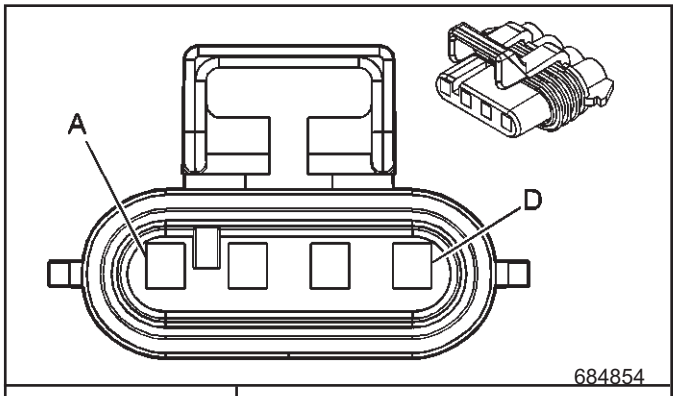
Ignition Coil/Driver (6.0/8.1L)

Ignition Coil/Driver - Cylinder #1 (6.0/8.1L)



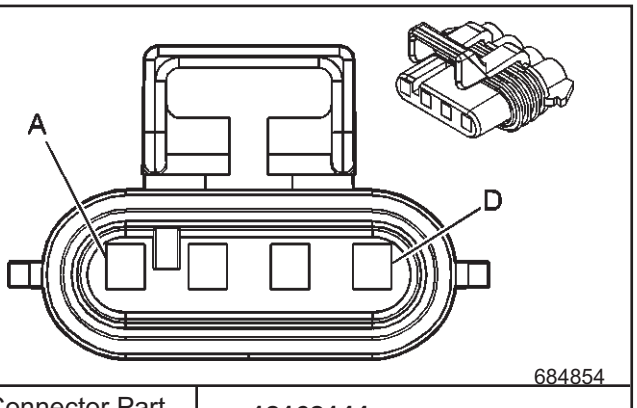
Connector Part Information	• 12162144 • 4-Way F Metri-Pack 150 Series Sealed (BLK)		
Pin	**Wire Color**	**Circuit No.**	**Function**
A	BLK		Ground
B	BRN		Low Reference
C	PPL		IC 1 Control
D	PNK		Ignition Voltage

Ignition Coil/Driver - Cylinder #3 (6.0/8.1L)



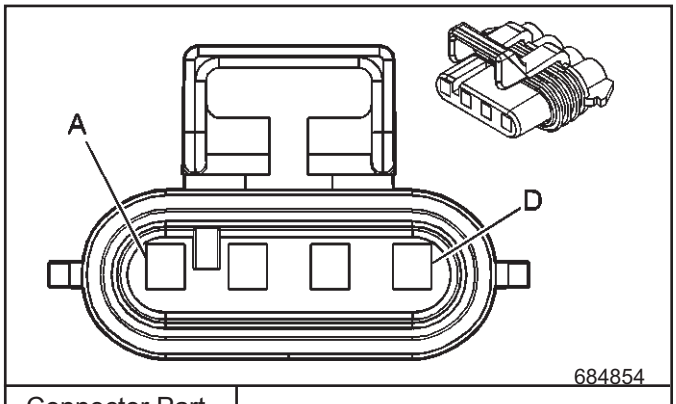
Connector Part Information	• 12162144 • 4-Way F Metri-Pack 150 Series Sealed (BLK)		
Pin	**Wire Color**	**Circuit No.**	**Function**
A	BLK		Ground
B	BRN		Low Reference
C	PPL		IC 3 Control
D	PNK		Ignition Voltage

Ignition Coil/Driver - Cylinder #5 (6.0/8.1L)



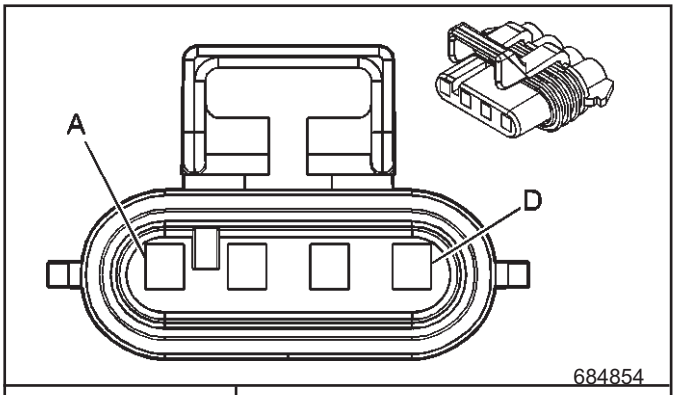
Connector Part Information	• 12162144 • 4-Way F Metri-Pack 150 Series Sealed (BLK)		
Pin	**Wire Color**	**Circuit No.**	**Function**
A	BLK		Ground
B	BRN		Low Reference
C	PPL		IC 5 Control
D	PNK		Ignition Voltage

Ignition Coil/Driver - Cylinder #7 (6.0/8.1L)



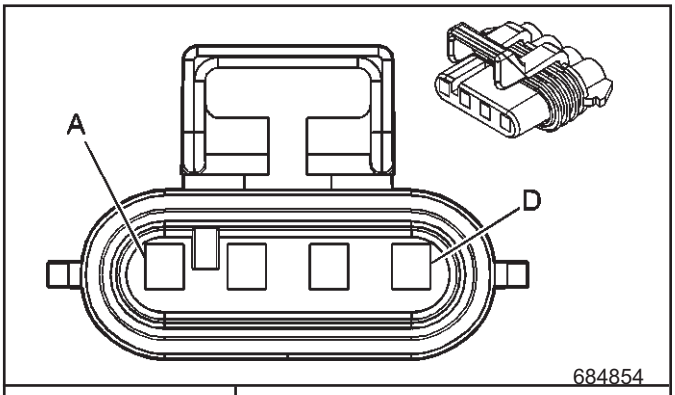
Connector Part Information	• 12162144 • 4-Way F Metri-Pack 150 Series Sealed (BLK)		
Pin	**Wire Color**	**Circuit No.**	**Function**
A	BLK		Ground
B	BRN		Low Reference
C	PPL		IC 7 Control
D	PNK		Ignition Voltage

Ignition Coil/Driver - Cylinder #2 (6.0/8.1L)



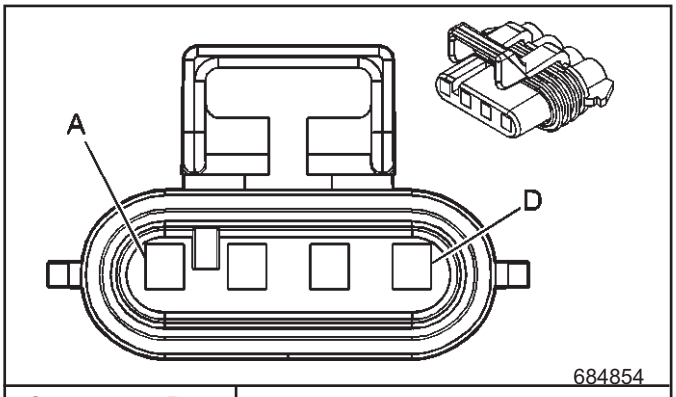
Connector Part Information	• 12162144 • 4-Way F Metri-Pack 150 Series Sealed (BLK)		
Pin	**Wire Color**	**Circuit No.**	**Function**
A	BLK		Ground
B	BRN		Low Reference
C	PPL		IC 1 Control
D	PNK		Ignition Voltage

Ignition Coil/Driver - Cylinder #4 (6.0/8.1L)



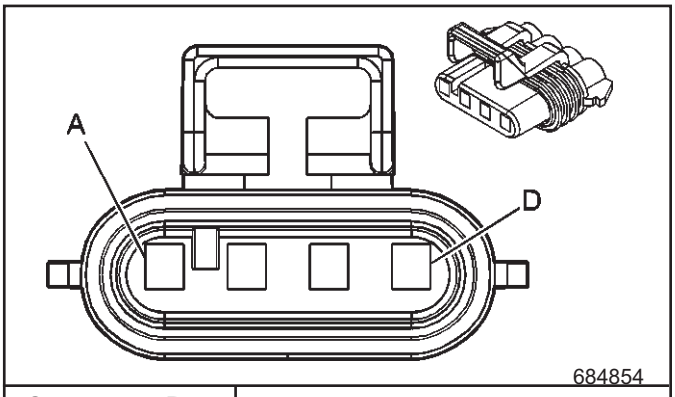
Connector Part Information	• 12162144 • 4-Way F Metri-Pack 150 Series Sealed (BLK)		
Pin	**Wire Color**	**Circuit No.**	**Function**
A	BLK		Ground
B	BRN		Low Reference
C	PPL		IC 3 Control
D	PNK		Ignition Voltage

Ignition Coil/Driver - Cylinder #6 (6.0/8.1L)



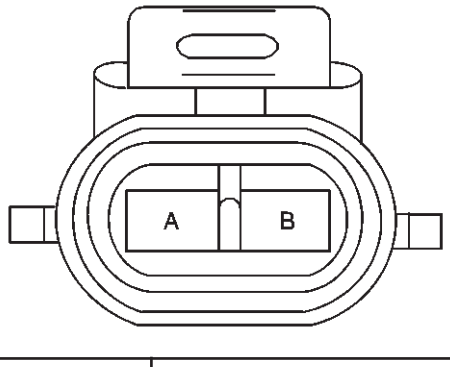
Connector Part Information	• 12162144 • 4-Way F Metri-Pack 150 Series Sealed (BLK)		
Pin	**Wire Color**	**Circuit No.**	**Function**
A	BLK		Ground
B	BRN		Low Reference
C	PPL		IC 6 Control
D	PNK		Ignition Voltage

Ignition Coil/Driver - Cylinder #8 (6.0/8.1L)



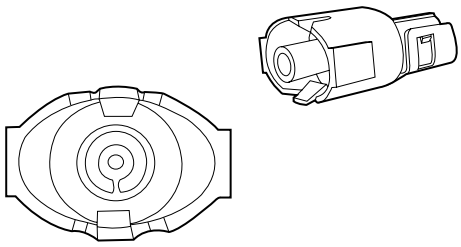
Connector Part Information	• 12162144 • 4-Way F Metri-Pack 150 Series Sealed (BLK)		
Pin	**Wire Color**	**Circuit No.**	**Function**
A	BLK		Ground
B	BRN		Low Reference
C	PPL		IC 8 Control
D	PNK		Ignition Voltage

Knock Sensor (6.0L)



Connector Part Information	• 15355362 • 1-Way F Metri-Pack 150 Series Sealed (NAT)		
Pin	**Wire Color**	**ECM Pin No.**	**Function**
A	Blk/Yel	27	KS 1 Signal
B	Blk/Wht	29	KS 2 Signal

Knock Sensor, Port (5.7L)

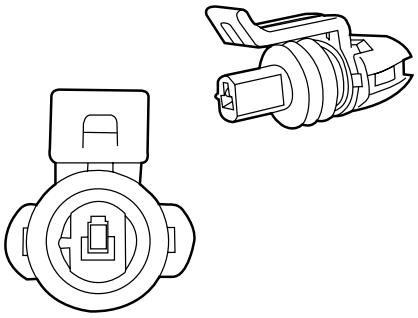


Connector Part Information	• •		
Pin	**Wire Color**	**ECM Pin No.**	**Function**
A	Blk/Yel	27	KS 1 Signal

Knock Sensor, Starboard (5.7L)

Pin	**Wire Color**	**ECM Pin No.**	**Function**
A	Blk/Wht	29	KS 2 Signal

Knock Sensor, Port (8.1L)



Connector Part Information	• •		
Pin	**Wire Color**	**ECM Pin No.**	**Function**
A	Blk/Yel	27	KS 1 Signal

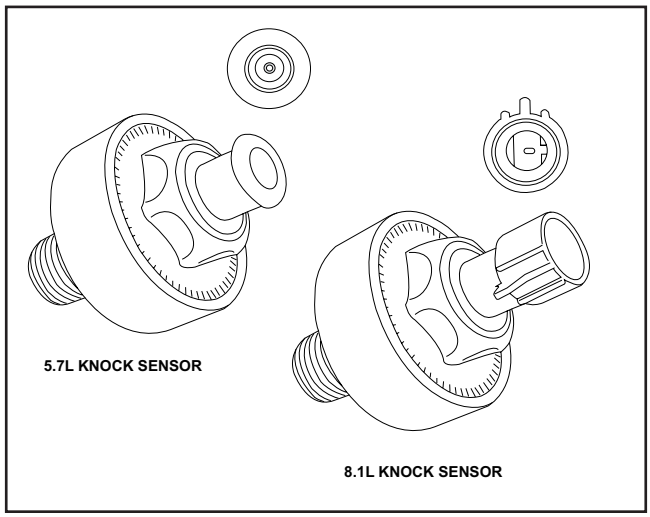
Knock Sensor, Starboard (8.1L)

Pin	**Wire Color**	**ECM Pin No.**	**Function**
A	Blk/Wht	29	KS 2 Signal

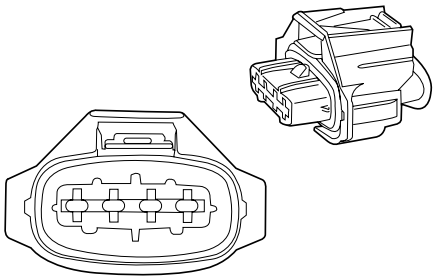
ECM DIAGNOSTIC TROUBLE CODES

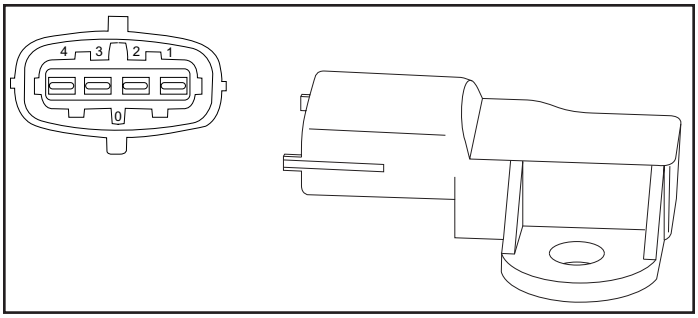
DTC 326 Knock Sensor 1/2 Excessive Signal - ECM detects a KNK 1/2 sensor input greater than 4.5 volts and MAP is less than 8.00 psia. Knock Spark Retard will be at maximum. Verify engine mechanical. Verify quality of fuel. Verify wiring, connections at KNK 1/2 and ECM, check for a short to power - repair as required. With the engine harness connected to KNK 1/2 verify signal output of each Knock Sensor. Replace Knock Sensor that has an excessive output.

DTC 327 Knock Sensor 1/2 Sensor Open - ECM detects a KNK 1/2 sensor input of less than .100 volts, and RPM is greater than 3000, and MAP is greater than 10 psia. Possible open on the KS signal path. Verify wiring, connections at KNK 1/2 and ECM - repair as required. Replace defective Knock Sensor.



Manifold Absolute Pressure (MAP) Sensor / Intake Air Temperature (IAT) Sensor (5.7L)





Manifold Absolute Pressure (MAP) Sensor / Intake Air Temperature (IAT) Sensor (5.7L)

Connector Part Information	• •		
Pin	**Wire Color**	**ECM Pin No.**	**Function**
1	Blk/Lt Grn	20	Ground Vref #1
2	Yel/Gry	39	IAT Sensor Signal
3	Lt Grn/Red	19	VREF #1 (5.0 Vdc)
4	Lt Grn	7	MAP Sensor Signal

ECM DIAGNOSTIC TROUBLE CODES

DTC 107 MAP Voltage Low - ECM detects MAP/IAT sensor voltage less than .100 volts, and TPS is greater than 2%, and RPM is less than 7000. Possible short to ground or open MAP/IAT sensor signal circuit. Drivability concerns include a rough or surging idle, heavy fuel smell at idle, and stalling at idle. Operation above 1200 RPM will appear normal. Verify wiring, connections at MAP/IAT and ECM - repair as required. Replace MAP/IAT.

DTC 108 MAP High Pressure - ECM detects MAP/IAT pressure is greater than 96.53 KPa (14.00 psia; 28.504 inHg), and TPS is less than 10%, and RPM is greater than 1800. Possible short to battery or VREF or failing MAP/IAT sensor. Verify wiring, connections at MAP/IAT and ECM - repair as required. Replace MAP/IAT.

Barometric Pressure (BP) readings are supplied to the ECM by the MAP/IAT Sensor. These readings are made once a Key cycle, at initial Key ON. Typically, you will have either the BP or MAP/IAT code displayed, but not both. High or Low BP may cause a no start. The engine will crank and sputter but it will not continue to run.

DTC 2229 BP High Pressure - At Key ON - ECM detects BP pressure is greater than 113.7635 KPa (16.50 psia; 33.594 inHg). Possible short to battery or VREF or failing MAP/IAT sensor. Verify wiring, verify correct pin locations at the MAP/IAT connector, verify connections at MAP/IAT and ECM - repair as required. Replace MAP/IAT.

DTC 129 BP Low Pressure - At Key ON - ECM detects BP pressure is less than 57.22649 KPa (8.30 psia; 16.899 inHg). Possible short to ground or Ground VREF or failing MAP/IAT sensor. Verify wiring, verify correct pin locations at the MAP/IAT connector, verify connections at MAP/IAT and ECM - repair as required. Replace MAP/IAT.

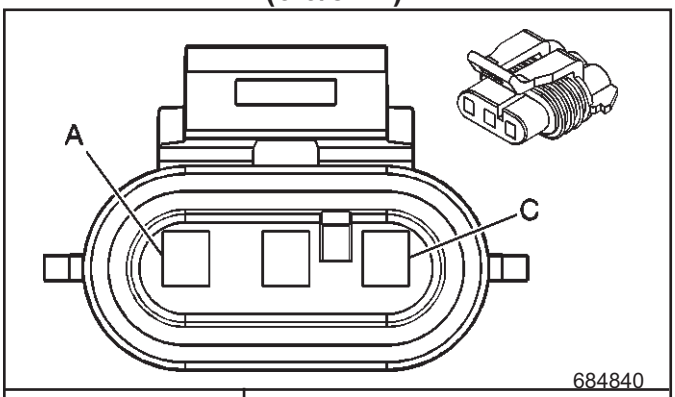
DTC 111 IAT Higher Than Expected Stage 1 - ECM detects IAT sensor temperature is greater than 160° F and RPM is greater 1500. Possible short to ground or bad connection. Verify wiring, connections at MAP/IAT and ECM - repair as required. Replace MAP/IAT.

DTC 112 IAT Voltage Low - ECM detects MAP/IAT sensor voltage less than .050 volts Possible short to ground MAP/IAT sensor signal circuit. Verify wiring, connections at MAP/IAT and ECM - repair as required. Replace MAP/IAT.

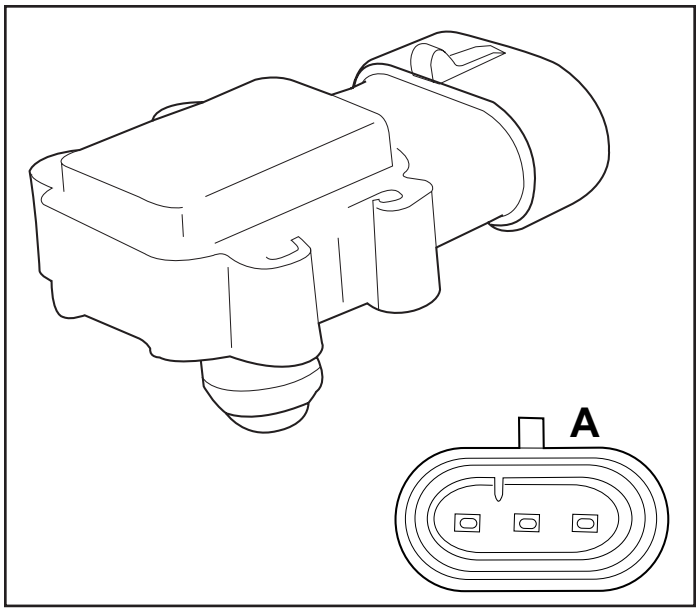
DTC 113 IAT Voltage High - ECM detects MAP/IAT sensor voltage greater than 4.950 volts. Possible short to battery or VREF voltage or an open MAP/IAT sensor signal circuit. Verify wiring, connections at MAP/IAT and ECM - repair as required. Replace MAP/IAT.

DTC 127 IAT Higher Than Expected Stage 2 - ECM detects IAT sensor temperature is greater than 175° F and RPM is greater 1500. Possible short to ground or bad connection. Verify wiring, connections at MAP/IAT and ECM - repair as required. Replace MAP/IAT.

Manifold Absolute Pressure (MAP) Sensor (6.0/8.1L)



Connector Part Information	• 12129946 • 3-Way F Metri-Pack 150 Series Sealed (GRY)		
Pin	**Wire Color**	**ECM Pin No.**	**Function**
A	Blk/Lt Grn	20	Ground Vref #1
B	Lt Grn	7	MAP Sensor Signal
C	Lt Grn/Red	19	VREF #1 (5.0 Vdc)



Manifold Absolute Pressure (MAP) Sensor (6.0/8.1L)

ECM DIAGNOSTIC TROUBLE CODES

DTC 107 MAP Voltage Low - ECM detects MAP sensor voltage less than .100 volts, and TPS is greater than 2%, and RPM is less than 7000. Possible short to ground or open MAP sensor signal circuit. Drivability concerns include a rough or surging idle, heavy fuel smell at idle, and stalling at idle. Operation above 1200 RPM will appear normal. Verify wiring, connections at MAP and ECM - repair as required. Replace MAP.

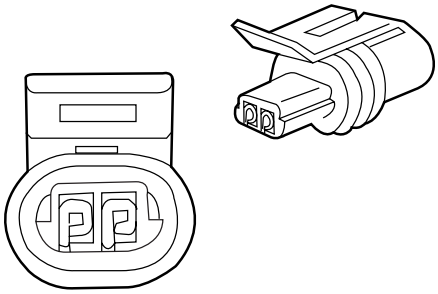
DTC 108 MAP High Pressure - ECM detects MAP pressure is greater than 96.53 KPa (14.00 psia; 28.504 inHg), and TPS is less than 10%, and RPM is greater than 1800. Possible short to battery or VREF or failing MAP sensor. Verify wiring, connections at MAP and ECM - repair as required. Replace MAP.

Barometric Pressure (BP) readings are supplied to the ECM by the MAP Sensor. These readings are made once a Key cycle, at initial Key ON. Typically, you will have either the BP or MAP code displayed, but not both. High or Low BP may cause a no start. The engine will crank and sputter but it will not continue to run.

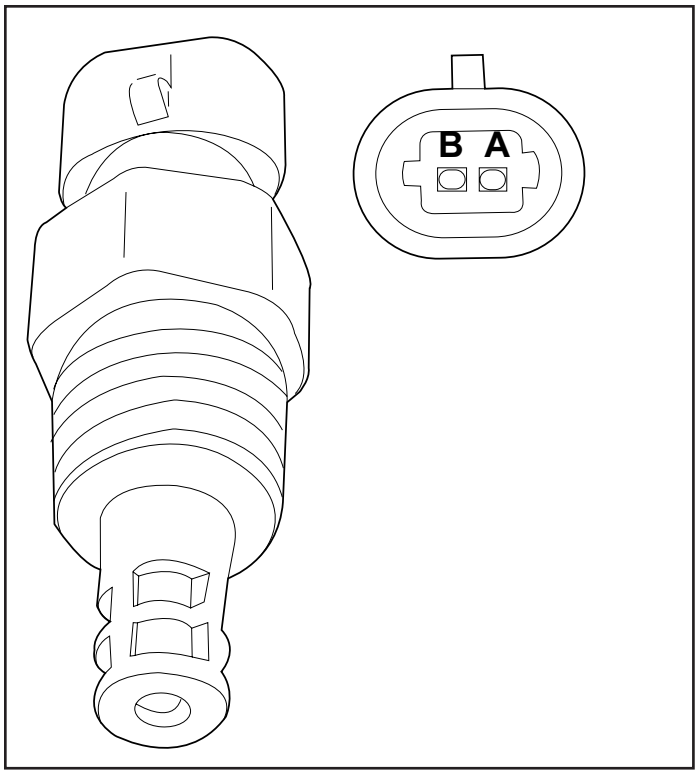
DTC 2229 BP High Pressure - At Key ON - ECM detects BP pressure is greater than 113.7635 KPa (16.50 psia; 33.594 inHg). Possible short to battery or VREF or failing MAP sensor. Verify wiring, verify correct pin locations at the MAP connector, verify connections at MAP and ECM - repair as required. Replace MAP.

DTC 129 BP Low Pressure - At Key ON - ECM detects BP pressure is less than 57.22649 KPa (8.30 psia; 16.899 inHg). Possible short to ground or Ground VREF or failing MAP sensor. Verify wiring, verify correct pin locations at the MAP connector, verify connections at MAP and ECM - repair as required. Replace MAP.

Intake Air Temperature Sensor (IAT) (6.0/8.1L)



Connector Part Information	• •		
Pin	**Wire Color**	**ECM Pin No.**	**Function**
A	Yel/Gry	39	IAT Sensor Signal
B	Blk/Lt Grn	20	Ground Vref #1



Intake Air Temperature Sensor (IAT) (6.0/8.1L)

ECM DIAGNOSTIC TROUBLE CODES

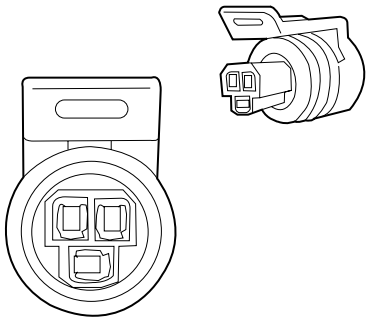
DTC 111 IAT Higher Than Expected Stage 1 - ECM detects IAT sensor temperature is greater than 160° F and RPM is greater 1500. Possible short to ground or bad connection. Verify wiring, connections at IAT and ECM - repair as required. Replace IAT.

DTC 112 IAT Voltage Low - ECM detects IAT sensor voltage less than .050 volts Possible short to ground IAT sensor signal circuit. Verify wiring, connections at IAT and ECM - repair as required. Replace IAT.

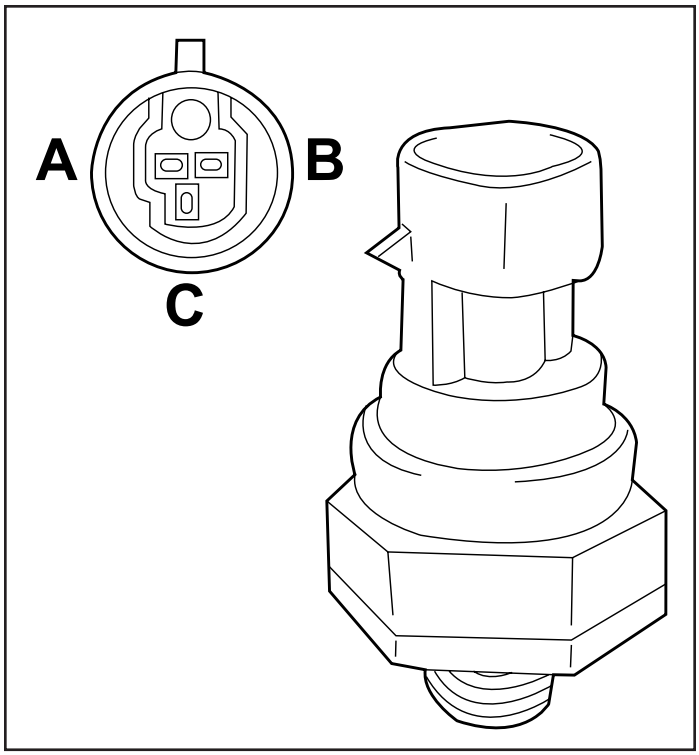
DTC 113 IAT Voltage High - ECM detects IAT sensor voltage greater than 4.950 volts. Possible short to battery or VREF voltage or an open IAT sensor signal circuit. Verify wiring, connections at IAT and ECM - repair as required. Replace IAT.

DTC 127 IAT Higher Than Expected Stage 2 - ECM detects IAT sensor temperature is greater than 175° F and RPM is greater 1500. Possible short to ground or bad connection. Verify wiring, connections at IAT and ECM - repair as required. Replace IAT.

Oil Pressure Sensor



Connector Part Information	• 12129946 • 3-Way F Metri-Pack 150 Series Sealed (GRY)		
Pin	**Wire Color**	**ECM Pin No.**	**Function**
A	Blk/Lt Grn	20	Ground Vref #1
B	Lt Grn/Red	19	VREF #1 (5.0 Vdc)
C	Lt Blu	53	Oil Pressure Signal



Oil Pressure Sensor

ECM DIAGNOSTIC TROUBLE CODES

DTC 521 Oil Pressure Sender High Pressure - ECM detects oil pressure is greater than 90 psi and RPM is greater 3000. Possible short to voltage, open circuit, or bad connection. Verify wiring, connections at Oil Pressure Sensor and ECM - repair as required. Verify oil pressure with an oil pressure gauge. If high, troubleshoot and repair engine mechanical, if normal replace Oil Pressure Sensor. DTC 523 may be displayed in addition to DTC 521.

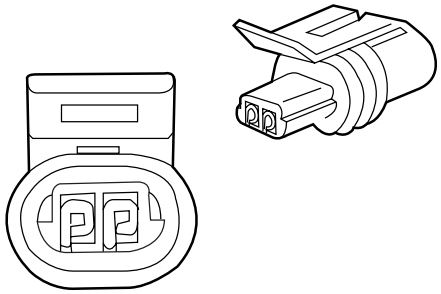
DTC 522 Oil Pressure Sender Voltage Low - ECM detects oil pressure signal voltage is less than .30 volts. Possible short to ground or bad connection. Verify wiring, connections at Oil Pressure Sensor and ECM - repair as required. Verify oil pressure with an oil pressure gauge. If low, verify proper oil level in crank case, troubleshoot and repair engine mechanical, if normal replace Oil Pressure Sensor. DTC 524 may be displayed in addition to DTC 522.

DTC 523 Oil Pressure Sender Voltage High - ECM detects oil pressure signal voltage is greater than 4.80 volts. Possible short to voltage, open circuit, or bad connection. Verify wiring, connections at Oil Pressure Sensor and ECM - repair as required. Verify oil pressure with an oil pressure gauge. If high, troubleshoot and repair engine mechanical, if normal replace Oil Pressure Sensor. DTC 521 may be displayed in addition to DTC 523.

DTC 524 Oil Pressure Sender Low Pressure - ECM detects oil pressure is less than 5 psi, RPM is greater than 550, and the engine has run for at least 10 seconds. Possible short to ground or bad connection. Verify wiring, connections at Oil Pressure Sensor and ECM - repair as required. Verify oil pressure with an oil pressure gauge. If low, verify proper oil level in crank case, troubleshoot and repair engine mechanical, if normal replace Oil Pressure Sensor. The Buzzer , if equipped, will sound for 1 second every minute. DTC 522 may be displayed in addition to DTC 524.

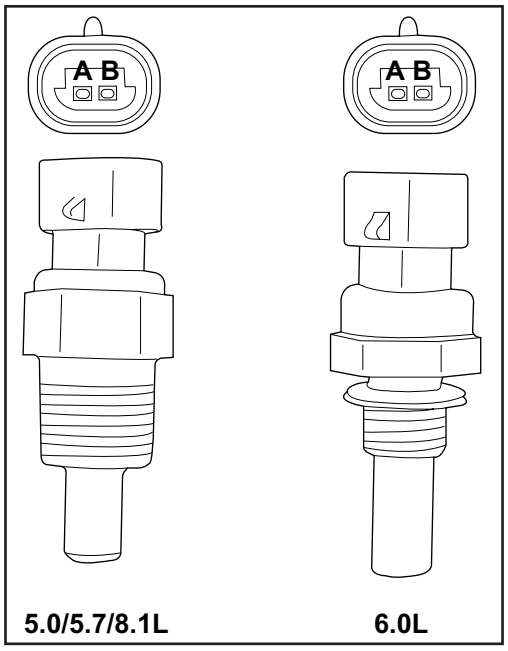
NOTE: An over- or under-filled crankcase can cause low oil pressure, always verify that the proper oil level exists and re-test; before performing costly engine repairs or replacement of the sensor.

Engine Coolant Temperature (ECT) Sensor



Connector Part Information	• •

Pin	Wire Color	ECM Pin No.	Function
A	Tan/Wht	40	ECT Sensor Signal
B	Blk/Lt Grn	20	Ground Vref #1



Engine Coolant Temperature (ECT) Sensor

ECM DIAGNOSTIC TROUBLE CODES

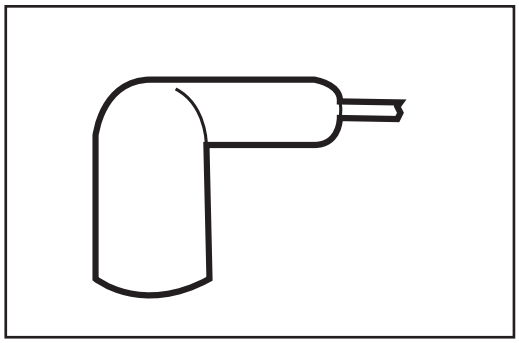
DTC 116 ECT Higher Than Expected Stage 1 - ECM detects ECT temperature greater than 190° F and engine RPM is above 500. Possible short to battery voltage. Panel gauge and Diacom may display higher than actual temperature. Verify Cooling System operation. Verify wiring, connections at ECT and ECM - repair as required. Replace ECT. The Buzzer if equipped, will sound for one second every minute. DTC 2428, DTC 118, DTC 217, and DTC 117 may be displayed in addition to DTC 116.

DTC 117 ECT Voltage Low - ECM detects ECT voltage is less than .050 volts. Possible short to ground at pin A or ECM pin 40. Panel gauge and Diacom will display a higher than actual temperature. Verify wiring, connections at ECT and ECM - repair as required. Replace ECT.

DTC 118 ECT Voltage High - ECM detects ECT voltage greater than 4.950 volts. Possible open circuit between pin A and ECM pin 40. Panel gauge and Diacom will display a lower than actual temperature. Verify wiring, connections at ECT and ECM - repair as required. Replace ECT.

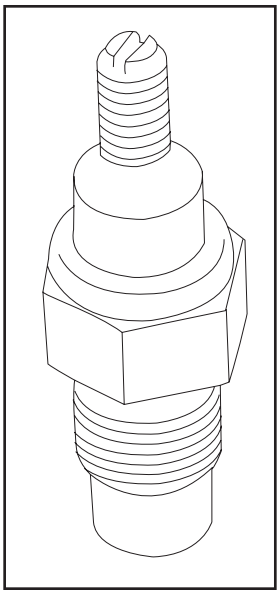
DTC 217 ECT Higher Than Expected Stage 2 - ECM detects ECT temperature greater than 205° F and engine RPM is above 550. Possible short to battery voltage. Panel gauge and Diacom may display higher than actual temperature. Verify Cooling System operation. Verify wiring, connections at ECT and ECM - repair as required. Replace ECT. The Buzzer, if equipped, will sound for one second every minute. DTC 2428, DTC 118, DTC 217, and DTC 117 may be displayed in addition to DTC 116.

Exhaust Temperature Switch



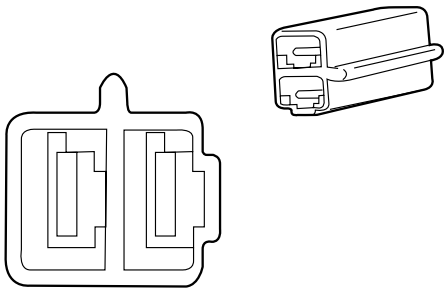
Connector Part Information	• •

Pin	Wire Color	ECM Pin No.	Function
A	Tan/Red	41	EGT Switch



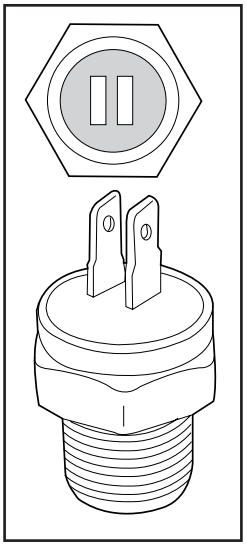
Exhaust Temperature Switch

Transmission Temperature Switch



Connector Part Information	• •

Pin	Wire Color	ECM Pin No.	Function
A	Pur/Wht	54	Trans. Temp Switch
B	Black		Ground



Transmission Temperature Switch

ECM DIAGNOSTIC TROUBLE CODES

DTC 2428 EGT Temperature High - ECM detects a ground or low level at ECM pin 41. The EGT switch closes at 248° ± 5° F applying a ground signal to the ECM. Verify the Cooling System operation. Verify no short to ground in the wiring, connections at EGT and ECM - repair as required. Replace EGT.

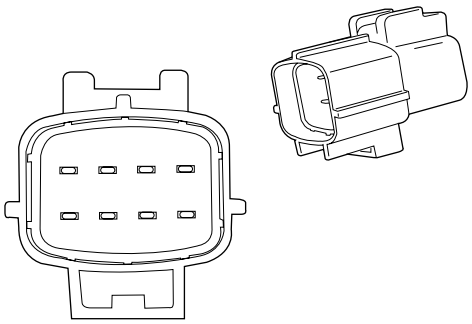
The Buzzer, if equipped, will sound for one second every minute. DTC 116 and/or DTC 217 may also be present with DTC 2428.

ECM DIAGNOSTIC TROUBLE CODES

DTC 1542 Transmission Temperature High - ECM detects a ground or low level at ECM pin 54. The Transmission Temperature Switch closes at 235° ± 10° F applying a ground signal (pin B of the switch) to the ECM. Verify the Cooling System operation. Verify that there are no blockages in the transmission cooler. Verify proper transmission fluid level. Verify no short to ground in the wiring, connections at Transmission Temperature Switch and ECM - repair as required. Replace Transmission Temperature Switch.

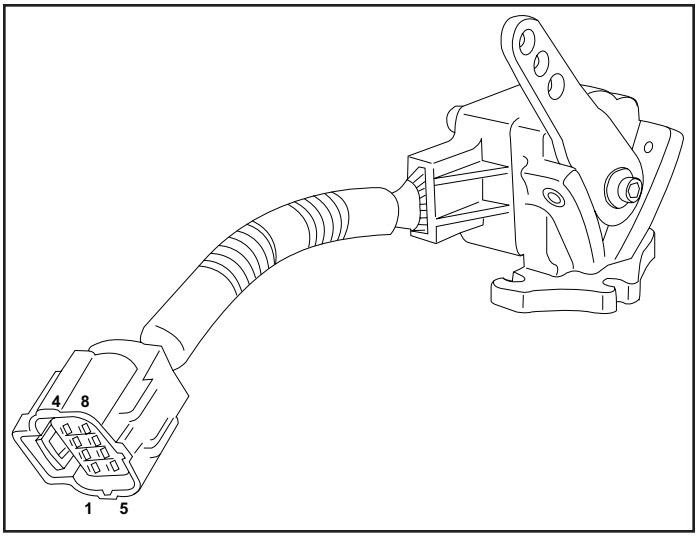
The Buzzer, if equipped, will sound for one second every minute. DTC 116, DTC 217, and/or DTC 2428 may also be present with DTC 1542.

Throttle Control Position (TCP) Sensor



Connector Part Information	• •

Pin	Wire Color	ECM Pin No.	Function
1	Blk/Lt Grn	20	Ground Vref #1
2	Lt Grn/Blk	50	Ground Vref #2
3	Orn/Blk	10	TCP Sensor 2 Signal
4	Lt Grn/Pur	49	VREF #2 (5.0 Vdc)
5	Dk Blu/Orn	9	TCP Sensor 1 Signal
6	Lt Grn/Red	19	VREF #1 (5.0 Vdc)
7	Black		Ground
8	Pur/Yel	48	Idle Validation Switch



Throttle Control Position (TCP) Sensor ECM DIAGNOSTIC TROUBLE CODES

The Throttle Control Position (TCP) sensor is comprised of two internal variable resistors (FPP1 and FPP2 signals) and an Idle Validation Switch (IVS). The TCP provides redundant signals to the ECM for throttle control. Should the TCP partially fail, you will still have full control of the throttle, but an error code will be set. FPP or Foot Pedal Position is a carryover term from automotive. TCP signals will be indicated as FPP on the Diacom display and in the error code description. When troubleshooting one of these codes, always verify VREF#1 and #2 supply voltage is correct.

DTC 2122 FPP1 Voltage High - FPP1 voltage is greater than 4.87 Vdc. Possible short in the wiring to battery or VREF or defective sensor.

DTC 2123 FPP1 Voltage Low - FPP1 voltage is less than 0.20 Vdc. Possible short in the wiring to ground or an open circuit or a defective sensor.

DTC 2127 FPP2 Voltage Low - FPP2 voltage is less than 0.090 Vdc. Possible short in the wiring to ground or an open circuit or a defective sensor.

DTC 2128 FPP2 Voltage High - FPP2 voltage is greater than 2.70 Vdc. Possible short in the wiring to battery or VREF or defective sensor.

DTC 2115 FPP1 Higher Than IVS - IVS at idle and FPP1 is greater than 0.90 Vdc. Possible open or short to voltage on the IVS circuit (ECM pin 48 to TCP pin 8), or defective TCP.

DTC 2139 FPP1 Lower than IVS - IVS off idle and FPP1 is less than 0.60 Vdc. Possible short to voltage on the FPP1 circuit (ECM pin 9 / TCP pin 5) or short to ground on the IVS circuit (ECM pin 48 to TCP pin 8), or defective TCP.

DTC 2116 FPP2 Higher Than IVS - IVS at idle and FPP2 is greater than 0.50 Vdc. Possible open or short to voltage on the IVS circuit (ECM pin 48 to TCP pin 8), or defective TCP.

DTC 2140 FPP2 Lower than IVS - IVS off idle and FPP1 is less than 0.27 Vdc. Possible short to voltage on the FPP1 circuit (ECM pin 9 / TCP pin 5) or short to ground on the IVS circuit (ECM pin 48 to TCP pin 8), or defective TCP.

DTC 2126 FPP1 Higher than FPP2 - FPP1 % is 20% greater than FPP2 %.

DTC 2121 FPP1 Lower than FPP2 - FPP1 % is 20% less than FPP2 %.

DTC 2130 IVS Stuck at idle, FPP1/2 match - Same parameters as individual FPP1/2 IVS fault detection.

DTC 2131 IVS Stuck off idle, FPP1/2 match - Same parameters as individual FPP1/2 IVS fault detection.

DTC 1121 FPP1/2 simultaneous voltages out of range - Same parameters as individual FPP1/2 fault detection.

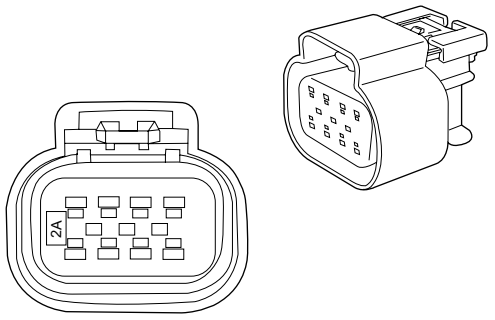
DTC 2120 FPP1 invalid voltage and FPP2 disagrees with IVS - Same parameters as individual FPP1/2 IVS fault detection.

DTC 2125 FPP1 invalid voltage and FPP2 disagrees with IVS - Same parameters as individual FPP1/2 IVS fault detection.

DTC 1122 FPP1/2 do not match each other or the IVS - Same parameters as individual FPP1/2 fault detection.

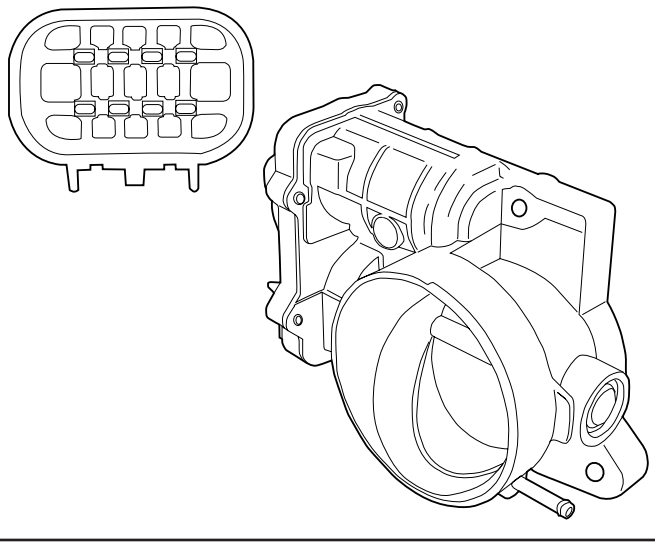
If any two sections of the TCP fail, or the VREF#2 input is lost, this will cause the buzzer, if equipped, to sound for .5 sec and be OFF for .25 sec. Also, the throttle will have no effect, the owner will have idle speed only.

Throttle Body-Throttle Position Sensor (TPS)



Connector Part Information	• •

Pin	Wire Color	ECM Pin No.	Function
A	Pnk/Wht	82	DBW (+)
B	Lt Grn/Red	19	VREF #1 (5.0 Vdc)
C	Tan/Orn	83	DBW (-)
D	Blk/Lt Grn	20	Ground Vref #1
E	Blk/Lt Grn	20	Ground Vref #1
F	Lt Blu/Blu	6	TPS 2
G	Pur/Lt blu	5	TPS 1
H	Lt Grn/Red	19	VREF #1 (5.0 Vdc)



Throttle Body-Throttle Position Sensor (TPS)

ECM DIAGNOSTIC TROUBLE CODES

The Throttle Position Sensor is located in the Throttle Body Assembly. The ECM commands the throttle plate to move based on Throttle Control Position sensor inputs and outputs commands (DBW +) to the throttle plate motor. Feedback is provided back to the ECM via TPS1 and TPS2 signals. The TPS uses the 5V REF #1 supply. Be sure to verify all wiring and pin connections between the ECM and Throttle body before replacing the Throttle body. If any of the failures listed below occur, the buzzer, if equipped, will sound for .5 sec and be off for .25 sec. Also, the throttle will have no effect, the owner will have idle speed only.

DTC 122 TPS1 Voltage Low - TPS1 is less than .20 Vdc.

DTC 123 TPS1 Voltage High - TPS1 is greater than 4.80 Vdc.

DTC 222 TPS2 Voltage Low - TPS2 is less than .20 Vdc.

DTC 223 TPS2 Voltage High - TPS2 is greater than 4.80 Vdc.

DTC 121 TPS1 Lower Than TPS2 - TPS1 is more than 20% lower than TPS2.

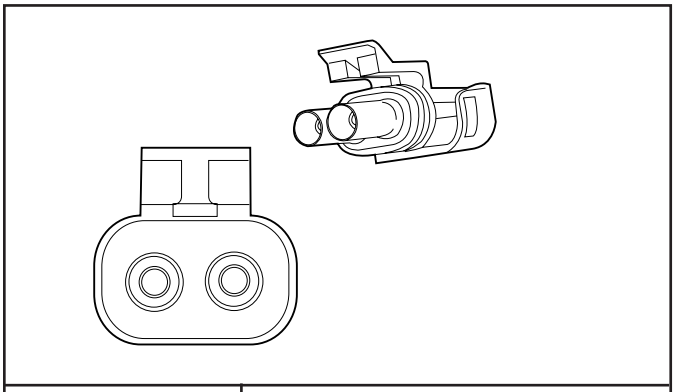
DTC 221 TPS1 Higher Than TPS2 - TPS1 is more than 20% higher than TPS2.

DTC 2111 Unable to reach Lower TPS - Target or requested TPS is 20% lower than actual TPS position.

DTC 2112 Unable to reach Higher TPS - Target or requested TPS is 20% higher than actual TPS position.

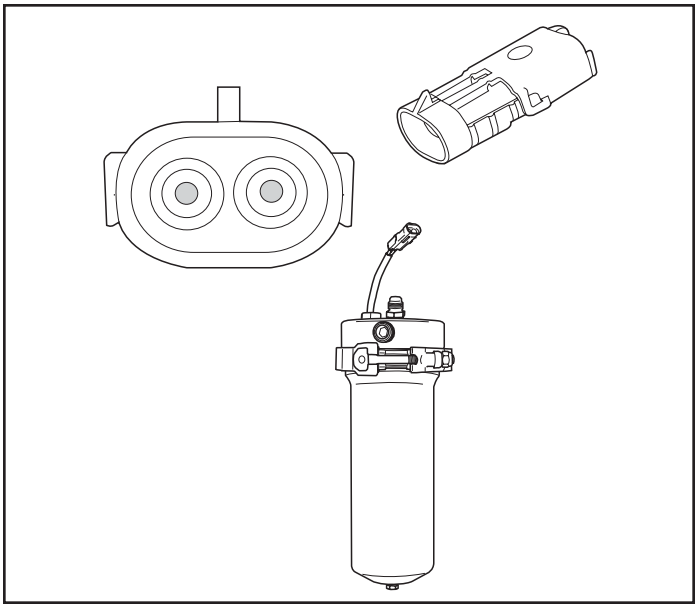
DTC 2135 TPS 1/2 Simultaneous Voltages Out Of Range - Uses the same parameters as individual TPS1/2 voltage faults listed above.

Fuel Control Cell (FCC)



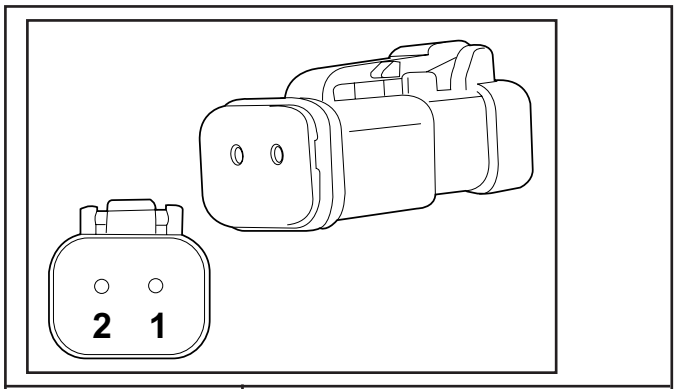
Connector Part Information	• •

Pin	Wire Color	ECM Pin No.	Function
A	Pink/Yel		Pin 87 Fuel Pump Relay
B	Black		Ground



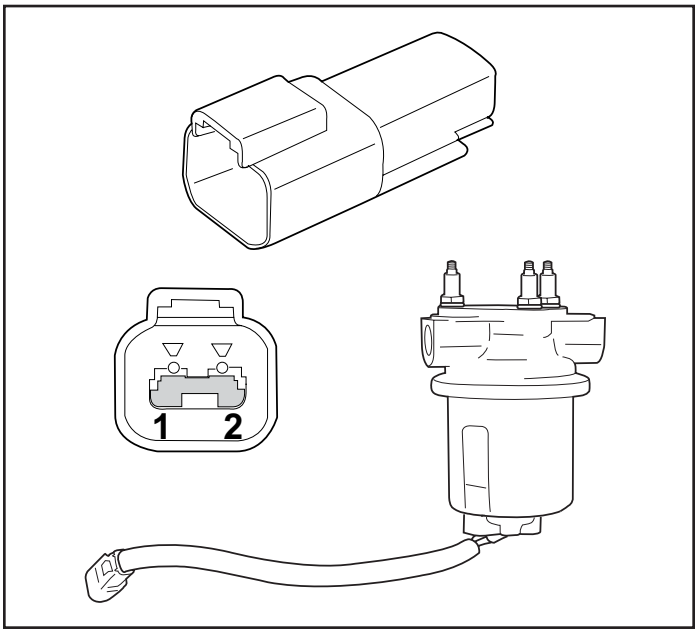
Fuel Control Cell (FCC)

Low Pressure Fuel Pump



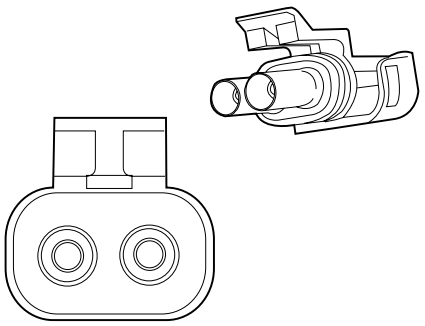
Connector Part Information	• •

Pin	Wire Color	ECM Pin No.	Function
1	Pink/Yel		Pin 87 Fuel Pump Relay
2	Black		Ground



Low Pressure Fuel Pump

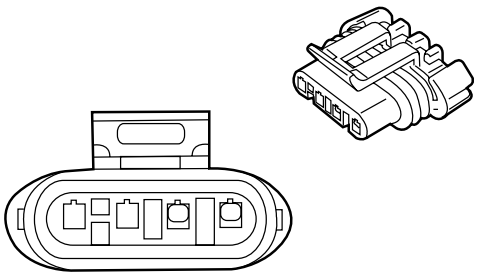
Fuel Tank Solenoid



Connector Part Information	• •

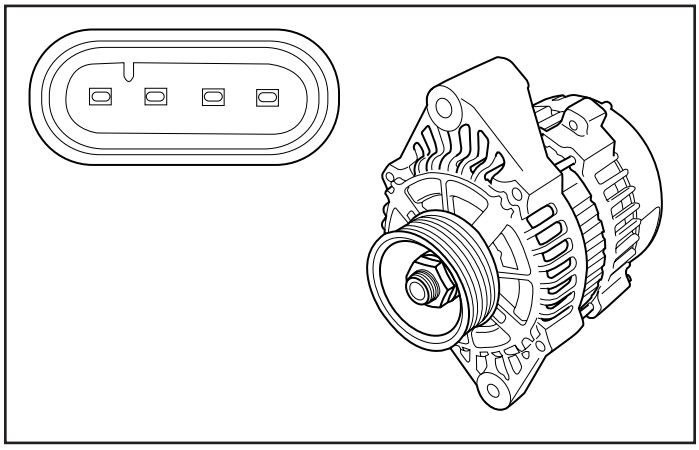
Pin	Wire Color	ECM Pin No.	Function
A	Pink/Yel		Pin 87 Fuel Pump Relay
B	Black		Ground

Alternator



Connector Part Information	• •

Pin	Wire Color	ECM Pin No.	Function
A	Plug		
B	Plug		
C	Purple	(Ignition)	Pin 5 - 8-Pin Boat Intrfc
D	Red		Battery Power



Alternator

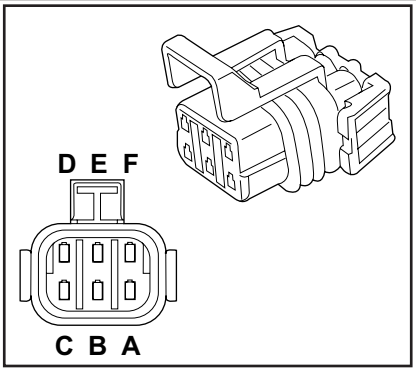
ECM DIAGNOSTIC TROUBLE CODES

The following codes indicate a problem with the Main Electrical System. Start at the battery, verifying that it is good, then troubleshoot your Main Electrical System power and ground paths. Correct any problem you may find. Then verify the Charging System is operating properly. Replace the alternator as required.

DTC 562 Battery Voltage Low - Battery voltage less than 10.0 volts at 1500 RPM.

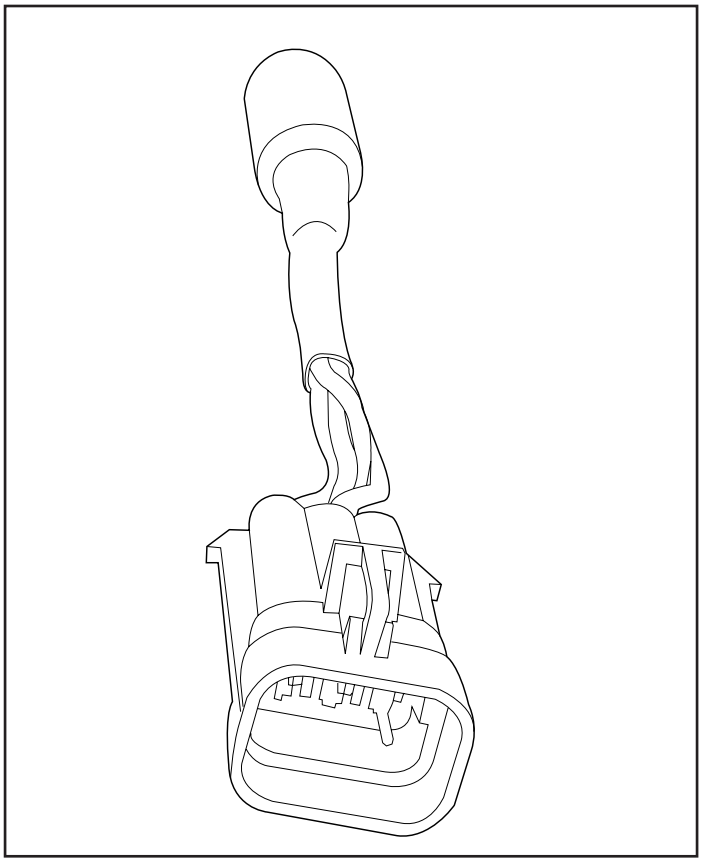
DTC 563 Battery Voltage High - Battery voltage greater than 16.0 volts.

Data Link Connector (DLC)



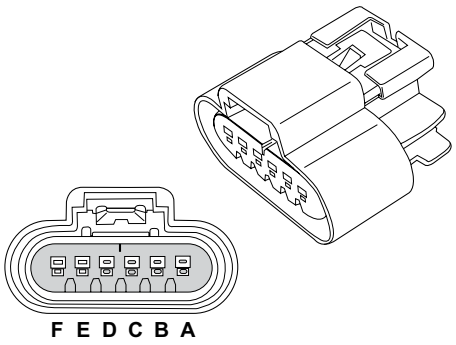
Connector Part Information	• •

Pin	Wire Color	ECM Pin No.	Function
A	Blk/Lt Grn	20	Ground Vref #1
B	Lt Grn/Red	19	VREF #1 (5.0 Vdc)
C	Dk Grn/Yel	55	Serial Data_TX
D	Orn/Yel	56	Serial Data_RX
E	Red		Battery Power
F	Black		Ground



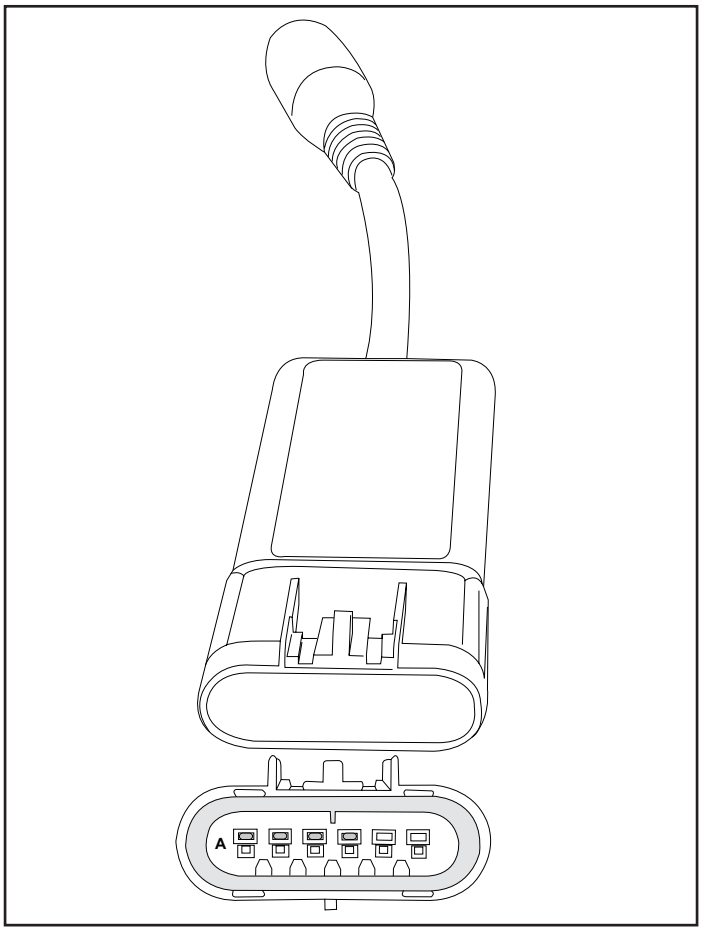
Diacom Diagnostic Tool Adapter

CAN Network / Calibration Tool Connector



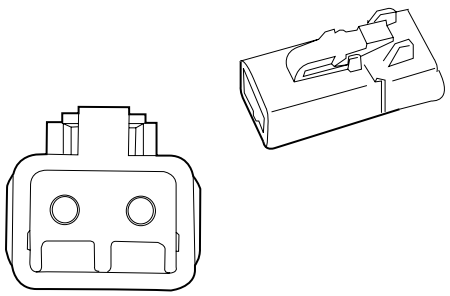
Connector Part Information	• •

Pin	Wire Color	ECM Pin No.	Function
A	Red/Pur	60	Battery Power
B	Black		Ground
C	Blk/Wht	14	CAN Bus #1 (+)
D	Wht	15	CAN Bus #1 (-)
E	Plug		
F	Plug		



Diacom CAN Network Adapter

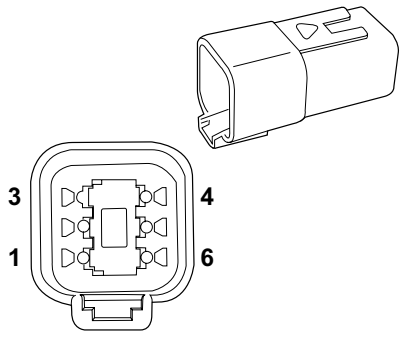
2-Pin Boat Harness Connector



Connector Part Information	• •

Pin	Wire Color	ECM Pin No.	Function
1	Red/Pur		Pin 31 40 Amp Fuse
2	Black		Ground

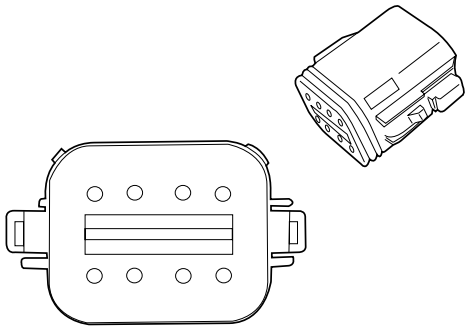
Twin Engine Master/Slave Connector



Connector Part Information	• **Deutsche 6-Way Connector** • **DT04-6P**

Pin	Wire Color	ECM Pin No.	Function
1	Wht	17	CAN Bus #2 (+)
2	Blk/Wht	16	CAN Bus #2 (-)
3	Plug		
4	Pnk/Lt Grn	11	Master/Slave
5	Blk/Wht	14	CAN Bus #1 (+)
6	Wht	15	CAN Bus #1 (-)

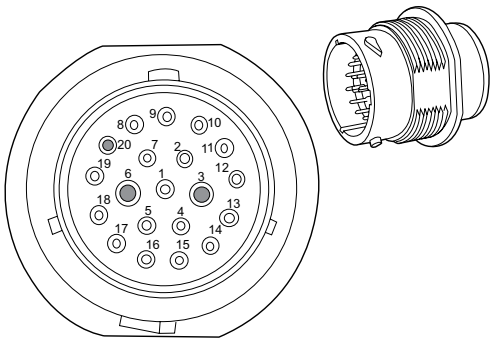
8-Pin Boat Harness Connector



Connector Part Information	• •

Pin	Wire Color	ECM Pin No.	Function
1	Plug		
2	Gray	58	Tachometer
3	Tan	87	Coolant Temperature
4	Tan/Blk	76	Buzzer
5	Purple	45	Ignition
6	Grn/Yel	80	MIL
7	Yel/Red		Pin 86 Starter Relay
8	Dk Blue	88	Oil Pressure

20-Pin Speed Control/CAN Bus Connector - Engine Side



Connector Part Information	• •

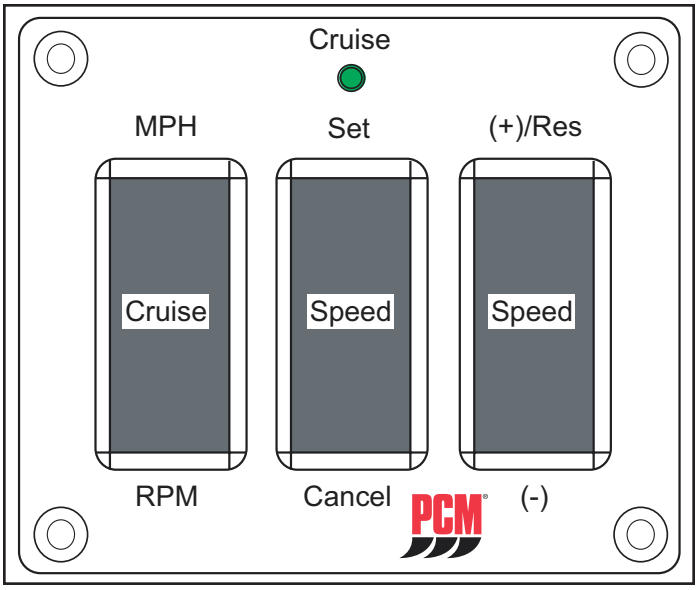
Pin	Wire Color	ECM Pin No.	Function
1	Pink	46	
2	Lt Grn/Wht	11	
3	Plug		
4	Pnk/Blk	47	Perfect Pass Request
5	Brn/Pnk	25	Paddle Wheel (+)
6	Plug		
7	Black	26	
8	Orange	44	MPH/RPM Mode
9	Orn/Lt Blu	51	Engage/Resume
10	Orn/Grn	52	Speed Inc/Dec
11	Red/Yel	86	Cruise (PP Status) Lamp
12	Plug		
13	Black		Perfect Pass Ground
14	Gray	58	Tachometer
15	Yellow	12	Perfect Pass VGOV
16	Blk/Wht	14	CAN Bus #1 (+)
17	Wht	15	CAN Bus #1 (-)
18	Brown	43	
19	Lt Blu/Blk	89	Sync Lamp/PP Handle Position
20	Purple	45	Ignition

ECM DIAGNOSTIC TROUBLE CODES

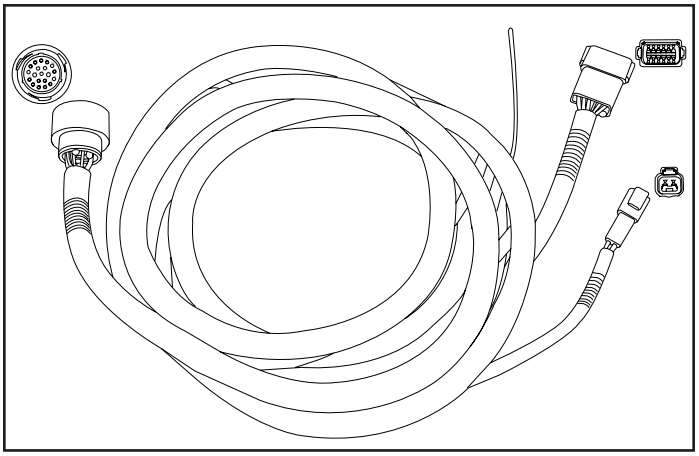
The following code indicates a problem with the Paddle Wheel input to the ECM. This fault only occurs when the speed control system is in MPH Mode. When the Paddle Wheel input is lost, the operator will feel a “bump” as the engine RPM increase by approximately 60. Speed will remain constant at the new RPM. If the paddle wheel input is re-established, speed will drop back to the previously programmed set speed. The MIL will only be on when the code is actively present, exiting the speed control mode will place this code into the history file and the MIL will go out. Should the owner forget to exit MPH mode when he shuts the boat off, the next time he starts the boat he will have full throttle control until he tries to Resume the previous set speed or Set a new speed in MPH mode. At this point the boat will initially hold the set speed then slowly start ramping the speed up to the current throttle handle position. Pulling the handle back will give the operator control again, at which time he should exit MPH mode and seek service and repair of the paddle wheel system. You will need to troubleshoot the paddle wheel wiring. Remember that this is an input from the boat harness to the 20-Pin connector at the engine. Locate the splice, and verify that the paddle wheel is functioning and not blocked by a foreign material. Verify the boat wiring to the 20-Pin then verify the engine wiring between the 20-Pin and ECM connector.

DTC 9999 Road Speed Loss of Input - No input or intermittent input from the Paddle Wheel.

Optional - PCM Speed Control System



PCM Basic Cruise Control Panel

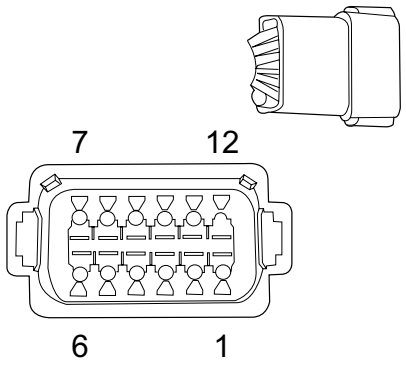


Sync/Cruise Interface Harness

Un-terminated Wires - Cruise Interface Harness - RA121091B

Pin	Wire Color	Function
	Lt Green	Paddle Wheel (+)
Must be connected to the Paddle Wheel (+) in the boat wiring.		

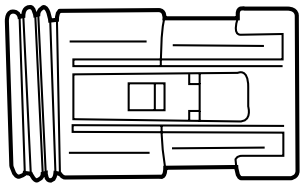
12-Pin Speed Control Panel Connector



Connector Part Information	• •

Pin	Wire Color	20 - Pin No.	Function
1	Pnk/Blk	4	Perfect Pass Request
2	Green	5	Paddle Wheel (+)
3	Gry/Blk	19	Perfect Pass Override
4	Gray	14	Tachometer
5	Yellow	15	Variable Governor
6	Red	20	Ignition
7	Black	13	Ground
8	Red/Yel	11	Cruise Status Lamp
9	Orn/Grn	10	Speed Inc/Dec
10	Orn/Lt Blu	9	Cruise Set/Cancel
11	Orange	8	RPM/MPH Mode
12	Plug		

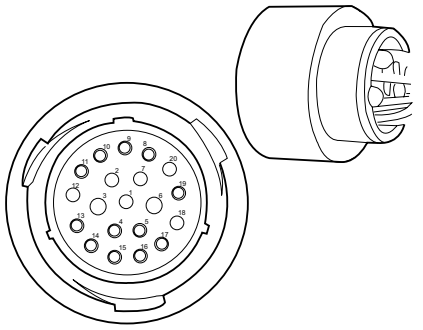
3-Pin Speed Control CAN-Bus Connector



Connector Part Information	• •

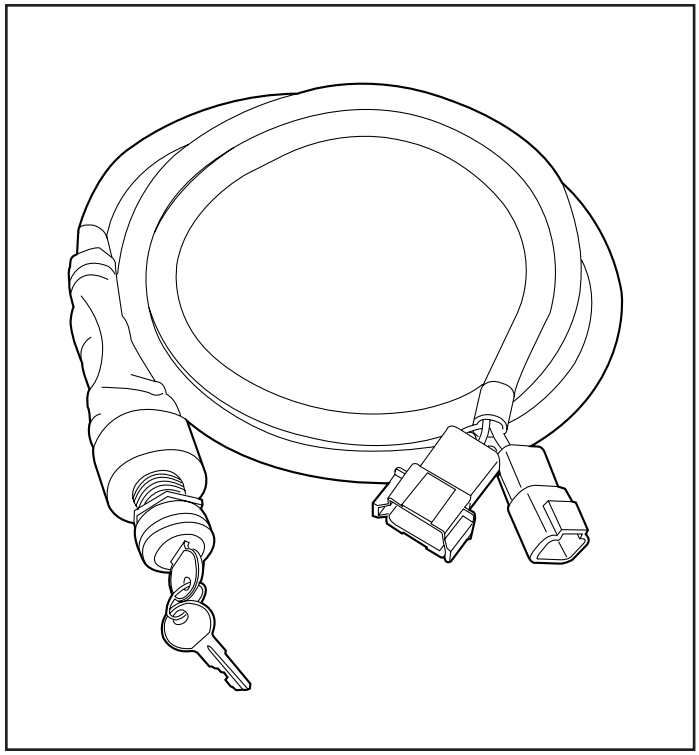
Pin	Wire Color	20 - Pin No.	Function
A	Wht	16	CAN-Bus 1 (+)
B	Blk/Wht	17	CAN-Bus 1 (-)
C	Plug		

20-Pin Speed Control/CAN Bus Connector - RA121091B



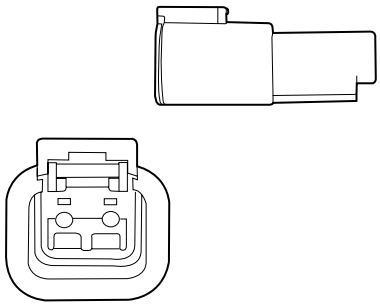
Connector Part Information	• •

Pin	Wire Color	12-Pin No.	Function
1	Plug		
2	Plug		
3	Plug		
4	Pnk/Blk	1	Perfect Pass Request
5	Green	2	Paddle Wheel (+)
6	Plug		
7	Plug		
8	Orange	11	MPH/RPM Mode
9	Orn/Lt Blu	10	CruiseSet/Cancel
10	Orn/Grn	9	Speed Inc/Dec
11	Red/Yel	8	Status Lamp
12	Plug		
13	Black	7	Ground
14	Gray	4	Tachometer
15	Yellow	5	Perfect Pass VGOV
16	White	3-Pin-A	CAN Bus #1 (+)
17	Blk/Wht	3-Pin-B	CAN Bus #1 (-)
18	Plug		
19	Gry/Blk	3	Perfect Pass Override
20	Red	6	Ignition



RT0091 Test Harness

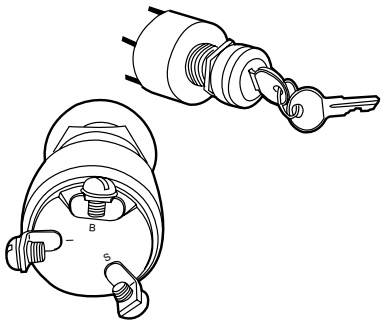
2-Pin Test Harness Connector



Connector Part Information	• •

Pin	Wire Color		Function
1	Red/Pur		Battery
2	Plug		

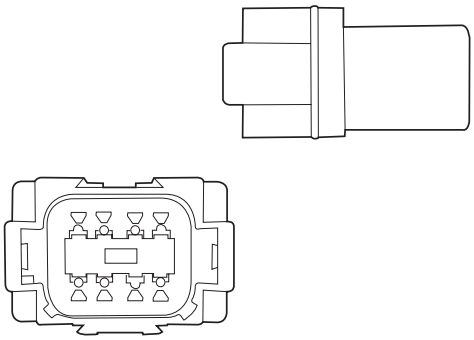
Key Switch - Test Harness



Connector Part Information	• •

Pin	Wire Color		Function
B	Red/Pur		Battery
S	Yel/Red		Starter
I	Purple		Ignition

8-Pin Test Harness Connector



Connector Part Information	• •

Pin	Wire Color		Function
1	Plug		
2	Plug		
3	Plug		
4	Plug		
5	Purple		Ignition
6	Plug		
7	Yel/Red		Starter
8	Plug		

PCM DRIVABILITY CHECKLIST

ENGINE SERIAL NUMBER: _____

Date: _____ **Dealership Name:** _____

Technician's Name: _____ **Technician's Contact Phone #:** _____

Owner/Operator Name: _____

Person Reporting the problem (if different from owner/operator): _____

Service Writer or Person that took the problem report: _____

1) PROBLEM OR SYMPTOM: _____

Who first observed the symptom? _____ When did the symptom first occur? _____
Any recent change or service work prior to symptom occurring - replaced belts or impeller, major engine or boat repairs, recently refueled, etc.? _____ Has someone, other than yourself, tried to correct the current symptom? _____ If yes, what work was done? _____

Accessories Added Recently? _____ Is the symptom currently present? _____

Special conditions (if any) required to duplicate the symptom: _____

Use an additional sheet of paper if more space is required for symptoms or descriptions.

2) CHECK FOR SERVICE UPDATES:

ENGINE SERIAL NUMBER: _____ **ENGINE MODEL NUMBER:** _____ **ENGINE HOURS:** ____

HULL NUMBER: _____

ENGINE: None Apply: ___ Performed: _____

BOAT: None Apply: ___ Performed: _____

3) VISUAL INSPECTION:

Inspection	YES	NO
Evidence of an over-heat:		
Engine Harness connectors connected properly:		
Physical Damage - wiring, connectors, assemblies, and **Remove Spark Plugs and inspect for fluids.**		
Corrosion:		
Hull-clean and free of excessive growth:		

Inspection	YES	NO
Evidence of or Excessive Water in the Bilge:		
Fluid levels checked:		
Leaking Fluids:		
Firing order correct:		
Correct size propellers installed:		
Underwater gear is undamaged:		
Accessories added? If yes, check items		

4) VERIFY THE PROBLEM - 'TAKING THE ENGINE'S PULSE'

	YES	NO	
Does the engine start and continue to run?	**go to 3 below**	**go to 1 below**	
1) Key-ON-Engine-OFF (KOEO)	**YES**	**NO**	**Fuel Press.**
Both Fuel Pumps run 2-4 seconds:			
Fuel Pressure near wot specification - when pumps run:			
2) Key-ON-Engine-Running (KOER)	**YES**	**NO**	**Fuel Press.**
Engine cranks:			
Fuel Pressure near wot specification - engine cranking:			
Engine Starts and continues to run:		continue check at **Step 5**	
3) WATER TEST	**YES**	**NO**	**Fuel Press.**
Verify reported symptom:			
Fuel Pressure - idle:			
Fuel Pressure - under load, @ wot:			

Check Accessories Added:

- ☐ Heater
- ☐ Shower
- ☐ Hot Water Tank
- ☐ Flush Kit
- ☐ Multi-Function Display
- ☐ Synchronizer
- ☐ After-Market Stereo Equipment
- ☐ After-Market Depth/Fish Finder
- ☐ After-Market Navigational Equipment, such as GPS, Radar, Sonar, Auto-pilot systems
- ☐ After-Market Radio Equipment
- ☐ Lights
- ☐ Other - (please list)

4A) Revised or additional symptom found?: _____

PCM DRIVABILITY CHECKLIST

5) PERFORM THE ON-BOARD DIAGNOSTIC SYSTEM CHECK

CODE(S) PRESENT: _____ DIAGNOSTIC PROCEDURE USED: _____ **Continue to Step 6**

6) ISOLATE AND REPAIR THE PROBLEM.

Were you able to isolate and repair the problem? If ***YES***, continue to **Step 7.**
If ***NO***, complete the Drivability Checklist for No Codes, step 6A below. If the problem is still not resolved, then call for factory technical assistance.

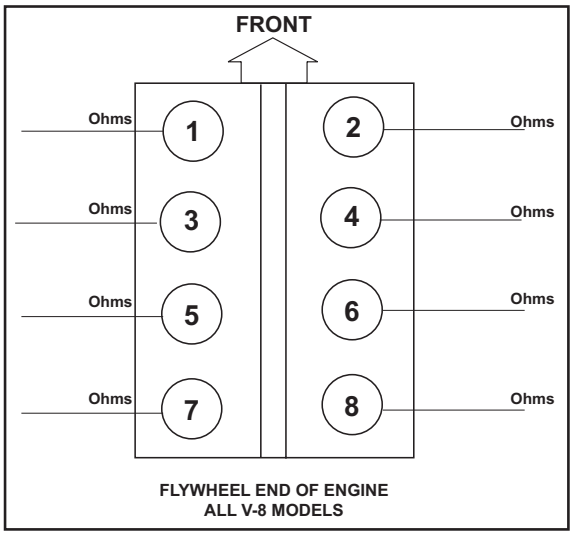
6A) NO CODES - ENGINE RUNS - DRIVABILITY SYMPTOM STILL PRESENT

Inspection or Check	YES	NO
1) Review Steps **1** thru **5**:		
2) Inspect fuel for contamination:		
3) Powertrain is aligned:		
4) Remove and Inspect Distributor Cap and Rotor (5.0/5.7L only):		
5) Check&**record** Ignition wire resistance:		
6) Remove and Inspect each spark plug:		
7) Perform a Compression Check on all 8 cylinders: **Record below.**		

Inspection or Check	YES	NO
WATER TEST		
8) Verify CAM Retard** (5.0/5.7L only):		
9) Performance verified against a similar boat w/same engine package, if available		
10) Perform the Diacom Power Balance Check; under load, @ 1600-1800rpm:		
11) Perform the harness 'Wiggle Test':		
12) Diacom recording-Pre-Delivery test:		

7) VERIFY REPAIR HAS CORRECTED THE PROBLEM. Check for and clear all codes from the ECM memory.
Water test the boat. Run the engine for a minimum of two (2) minutes, then verify that no codes have returned. Continue with your water test long enough to verify that the problem has been corrected.

**** CAM Retard - '02 thru '06 = 43-47 degrees**
'07 - newer = 0 - 4 degrees



IGNITION WIRE RESISTANCE CHECK
Less than 10,000 ohms/ft

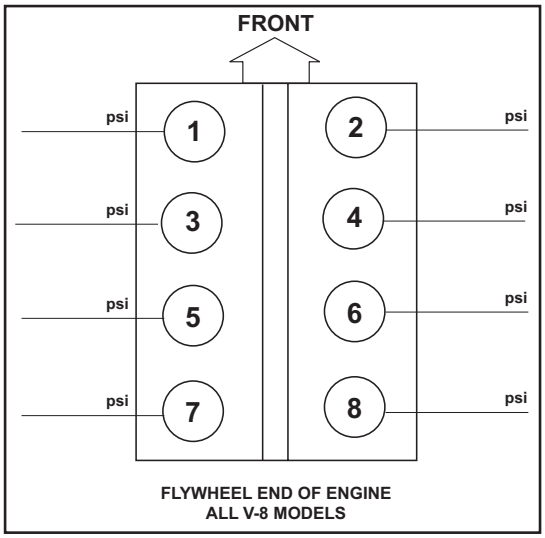
COMPRESSION PRESSURE:

5.0/5.7L - 130-215 psi

6.0L - 130-215 psi

8.1L - 130-175 psi

Lowest pressure should be within 70% of highest pressure. Minimum cylinder pressure - 100 psi.



COMPRESSION CHECK

REFERENCES:

Master Engine Specification Sheet

ECM-07 Diagnostic Supplement

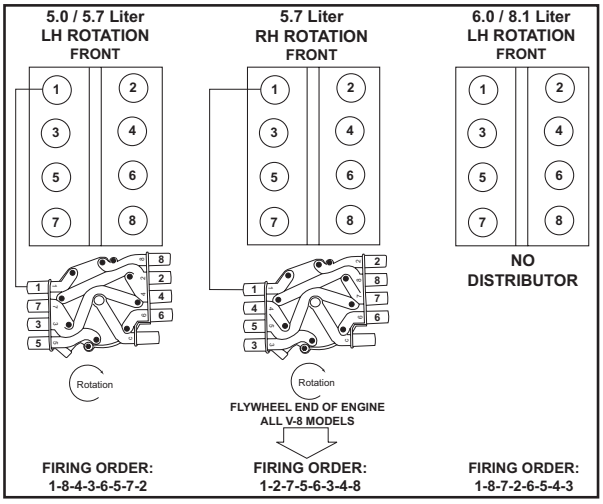
L510005P - MEFI 4/4B Diagnostic Manual

L510005P-S1 - DTC Diagnostic Supplement

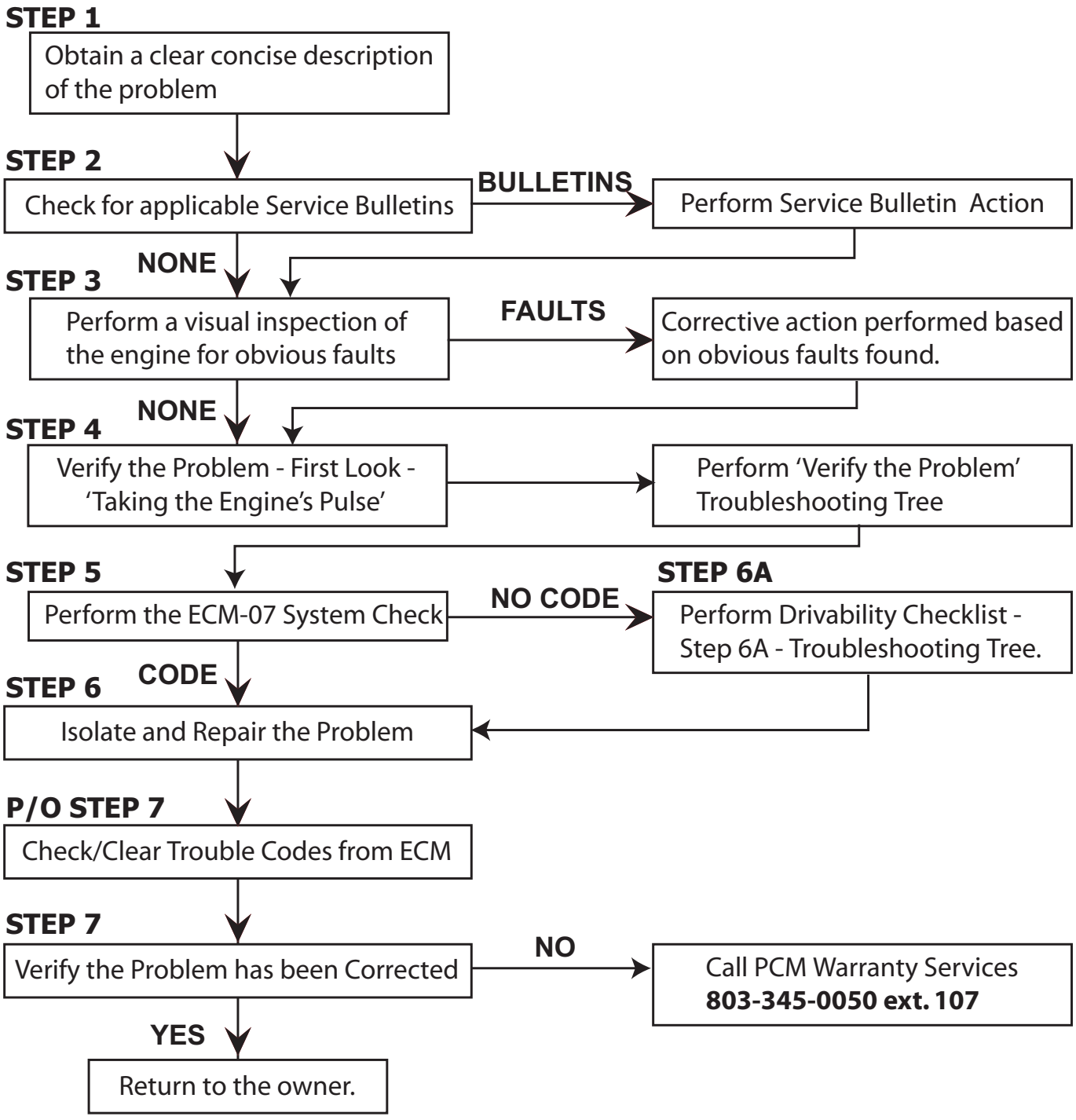
L510003 - 8.1L Engine Mechanical Service Manual

L510015 - 5.0/5.7L Engine Mechanical Service Manual

L510016 - 6.0L Engine Mechanical Service Manual



PCM DRIVABILITY CHECKLIST TROUBLESHOOTING TREE

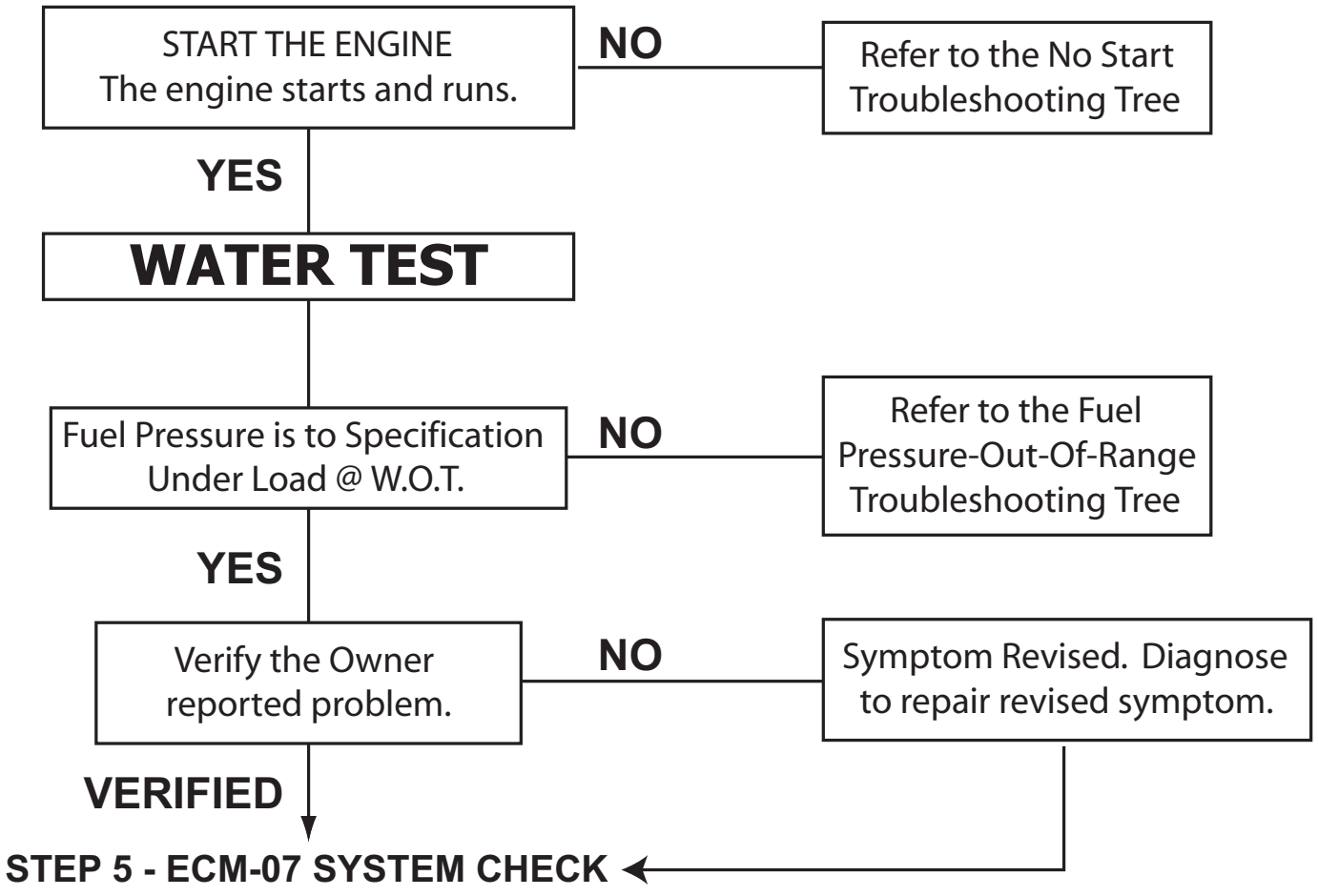


STEP 4

- VERIFY THE PROBLEM -

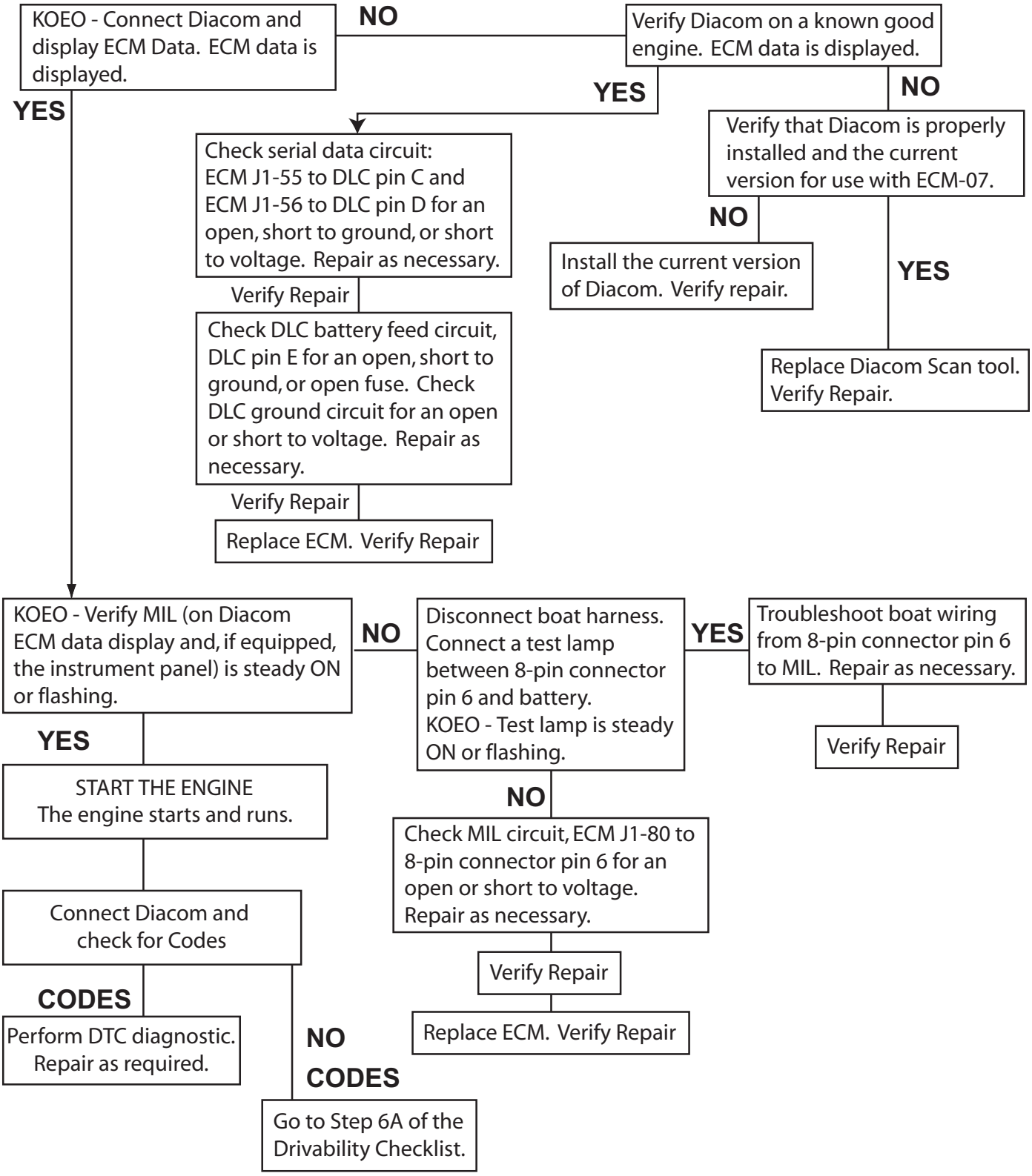
TAKING THE ENGINES PULSE

IMPORTANT:
FOR A **REPORTED** OVERHEAT OR MAIN ELECTRICAL SYSTEM PROBLEM, SUCH AS BATTERY, STARTER OR CHARGE SYSTEM PROBLEMS - **STOP!**
PERFORM OVERHEAT TROUBLESHOOTING OR MAIN ELECTRICAL SYSTEM TROUBLESHOOTING FIRST.



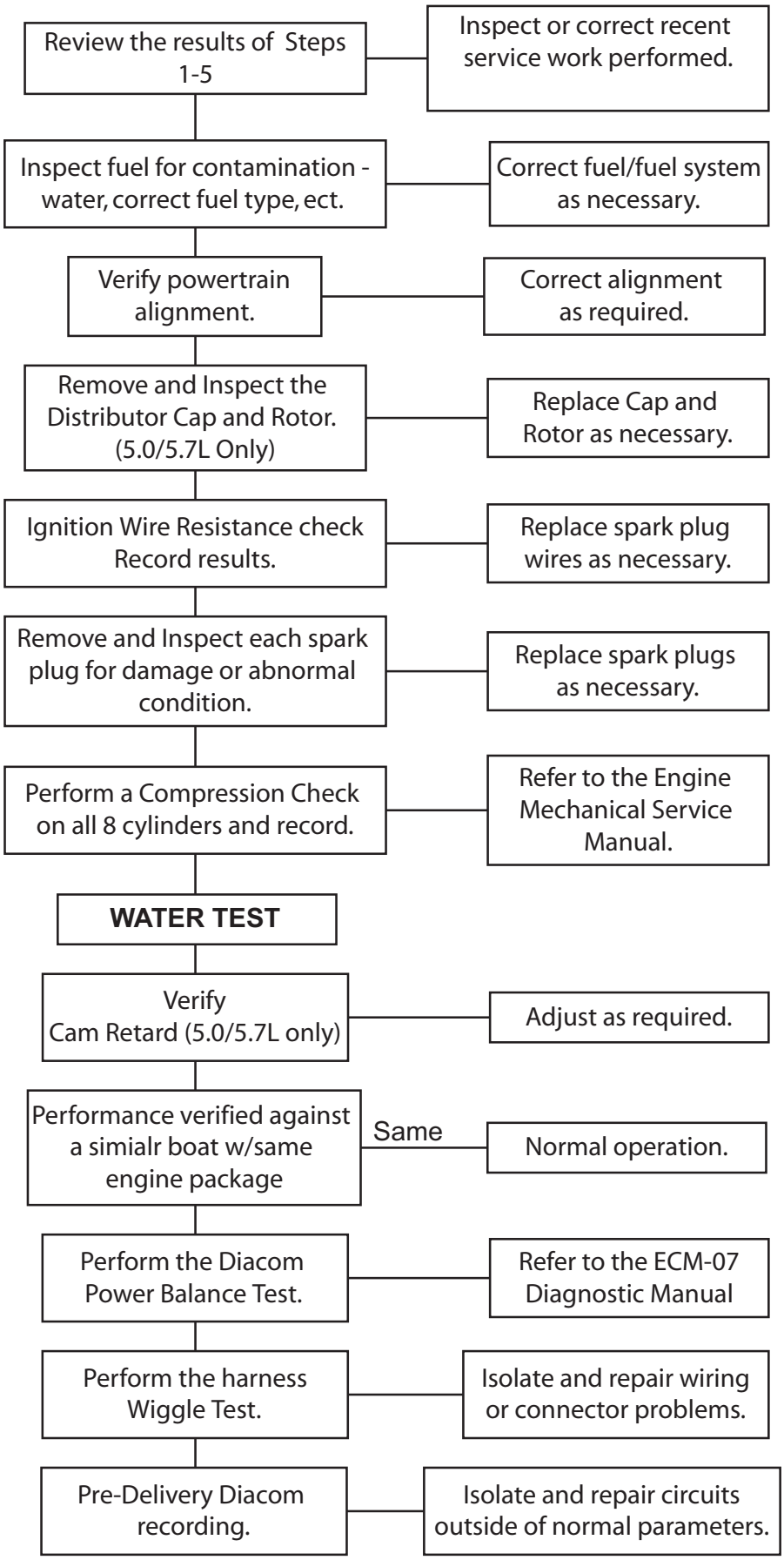
STEP 5

- ECM-07 SYSTEM CHECK -

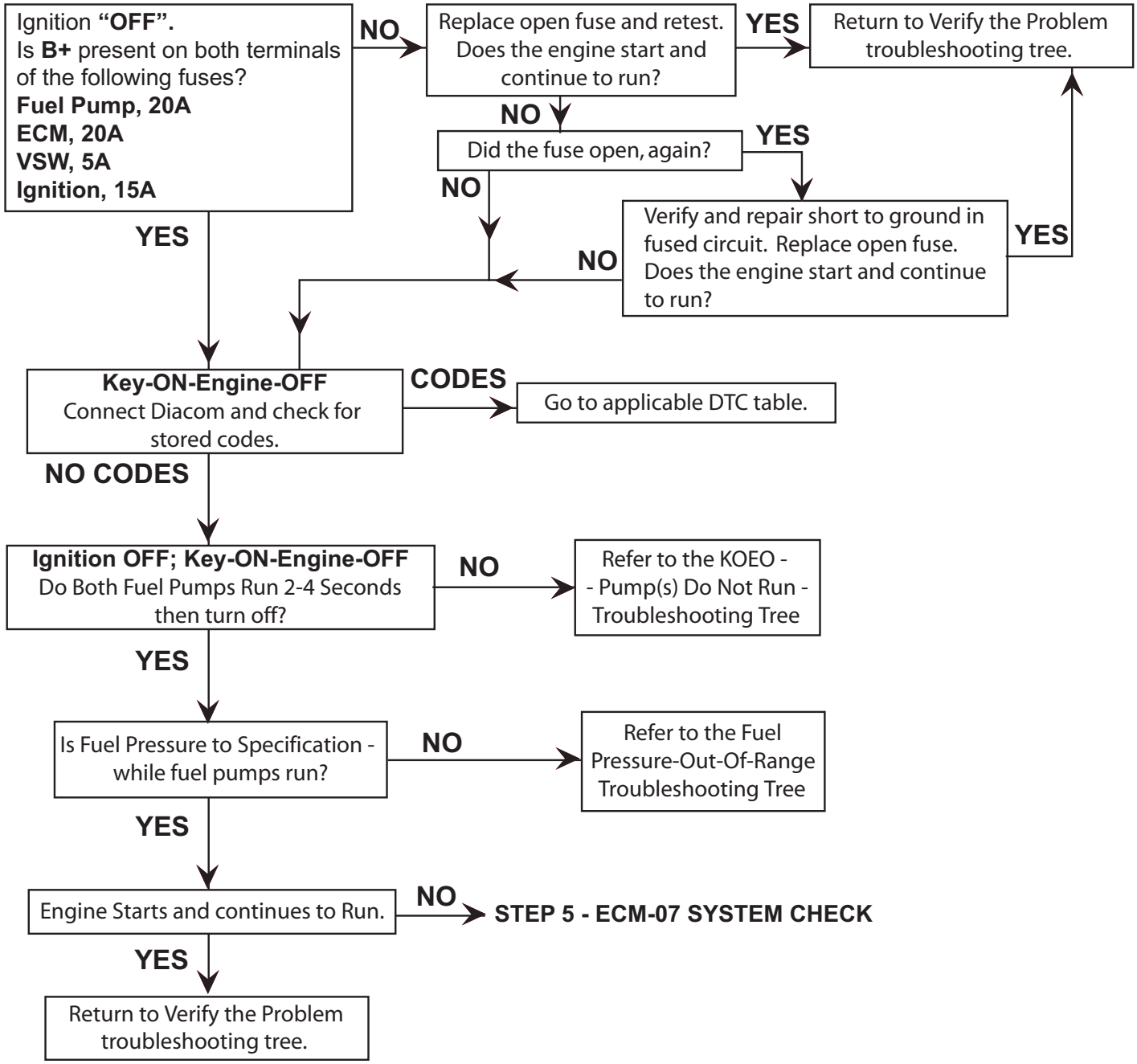


STEP 6 - ISOLATE AND REPAIR

STEP 6A
DRIVABILITY CHECKLIST - NO CODES



NO START TROUBLESHOOTING TREE

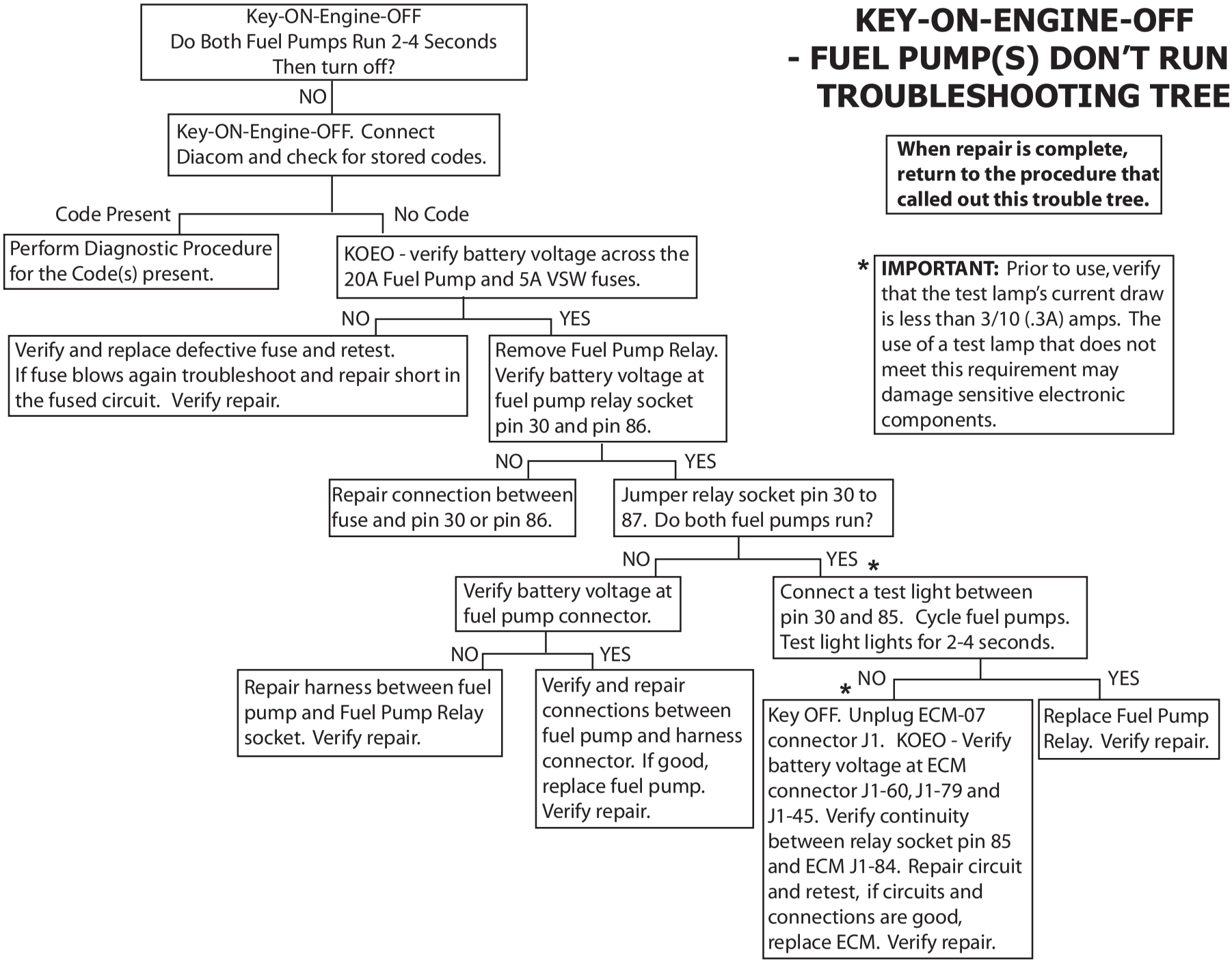


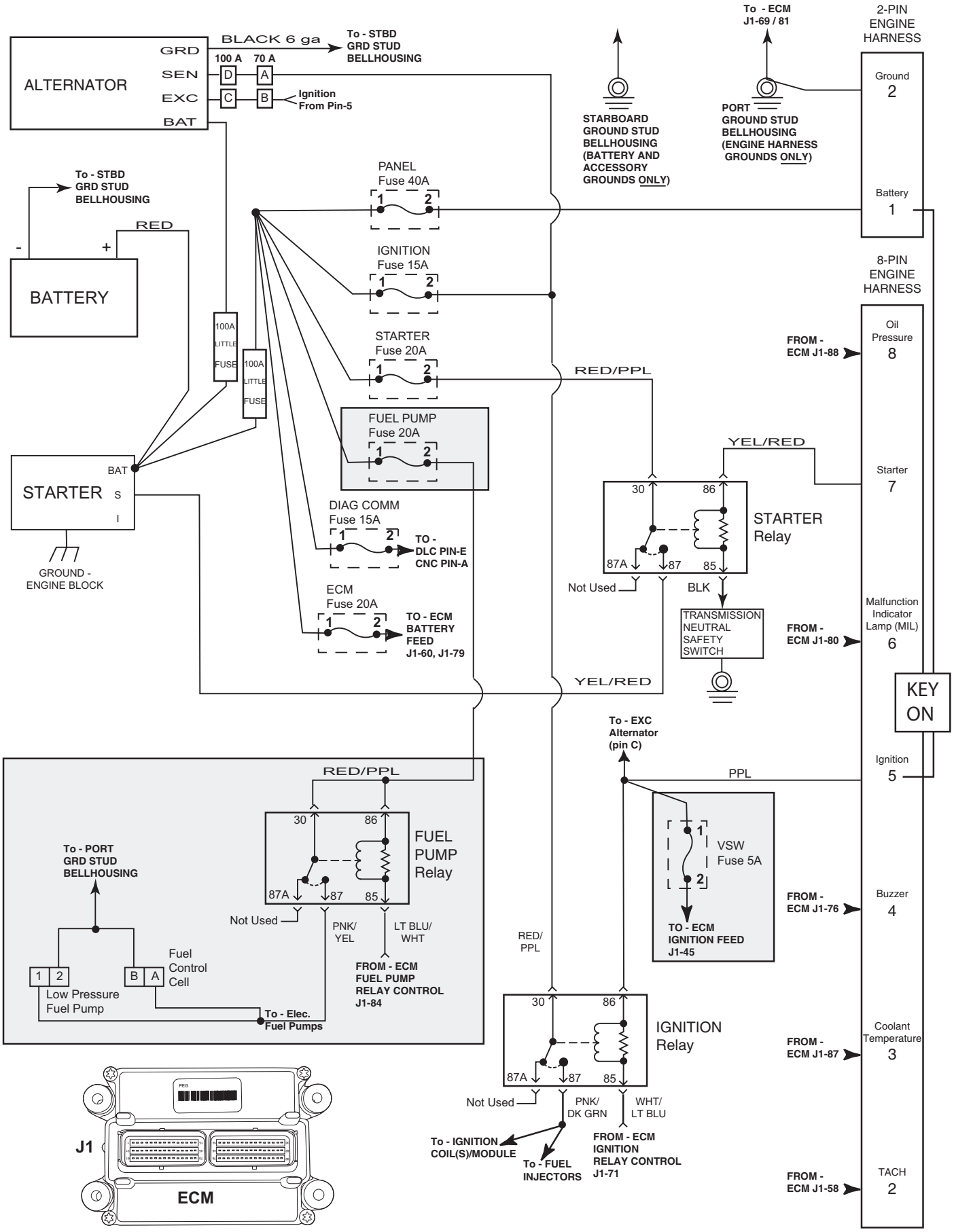
IMPORTANT:
USE THIS TROUBLESHOOTING TREE FOR THE CONDITION WHERE THE ENGINE CRANKS NORMALLY, BUT WILL NOT START AND CONTINUE TO RUN.
USE THE MAIN ELECTRICAL SYSTEM TROUBLESHOOTING TREES FOR SLOW CRANK OR NO CRANK TO TROUBLESHOOT STARTER ISSUES.

KEY-ON-ENGINE-OFF - FUEL PUMP(S) DON'T RUN - TROUBLESHOOTING TREE

When repair is complete, return to the procedure that called out this trouble tree.

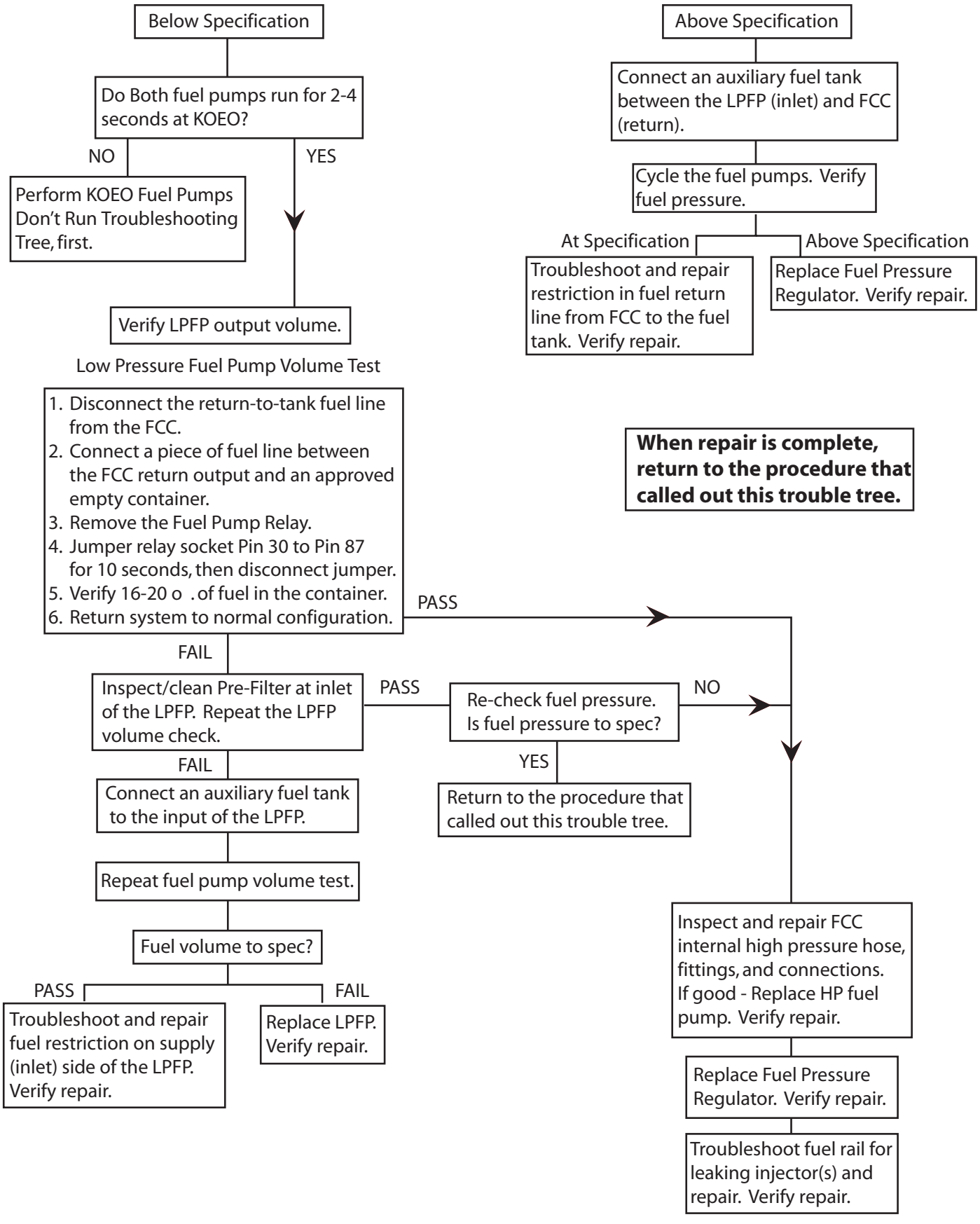
* **IMPORTANT:** Prior to use, verify that the test lamp's current draw is less than 3/10 (.3A) amps. The use of a test lamp that does not meet this requirement may damage sensitive electronic components.





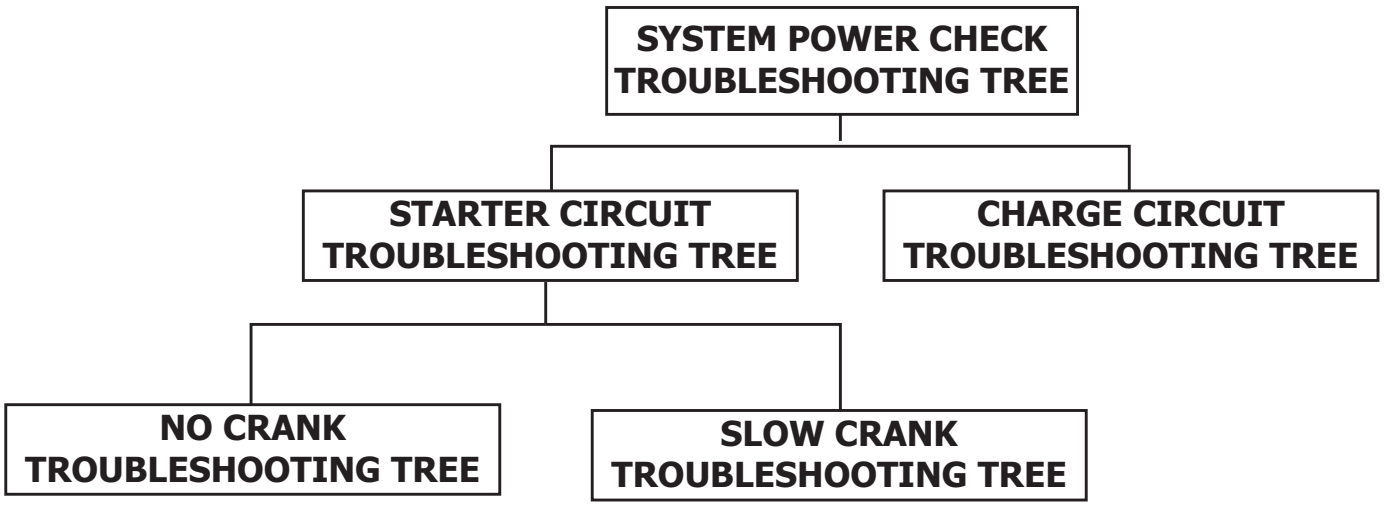
FUEL PUMPS POWER / GROUND / CONTROL DIAGRAM

KEY-ON-ENGINE-OFF
FUEL PRESSURE OUT OF RANGE - PUMPS RUN



MAIN ELECTRICAL SYSTEM TROUBLESHOOTING TREE

Dead Battery, Charge System Problems, No Crank, Slow Crank or any problem related to the main system power.



SYSTEM POWER CHECK TROUBLESHOOTING TREE

Key-OFF
Verify that the battery is the correct si e, rating, and fully charged. Battery charge needs to be verified using a load tester.

→ Replace Battery with a known good battery of the correct si e and rating.

↓

Inspect, clean, and repair as required battery terminals and connections.

↓

Inspect, clean, and repair as required engine ground connections.

→ NOTE: Ground locations are critical for proper engine operation. Refer to the Main System Power - Grounds Diagram for device and ground locations. Ensure only the ECM / Engine harness is grounded at the Port ground stud.

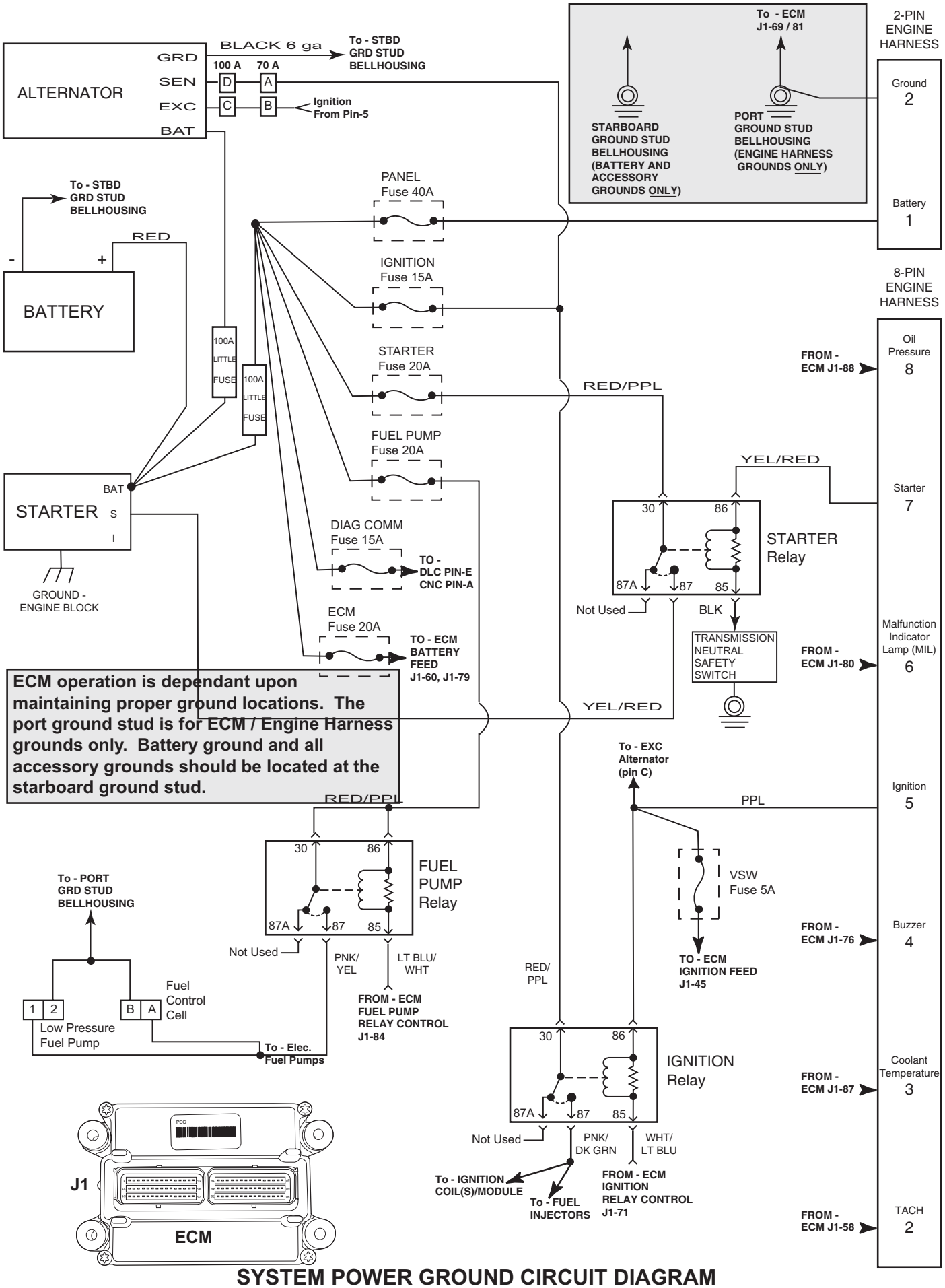
↓

Key 'ON' and boat lights ON. Verify voltage is not less than .3 vdc of battery voltage at each system power test point. Refer to Main System Power - Test Points Diagram.

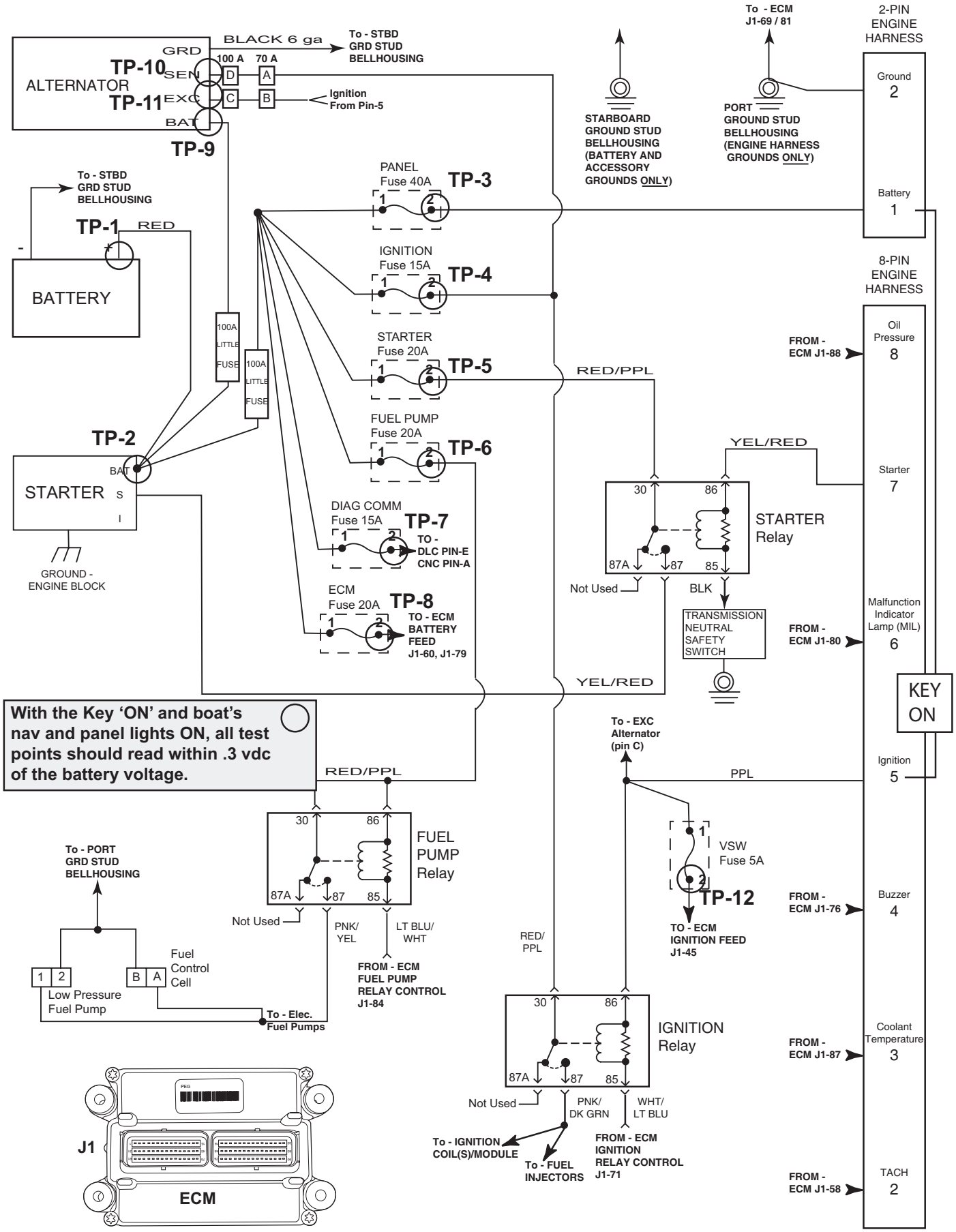
→ Inspect, clean and repair connections or wiring that are not within specification.

↓

Continue to Starter Circuit, Charge Circuit or return to the diagnostic procedure that requested a System Power Check.

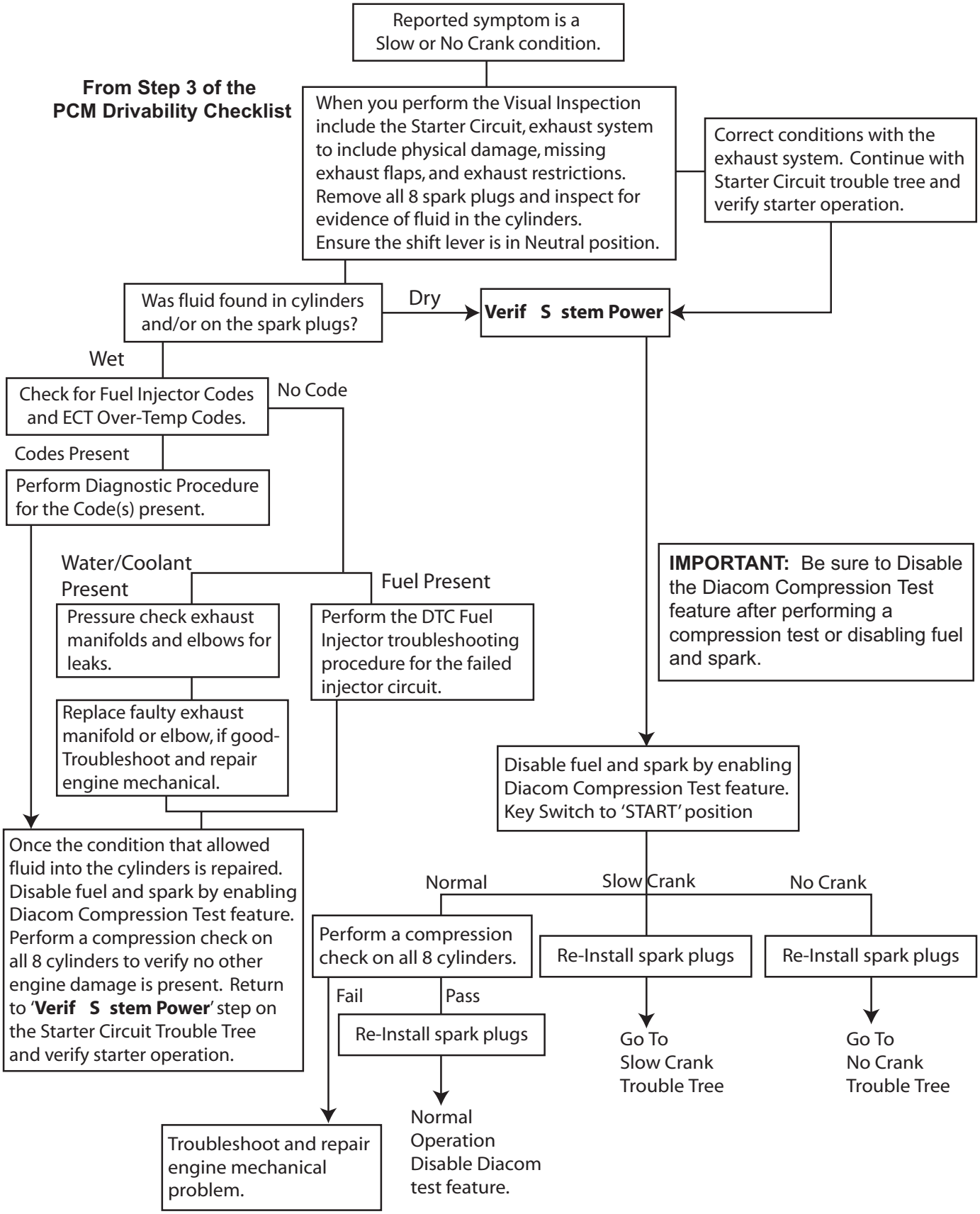


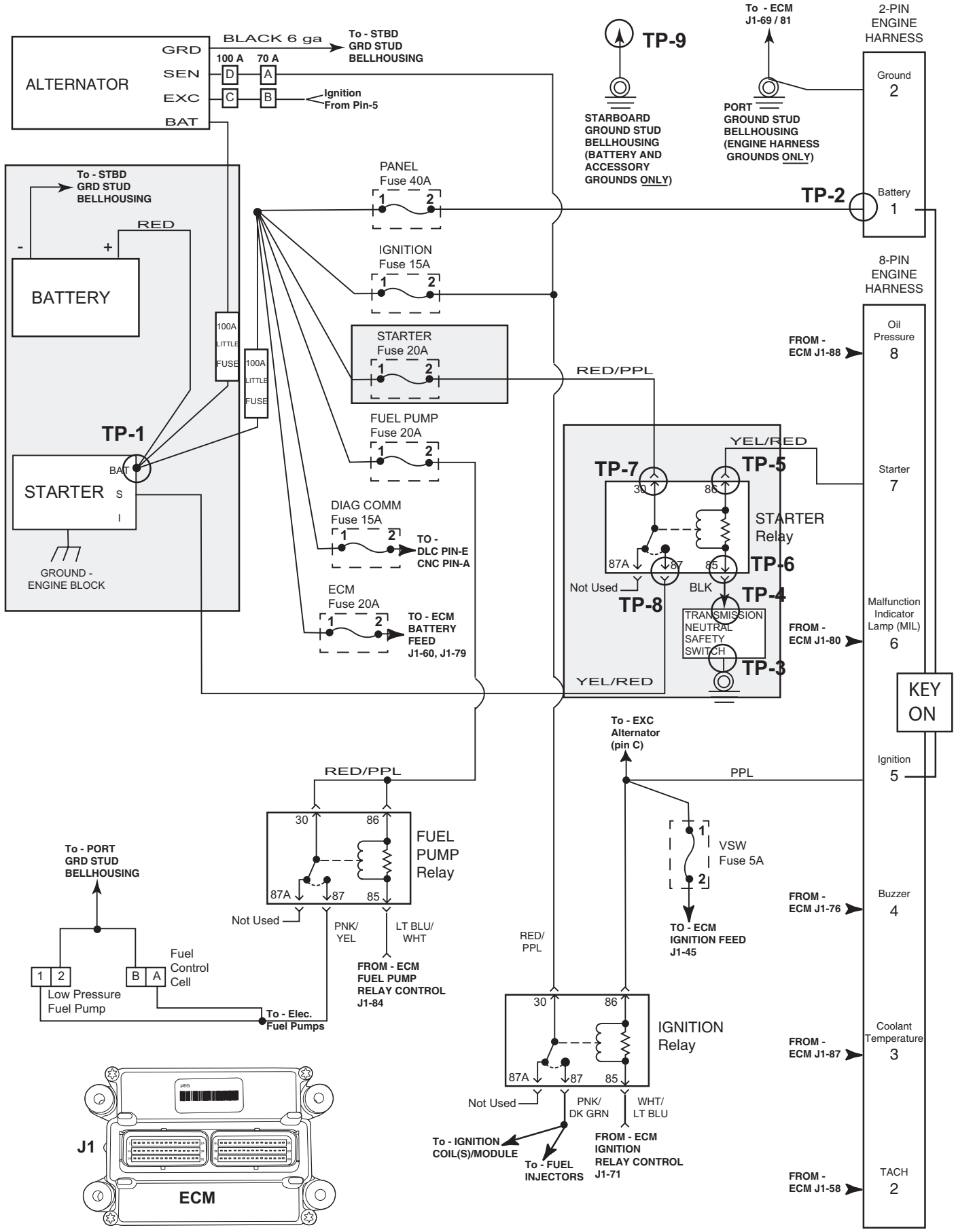
SYSTEM POWER GROUND CIRCUIT DIAGRAM



SYSTEM POWER KOEO VOLTAGE CHECK CIRCUIT DIAGRAM

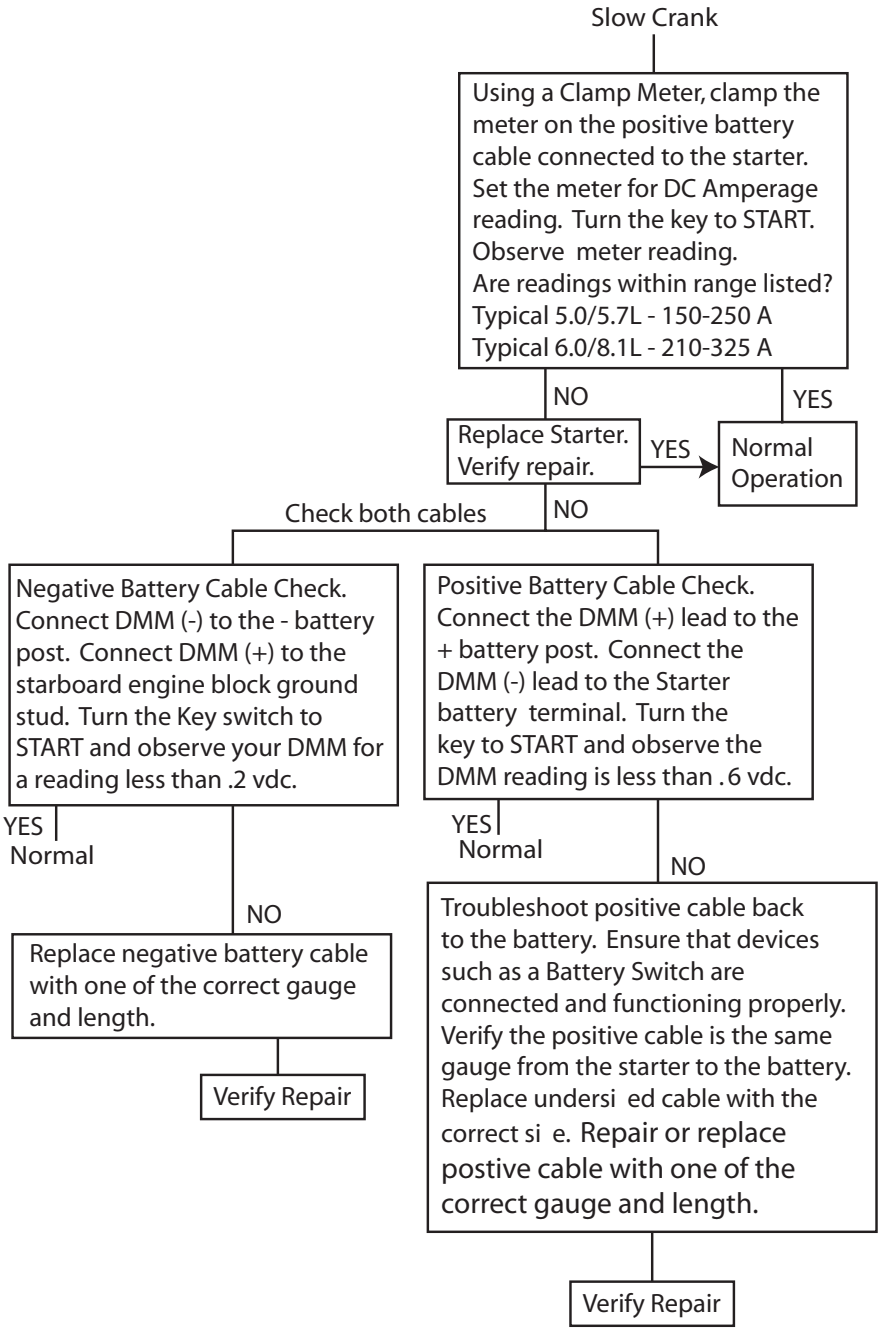
STARTER CIRCUIT TROUBLESHOOTING TREE





STARTER CIRCUIT DIAGRAM

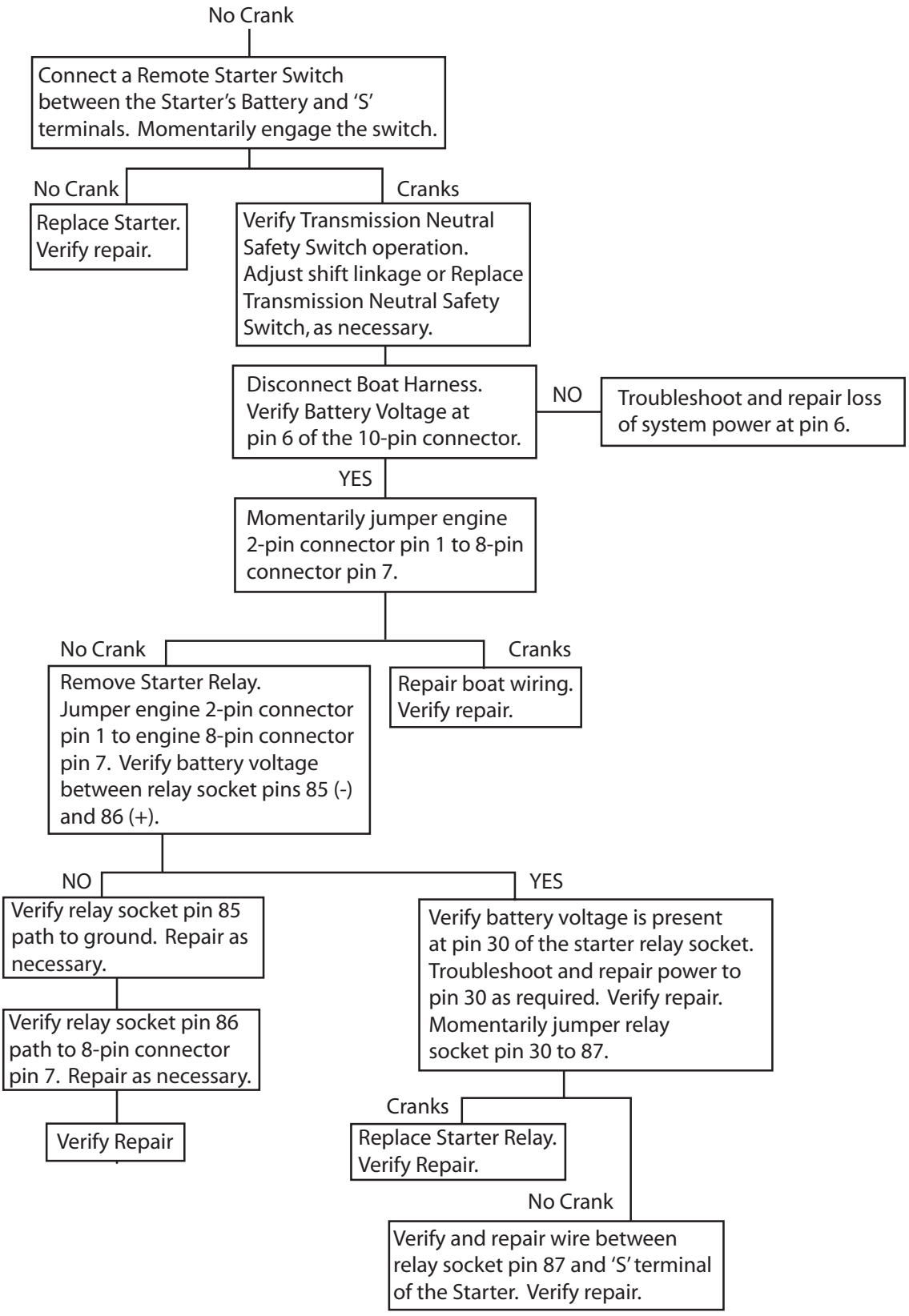
STARTER CIRCUIT TROUBLESHOOTING TREE SLOW CRANK CONDITION



******** IMPORTANT ********

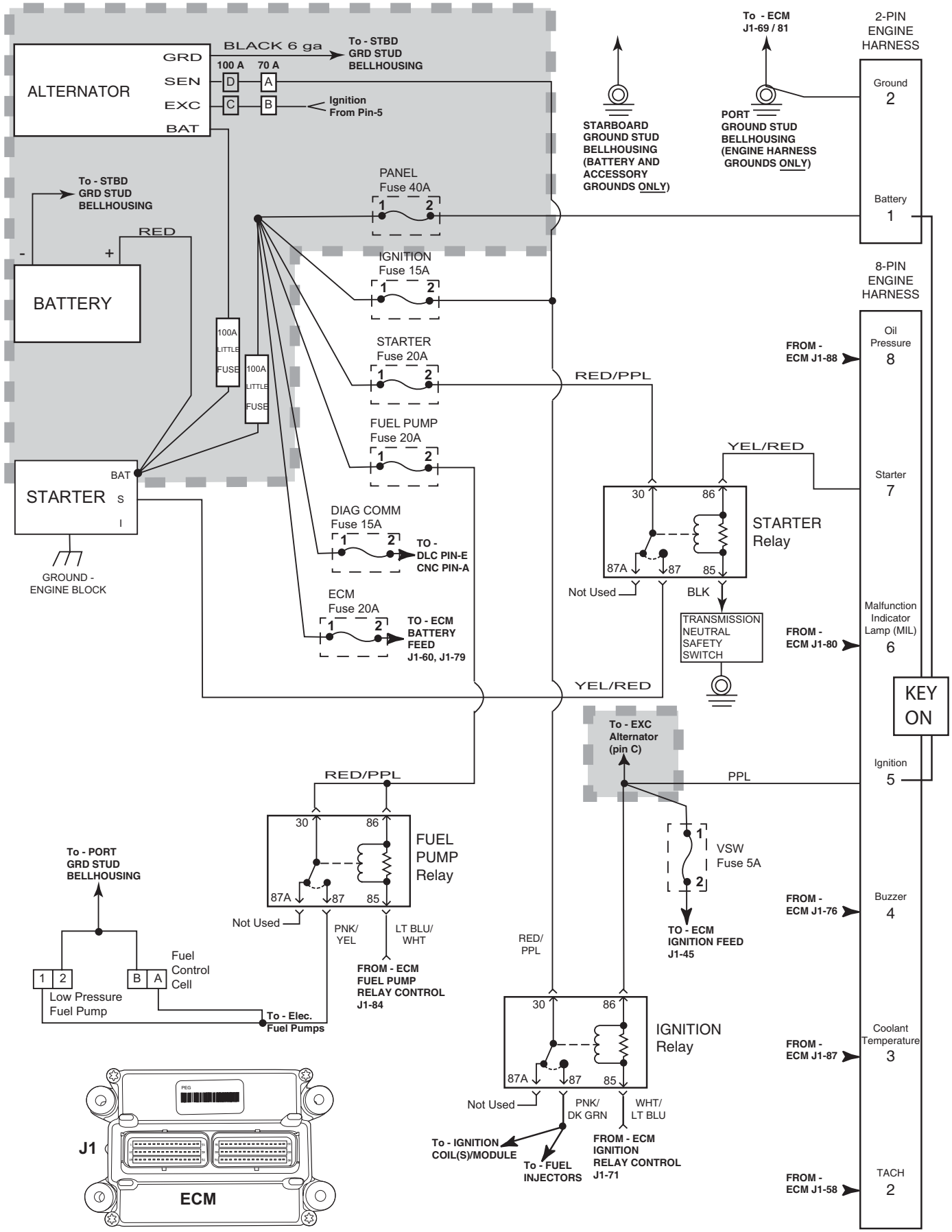
When you have completed your troubleshooting and repair of the starter, be sure to disable the Diacom Compression Test feature, then verify the engine starts and runs.

STARTER CIRCUIT TROUBLESHOOTING TREE NO CRANK CONDITION



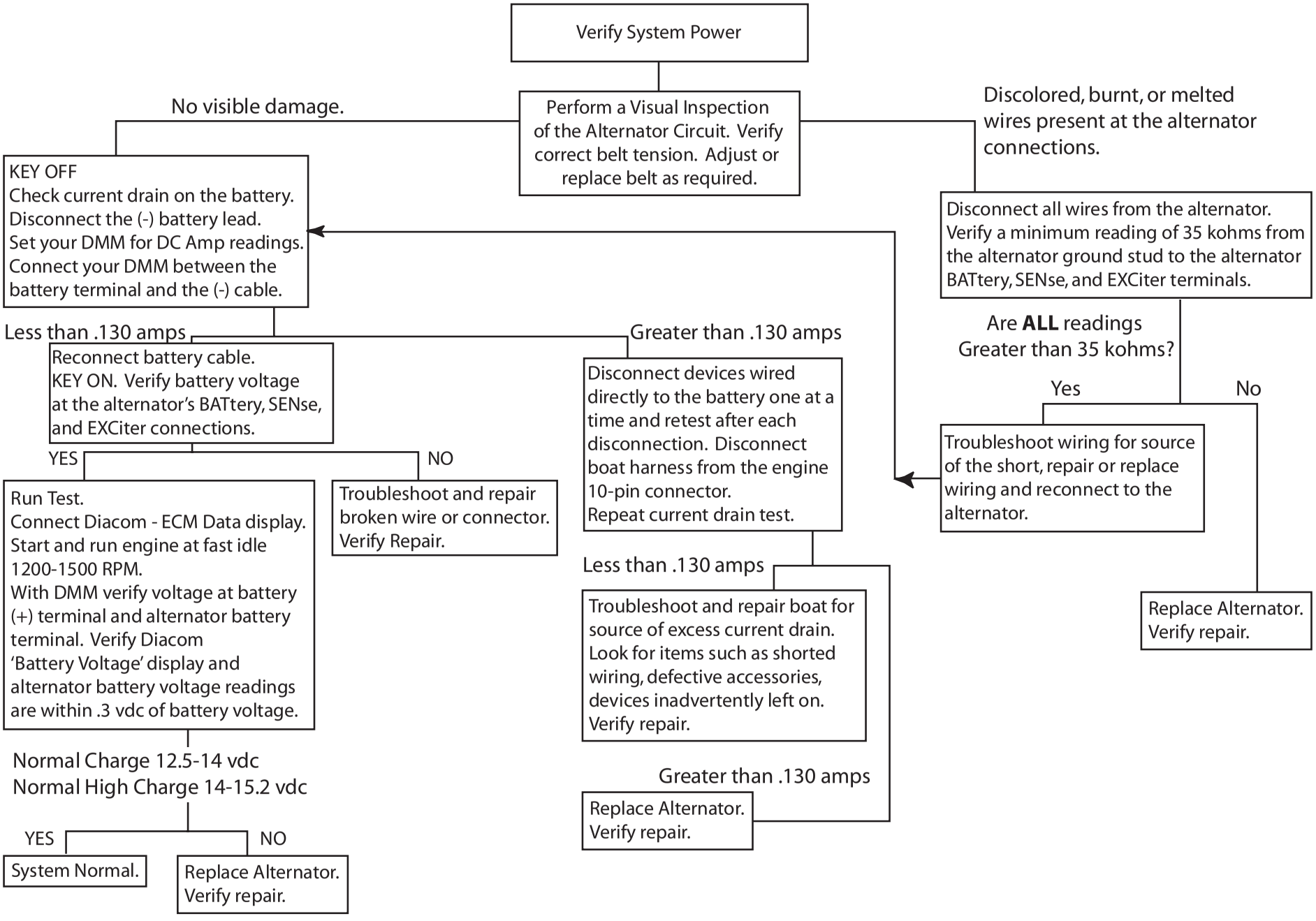
******** IMPORTANT ********

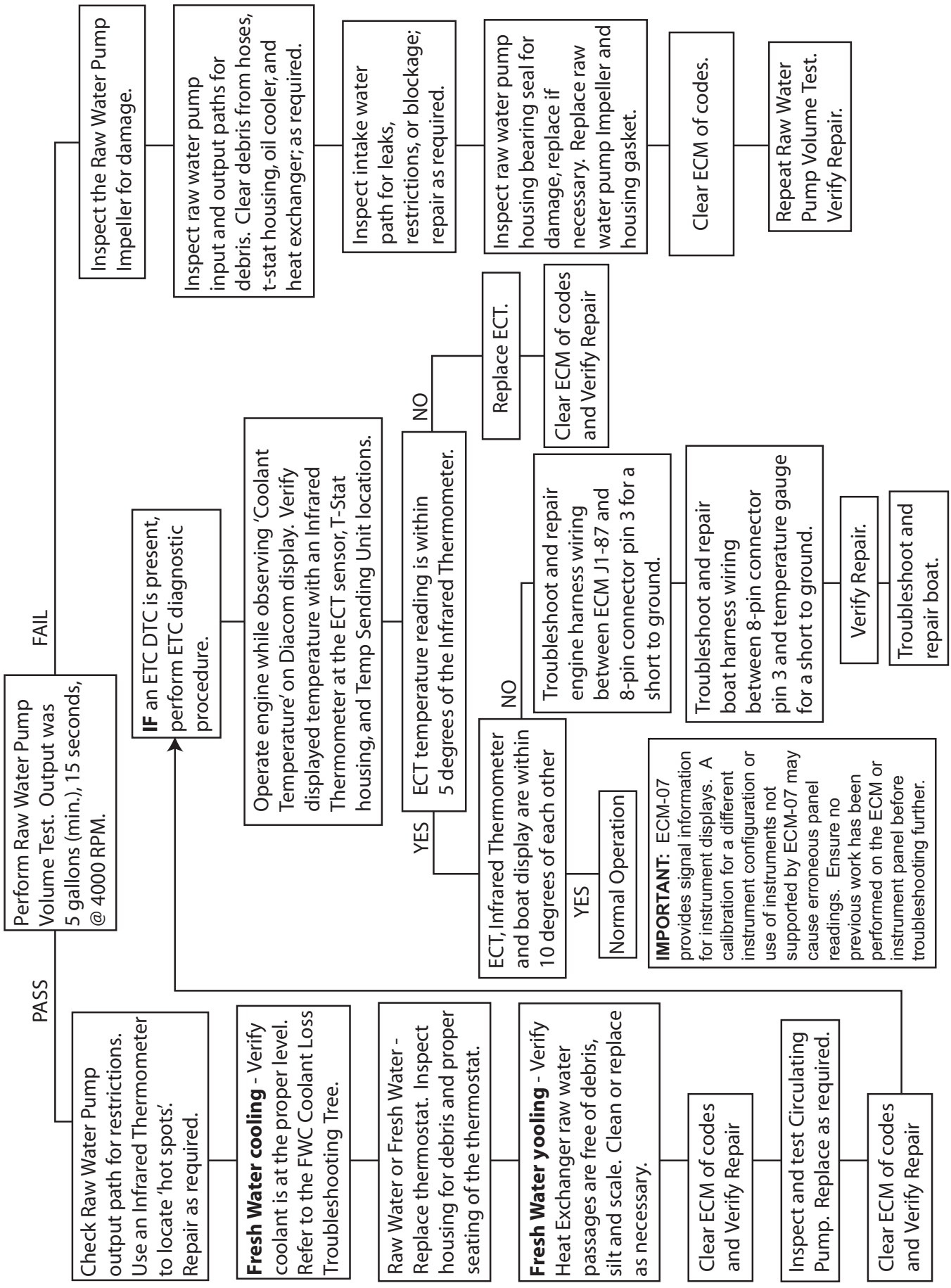
When you have completed your troubleshooting and repair of the starter, be sure to disable Diacom Compression Test feature, then verify the engine starts and runs.



CHARGE CIRCUIT DIAGRAM

CHARGE CIRCUIT TROUBLESHOOTING TREE



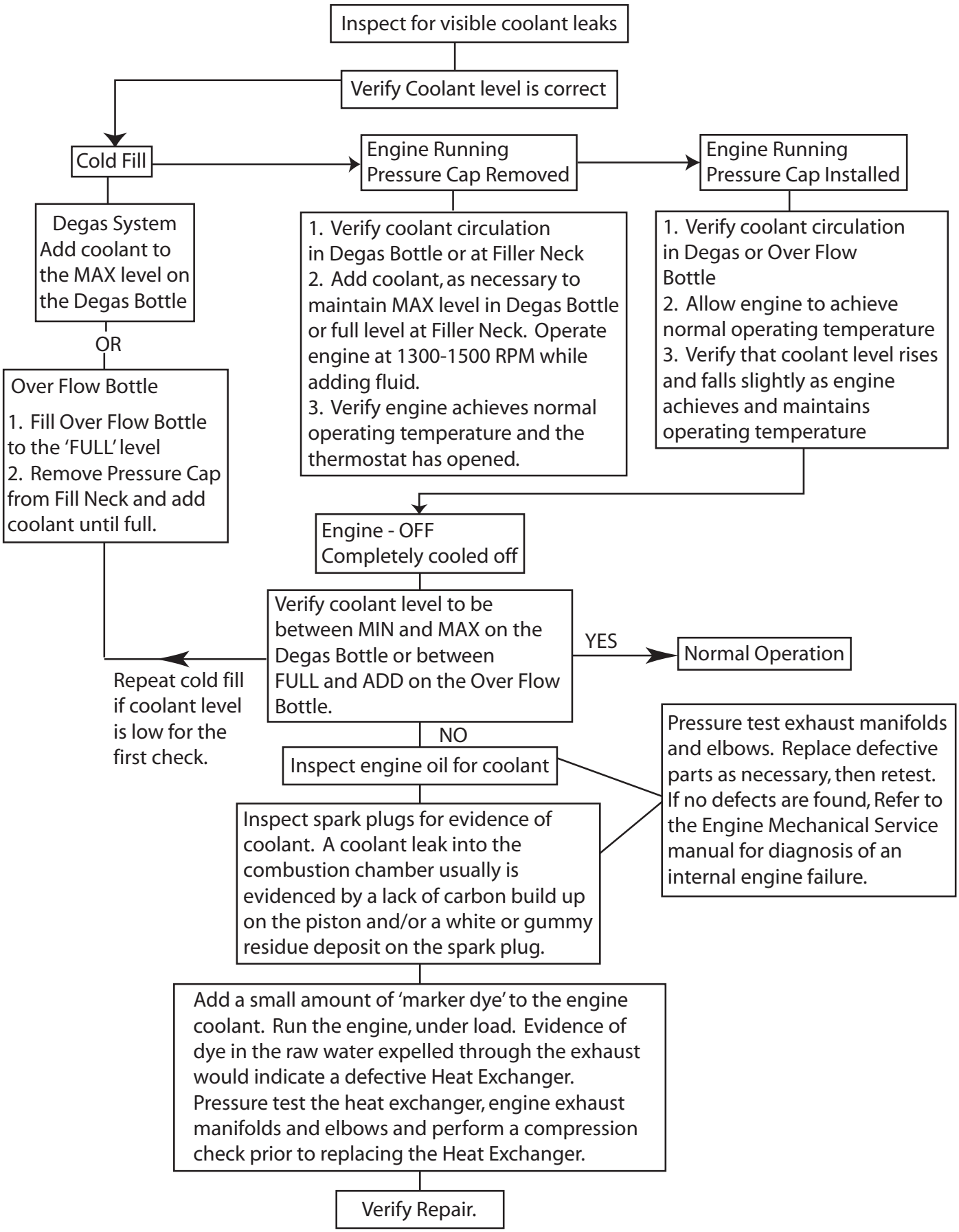

TROUBLESHOOTING AN OVER-TEMPERATURE CONDITION
Perform Raw Water Pump Volume Test. Output was 5 gallons (min.), 15 seconds, @ 4000 RPM.
PASS
FAIL
Check Raw Water Pump output path for restrictions. Use an Infrared Thermometer to locate 'hot spots'. Repair as required.
Fresh Water cooling - Verify coolant is at the proper level. Refer to the FWC Coolant Loss Troubleshooting Tree.
Raw Water or Fresh Water - Replace thermostat. Inspect housing for debris and proper seating of the thermostat.
Fresh Water yooling - Verify Heat Exchanger raw water passages are free of debris, silt and scale. Clean or replace as necessary.
Clear ECM of codes and Verify Repair
Inspect and test Circulating Pump. Replace as required.
Clear ECM of codes and Verify Repair
Inspect the Raw Water Pump Impeller for damage.
Inspect raw water pump input and output paths for debris. Clear debris from hoses, t-stat housing, oil cooler, and heat exchanger; as required.
Inspect intake water path for leaks, restrictions, or blockage; repair as required.
Inspect raw water pump housing bearing seal for damage, replace if necessary. Replace raw water pump Impeller and housing gasket.
Clear ECM of codes.
Repeat Raw Water Pump Volume Test. Verify Repair.
IF an ETC DTC is present, perform ETC diagnostic procedure.
Operate engine while observing 'Coolant Temperature' on Diacom display. Verify displayed temperature with an Infrared Thermometer at the ECT sensor, T-Stat housing, and Temp Sending Unit locations.
ECT temperature reading is within 5 degrees of the Infrared Thermometer.
YES
NO
Replace ECT.
Clear ECM of codes and Verify Repair
ECT, Infrared Thermometer and boat display are within 10 degrees of each other
NO
YES
Normal Operation
Troubleshoot and repair engine harness wiring between ECM J1-87 and 8-pin connector pin 3 for a short to ground.
Troubleshoot and repair boat harness wiring between 8-pin connector pin 3 and temperature gauge for a short to ground.
Verify Repair.
Troubleshoot and repair boat.
IMPORTANT: ECM-07 provides signal information for instrument displays. A calibration for a different instrument configuration or use of instruments not supported by ECM-07 may cause erroneous panel readings. Ensure no previous work has been performed on the ECM or instrument panel before troubleshooting further.

The raw water pump volume test must be accomplished with the boat in the water.

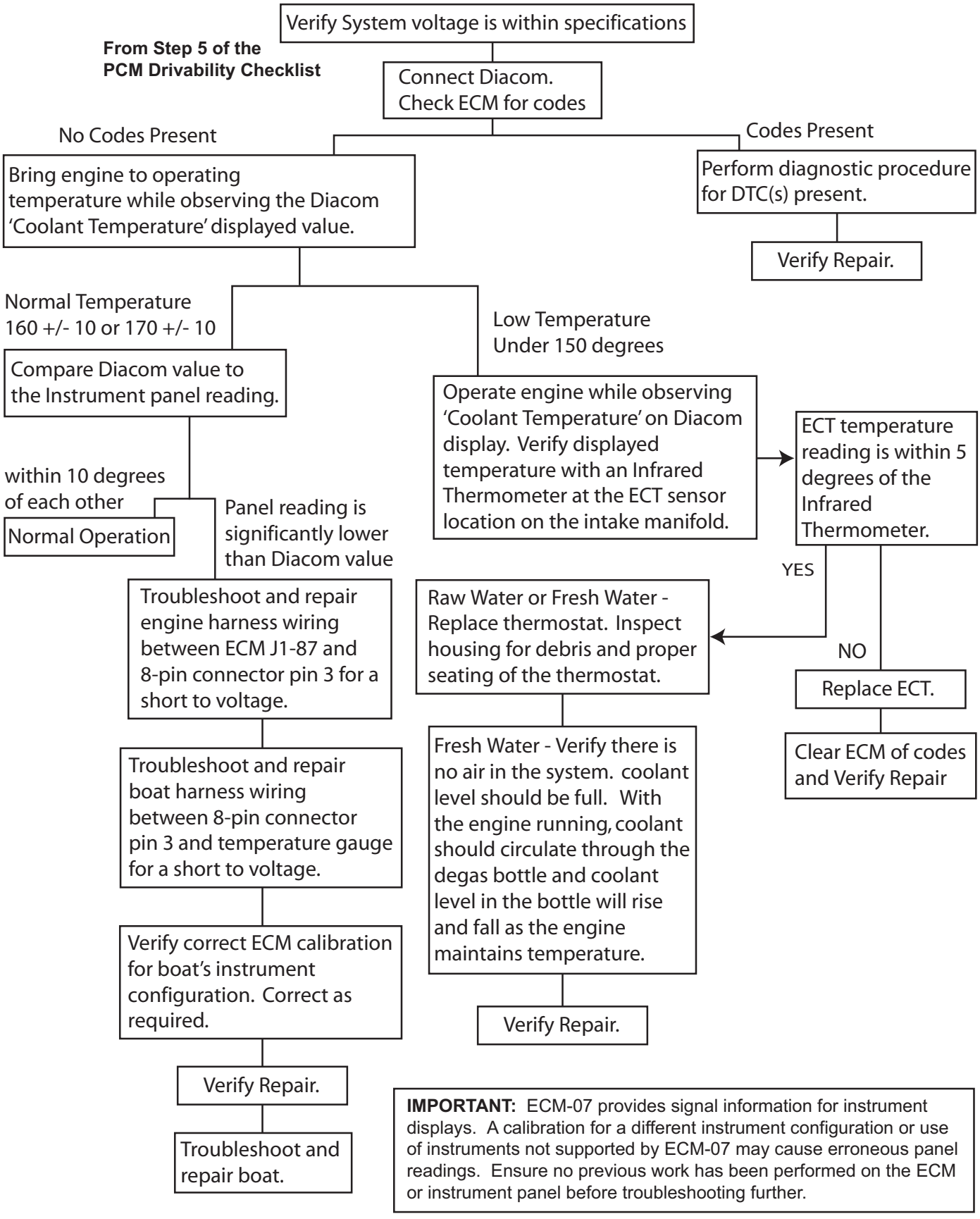
Use a container that will hold at least 5 gallons of water.

1. Disconnect the hose connected to the output of the Raw Water Pump. Connect a hose of sufficient length to reach the 5 gallon (minimum) container.
2. **With the boat in the water, not on a trailer.** Start the engine and bring the engine RPM up to 4000. Place the hose into the 5 gallon (minimum) container. Hold 4000 RPM for 15 seconds then slowly return to idle and shut off the engine.
3. **At the 15 seconds point in the test**, verify you have at least 5 gallons of water in the container.

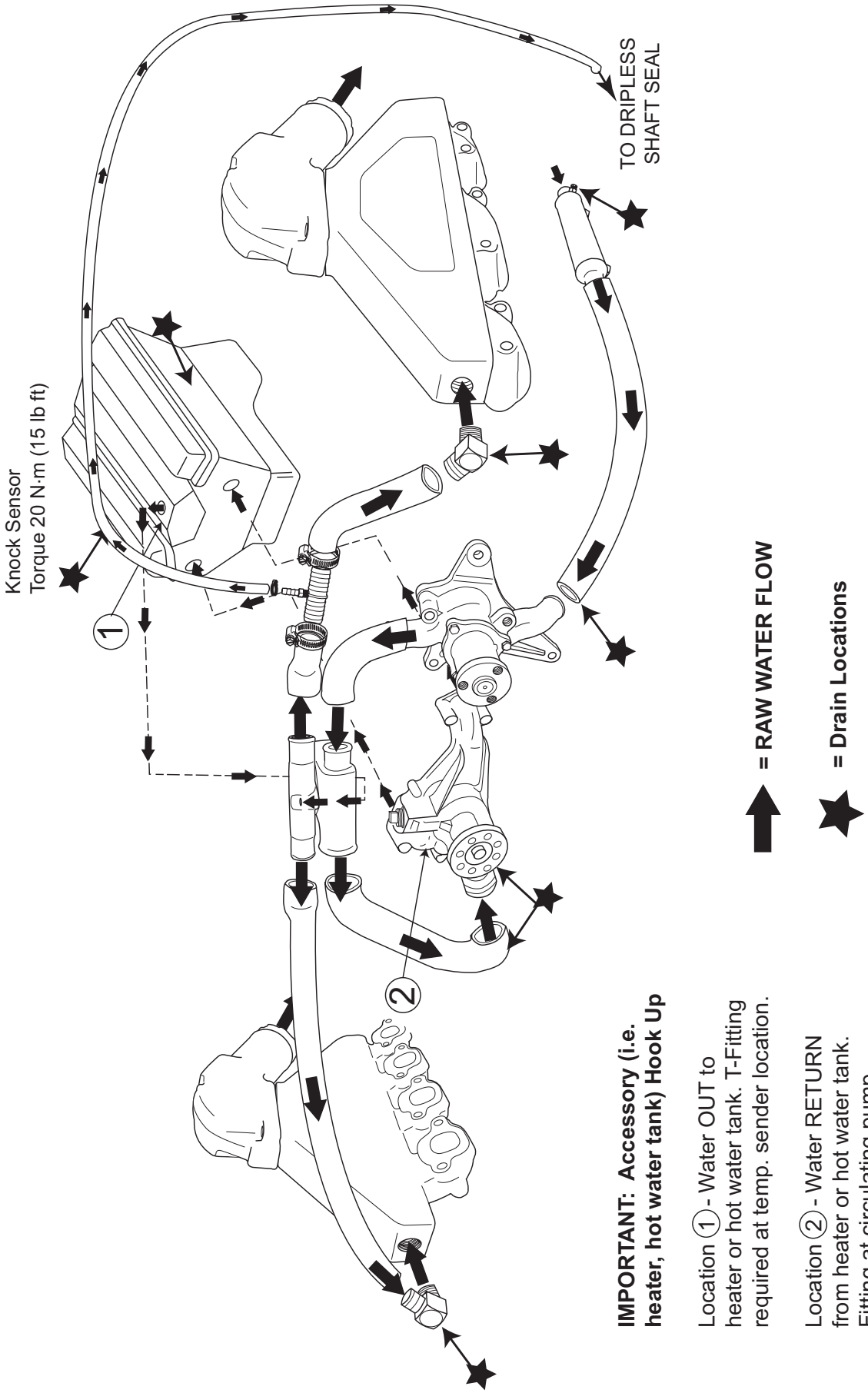
TROUBLESHOOTING A FWC - COOLANT LOSS CONDITION



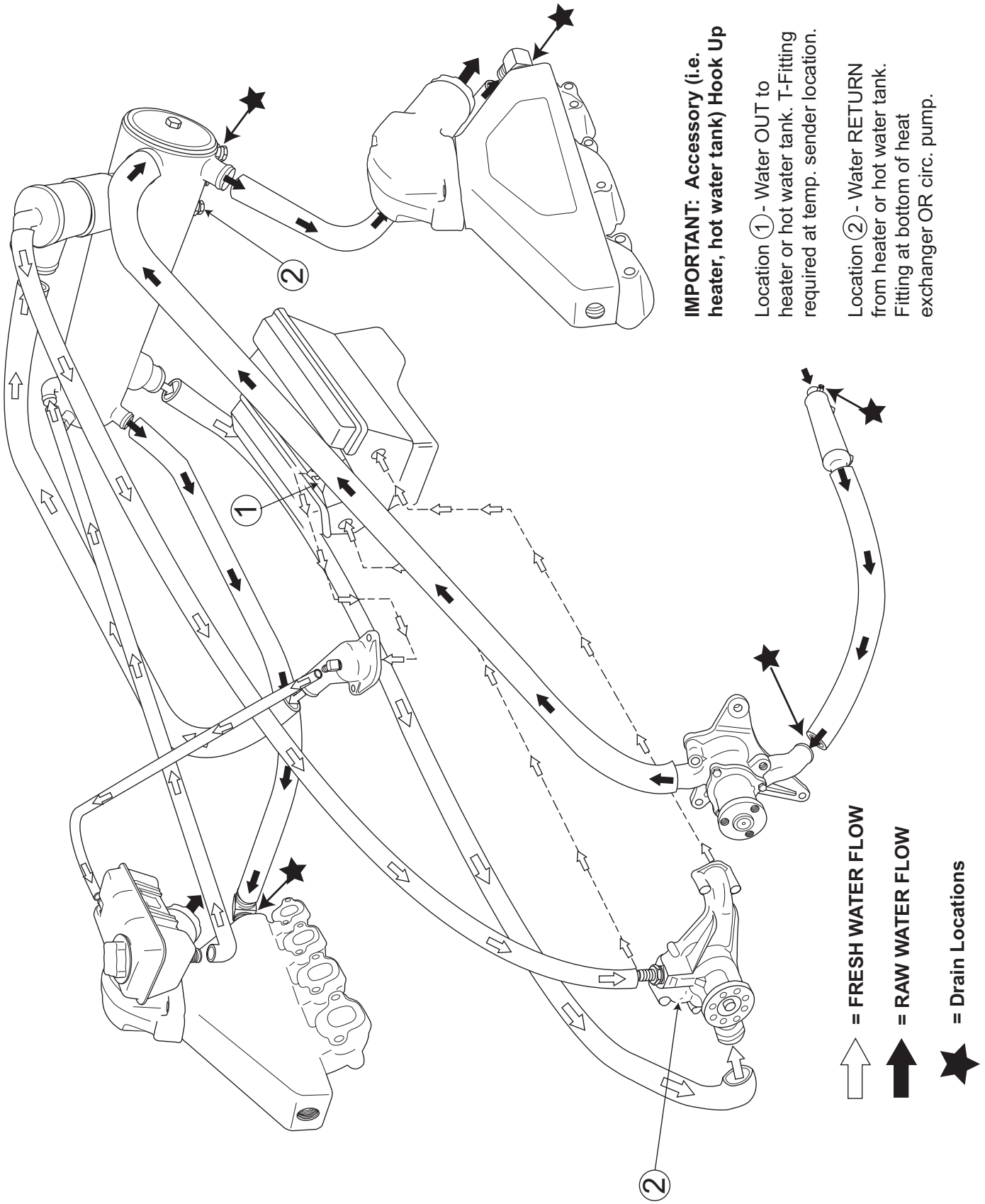
TROUBLESHOOTING AN UNDER-TEMPERATURE CONDITION



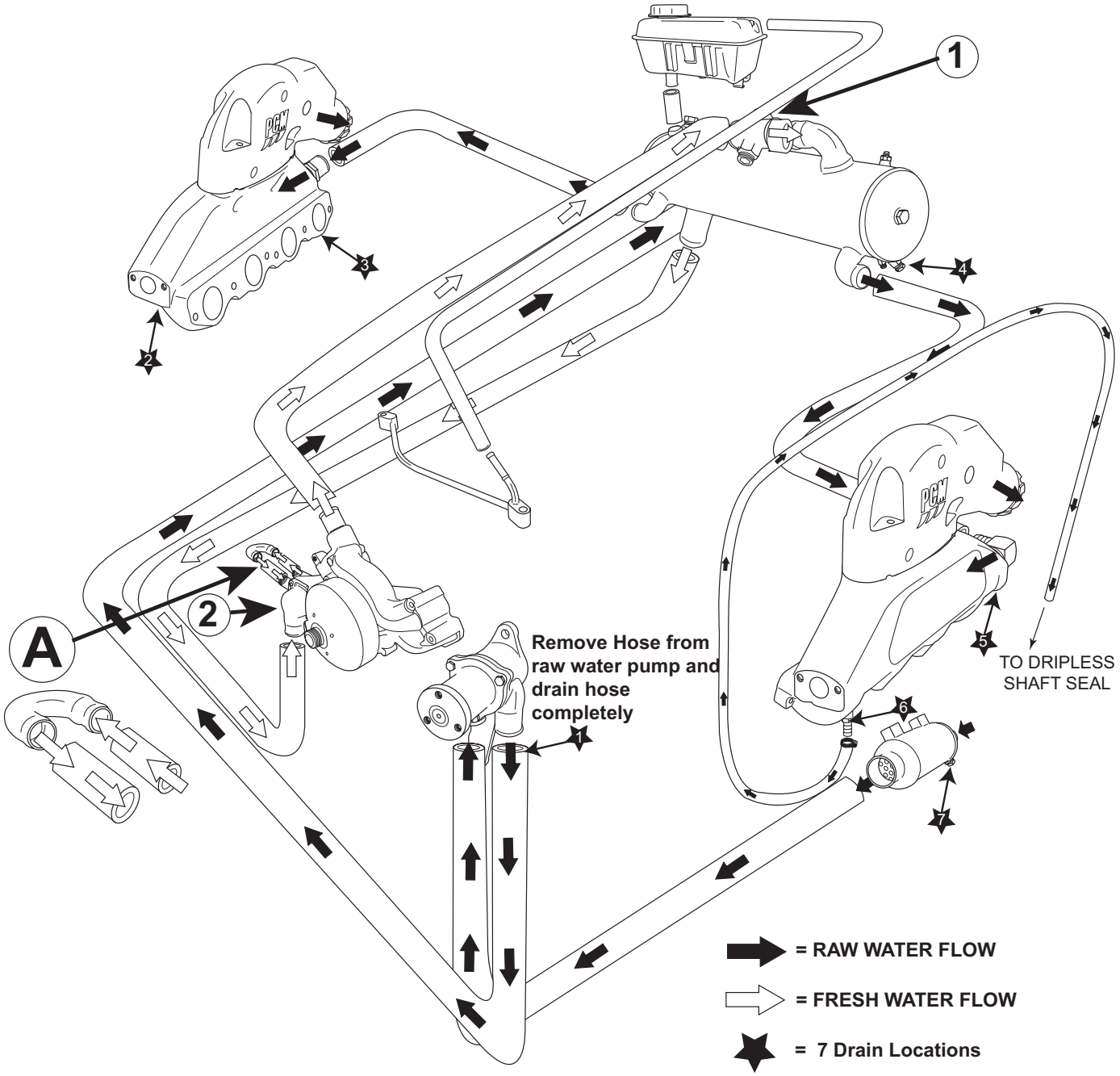
IMPORTANT: ECM-07 provides signal information for instrument displays. A calibration for a different instrument configuration or use of instruments not supported by ECM-07 may cause erroneous panel readings. Ensure no previous work has been performed on the ECM or instrument panel before troubleshooting further.



5.0/5.7L RAW WATER COOLED WATER FLOW DIAGRAM



5.0/5.7L RAW WATER COOLED WATER FLOW DIAGRAM



IMPORTANT: Accessory (i.e. heater, hot water tank) Hook Up
A tee may be inserted anywhere in the specified hose for most appropriate routing.

Location (1) - Water OUT to heater or hot water tank

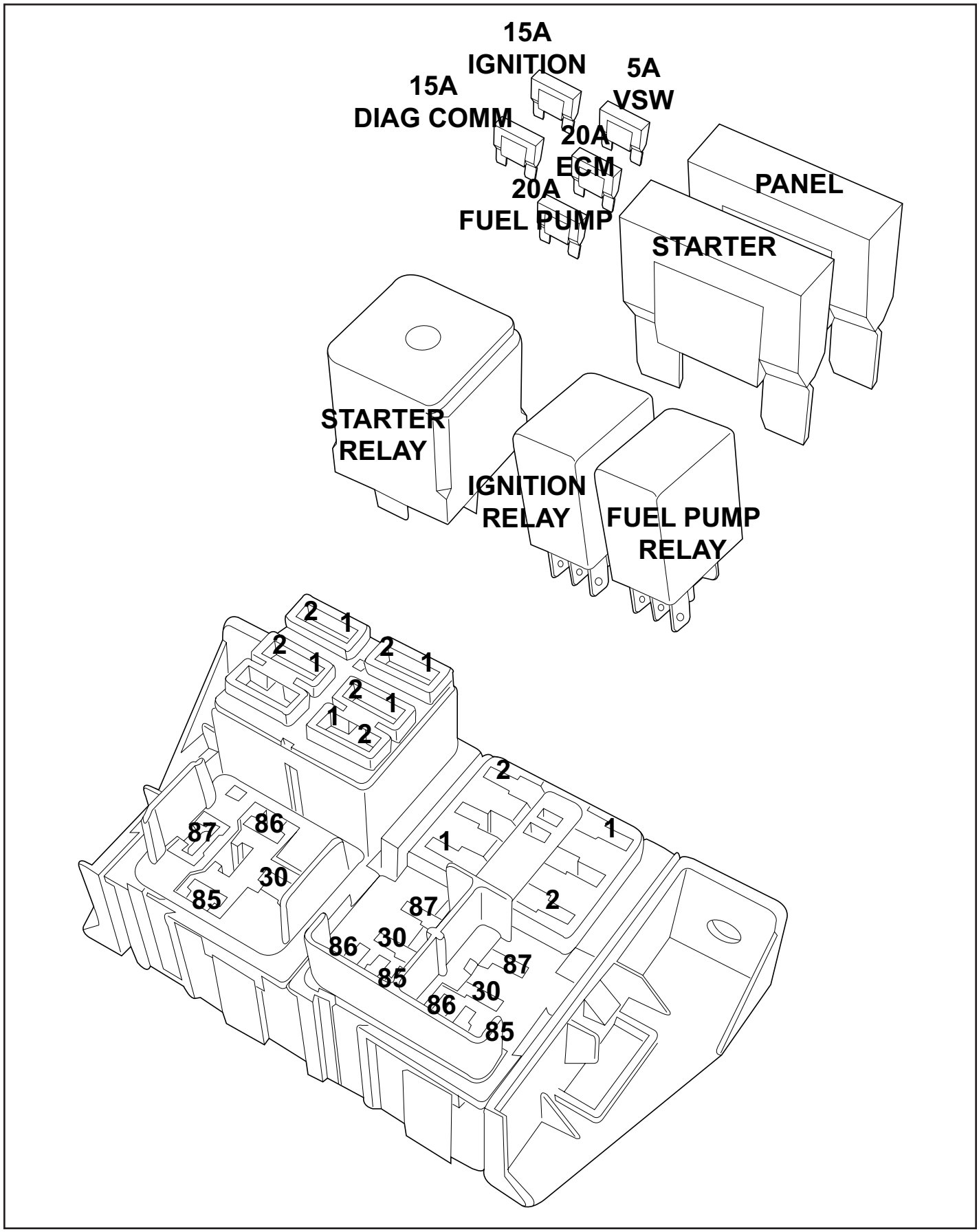
Location (2) - Water RETURN from heater or hot water tank

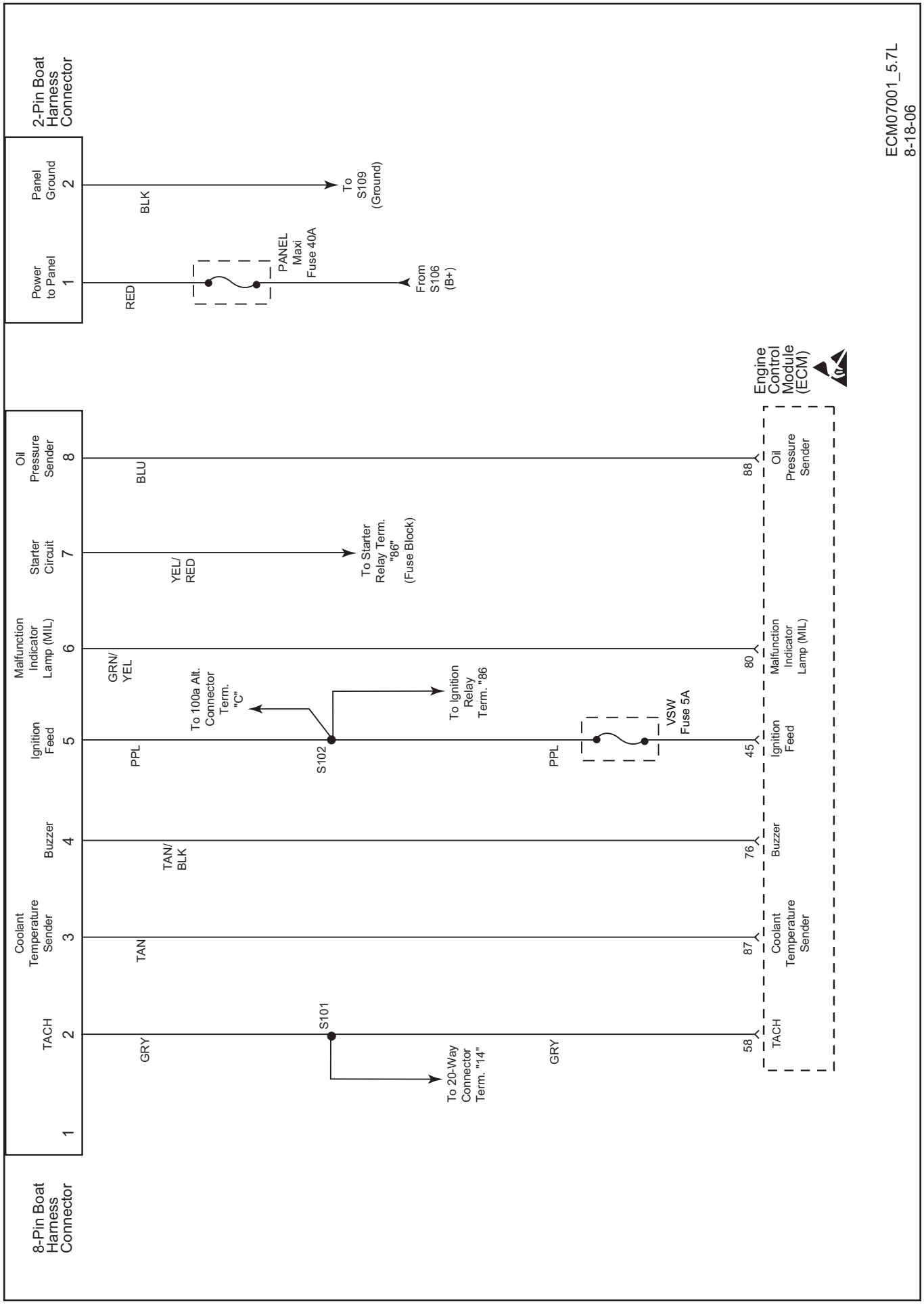
NOTE: Location (A) is the cooling system bypass. This bypass hose MUST NOT be tampered with. DO NOT hook up any external accessories (i.e. heaters, hot water tanks) at this location.

6.0L FRESH WATER COOLED WATER FLOW DIAGRAM

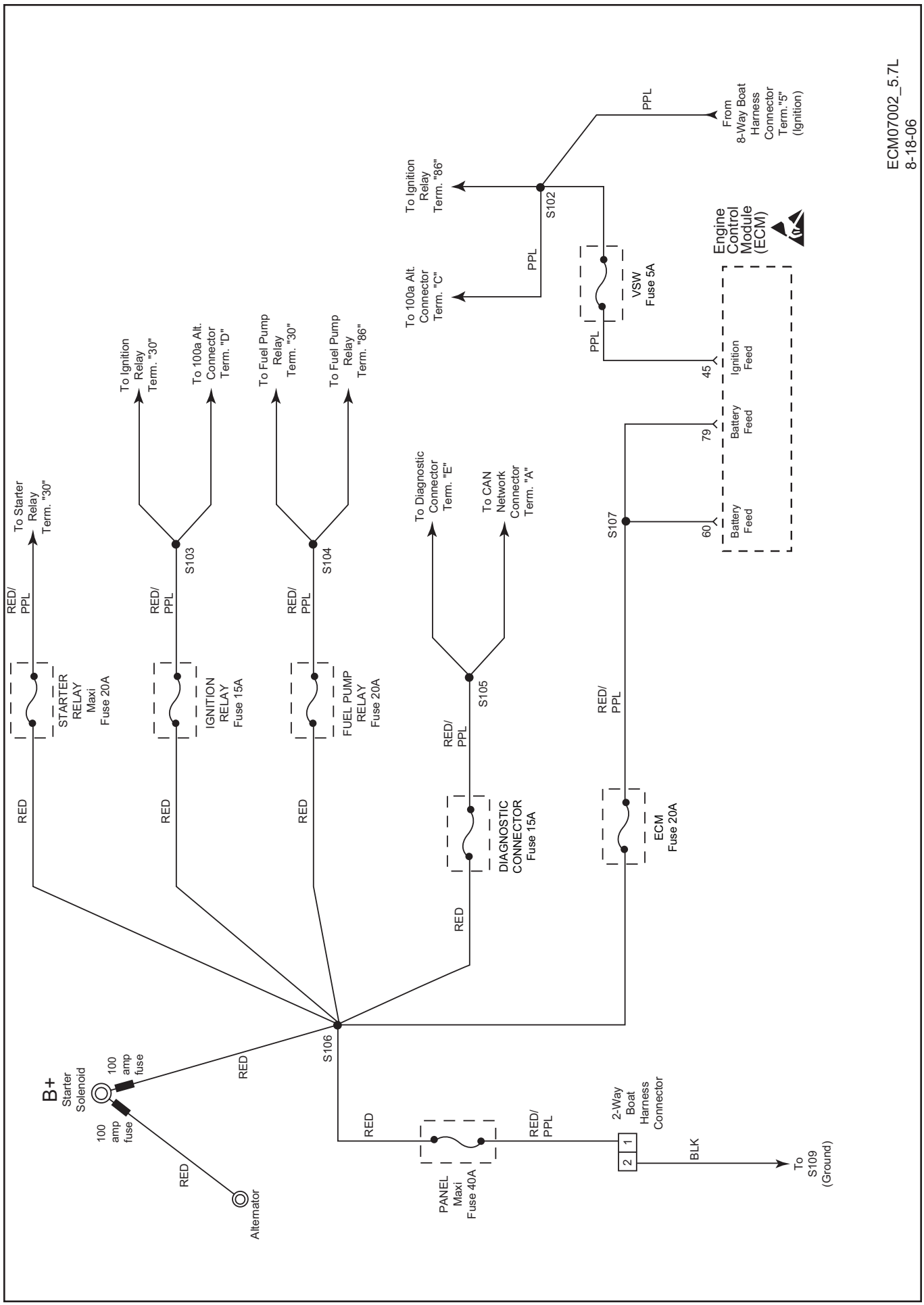
FUSE BLOCK PIN-OUT DIAGRAM

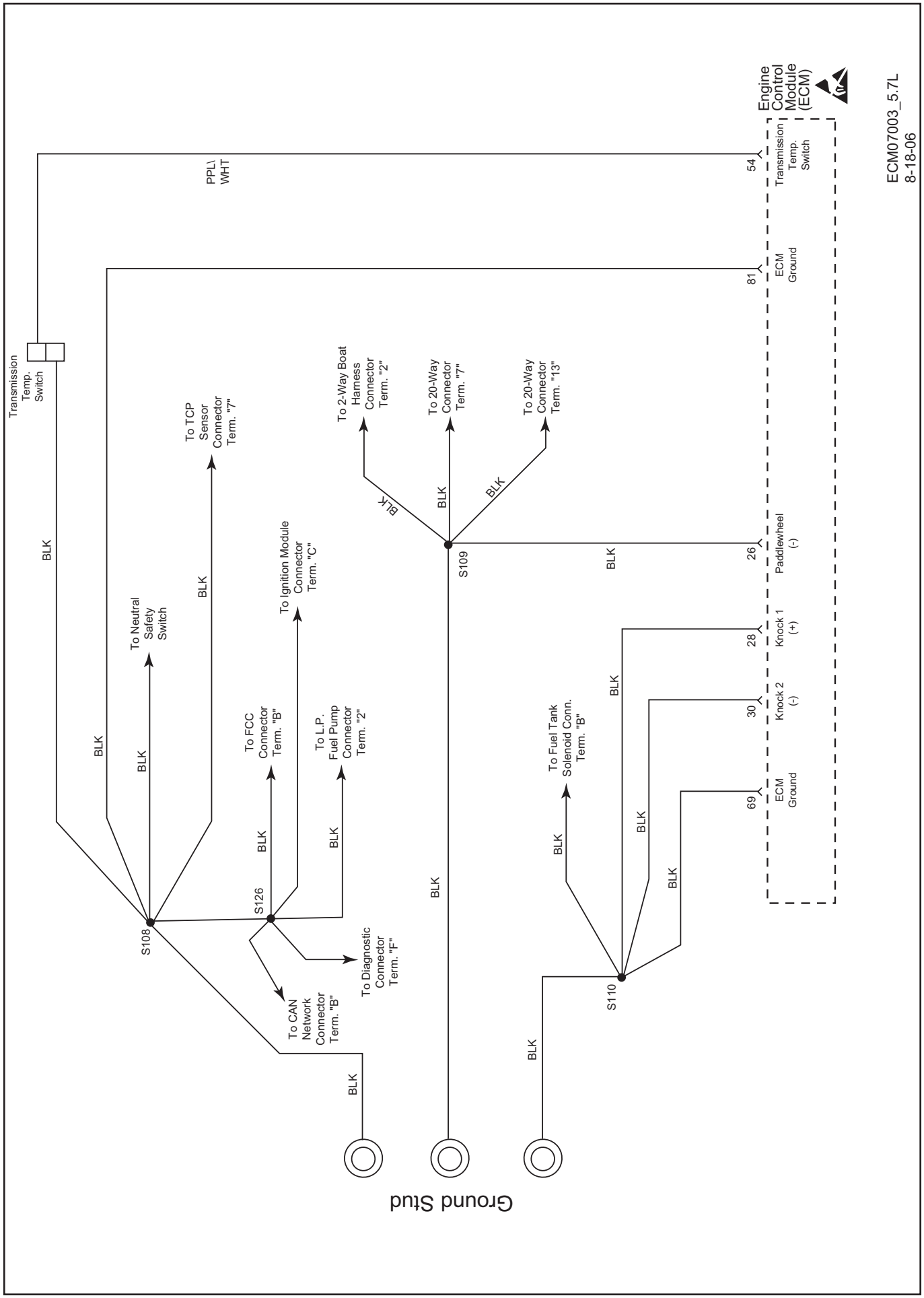
Use the Fuse Block Pin-Out in conjunction with the engine controls wiring schematics for pin locations. Pin 1 of the fuses is to the power side of the fuse and pin 2 is to the device side of the fuse.



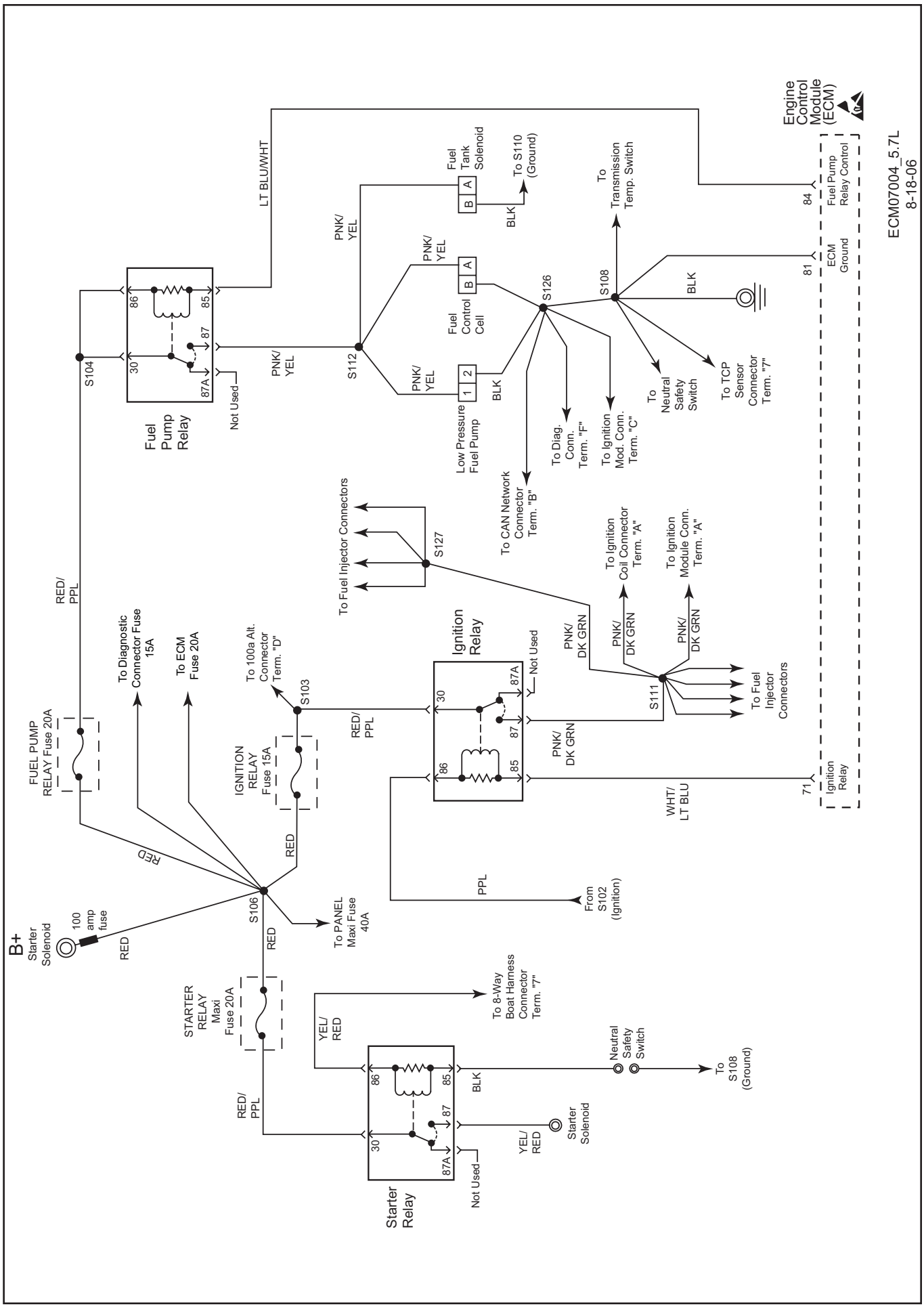

Engine Controls Wiring Schematics- 5.7L (1 of 10)
ECM07001_5.7L
8-18-06
2-Pin Boat Harness Connector
Power to Panel 1
Panel Ground 2
RED
BLK
PANEL Maxi Fuse 40A
From S106 (B+)
To S109 (Ground)
8-Pin Boat Harness Connector
1 TACH
2
3 Coolant Temperature Sender
4 Buzzer
5 Ignition Feed
6 Malfunction Indicator Lamp (MIL)
7 Starter Circuit
8 Oil Pressure Sender
GRY
TAN
TAN/ BLK
PPL
GRN/ YEL
YEL/ RED
BLU
S101
S102
To 20-Way Connector Term. "14"
To 100a Alt. Connector Term. "C"
To Ignition Relay Term. "86
To Starter Relay Term. "86" (Fuse Block)
VSW Fuse 5A
Engine Control Module (ECM)
58 TACH
87 Coolant Temperature Sender
76 Buzzer
45 Ignition Feed
80 Malfunction Indicator Lamp (MIL)
88 Oil Pressure Sender

Engine Controls Wiring Schematics- 5.7L (2 of 10)

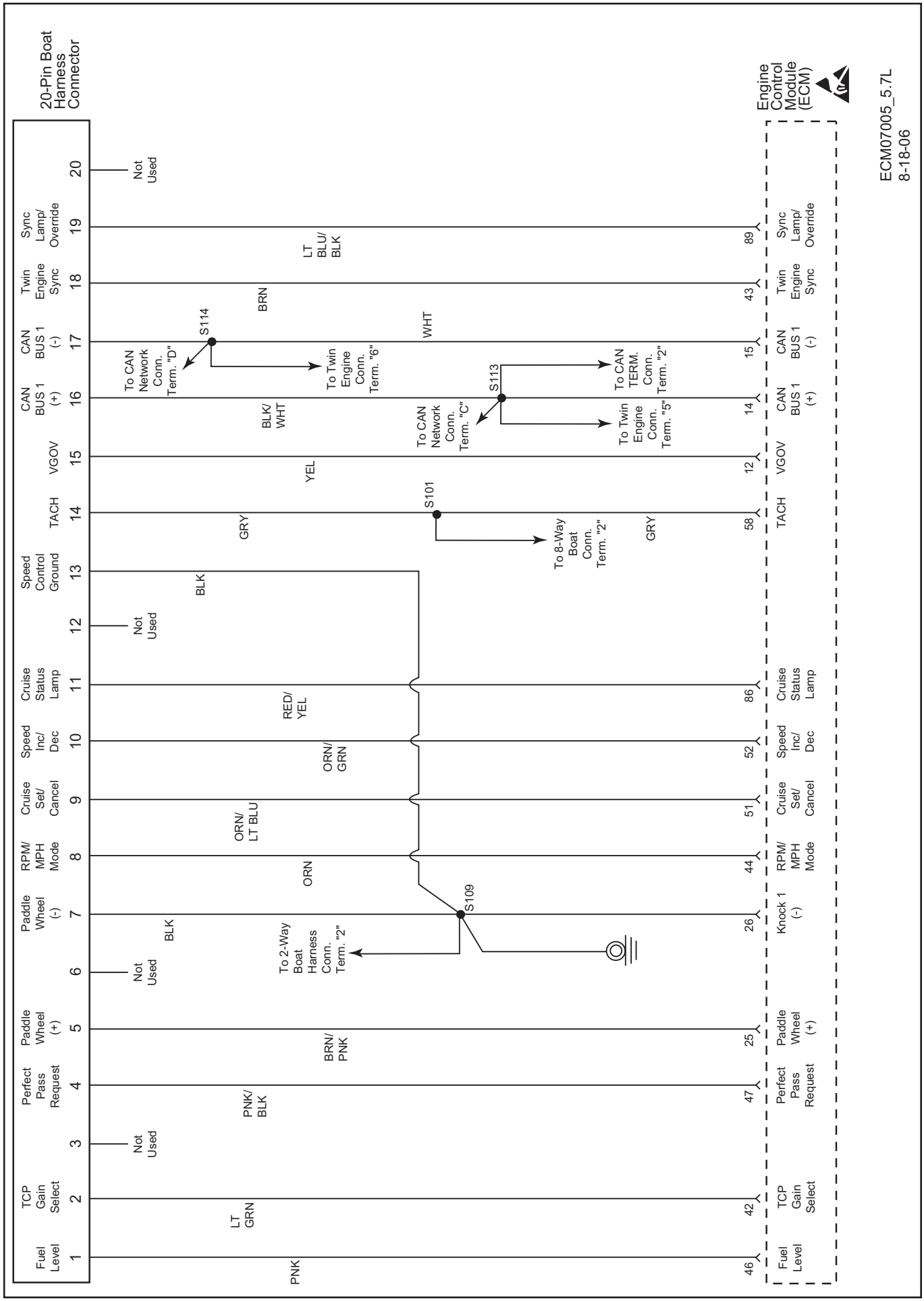



Engine Controls Wiring Schematics- 5.7L (3 of 10)
Engine Control Module (ECM)
54 Transmission Temp. Switch
81 ECM Ground
26 Paddlewheel (-)
28 Knock 1 (+)
30 Knock 2 (-)
69 ECM Ground
PPL\ WHT
BLK
Transmission Temp. Switch
To TCP Sensor Connector Term. "7"
To Neutral Safety Switch
To Ignition Module Connector Term. "C"
To FCC Connector Term. "B"
To L.P. Fuel Pump Connector Term. "2"
To Diagnostic Connector Term. "F"
To CAN Network Connector Term. "B"
To 2-Way Boat Harness Connector Term. "2"
To 20-Way Connector Term. "7"
To 20-Way Connector Term. "13"
To Fuel Tank Solenoid Conn. Term. "B"
S108
S109
S110
S126
Ground Stud
ECM07003_5.7L
8-18-06

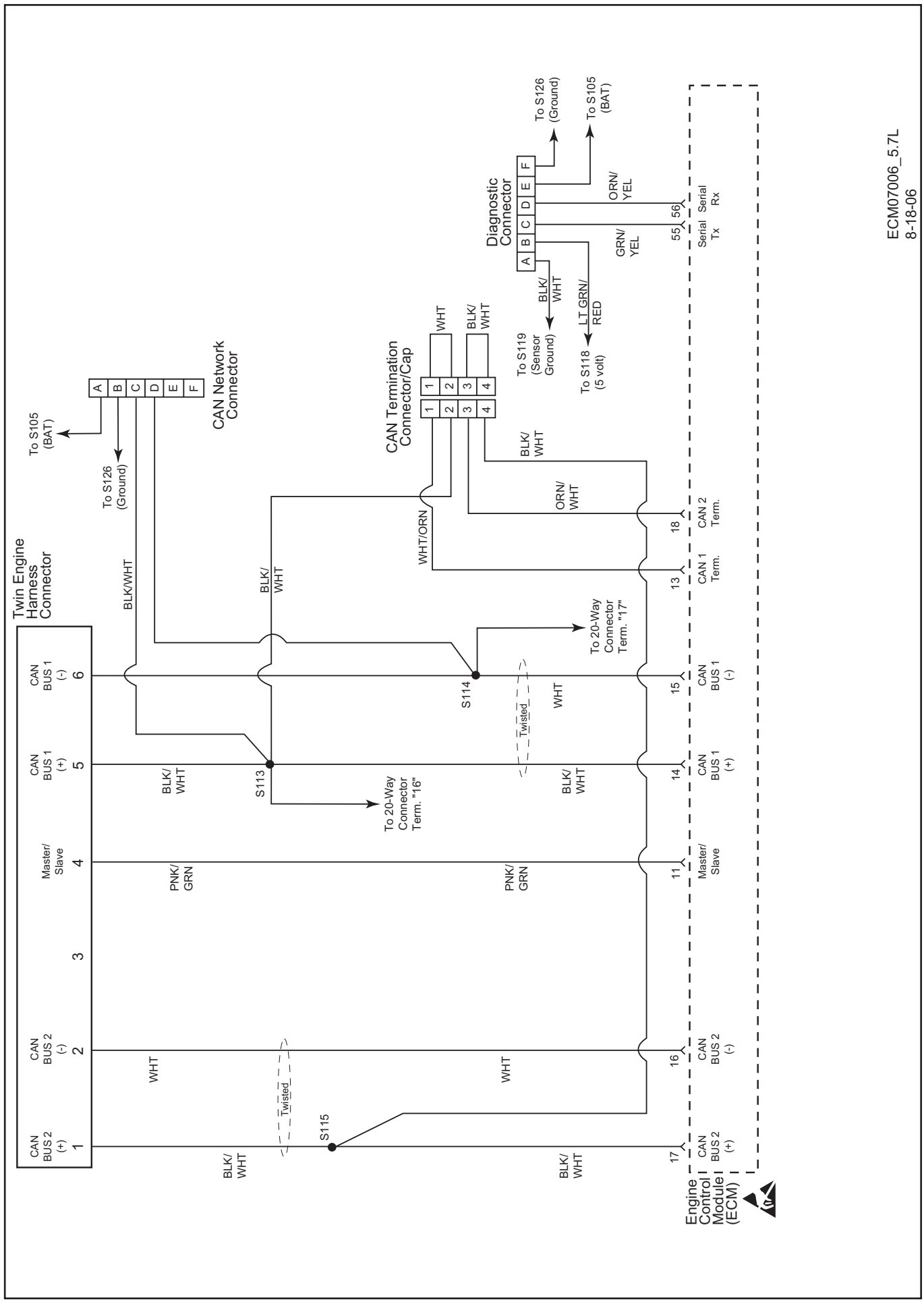
Engine Controls Wiring Schematics- 5.7L (4 of 10)

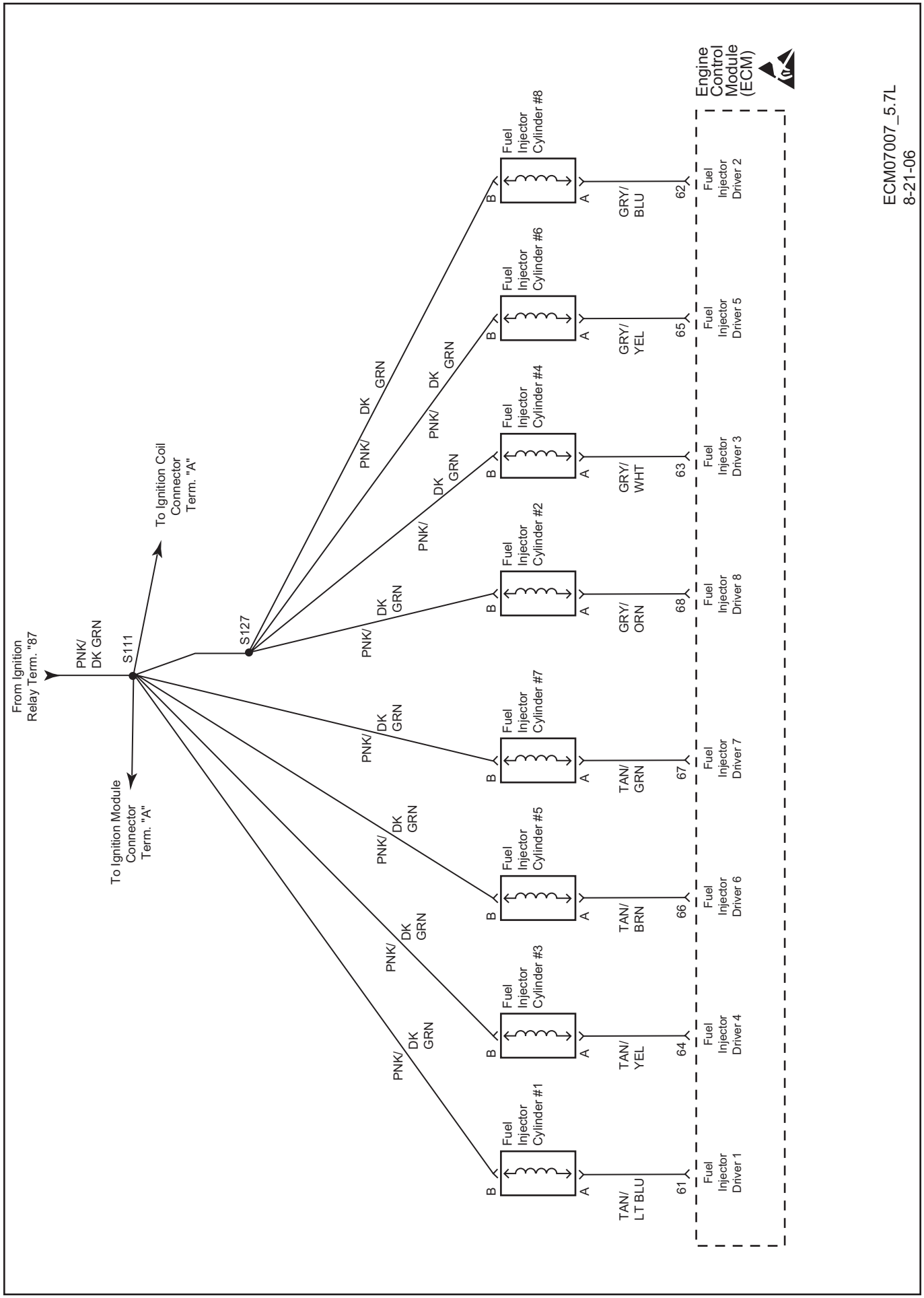


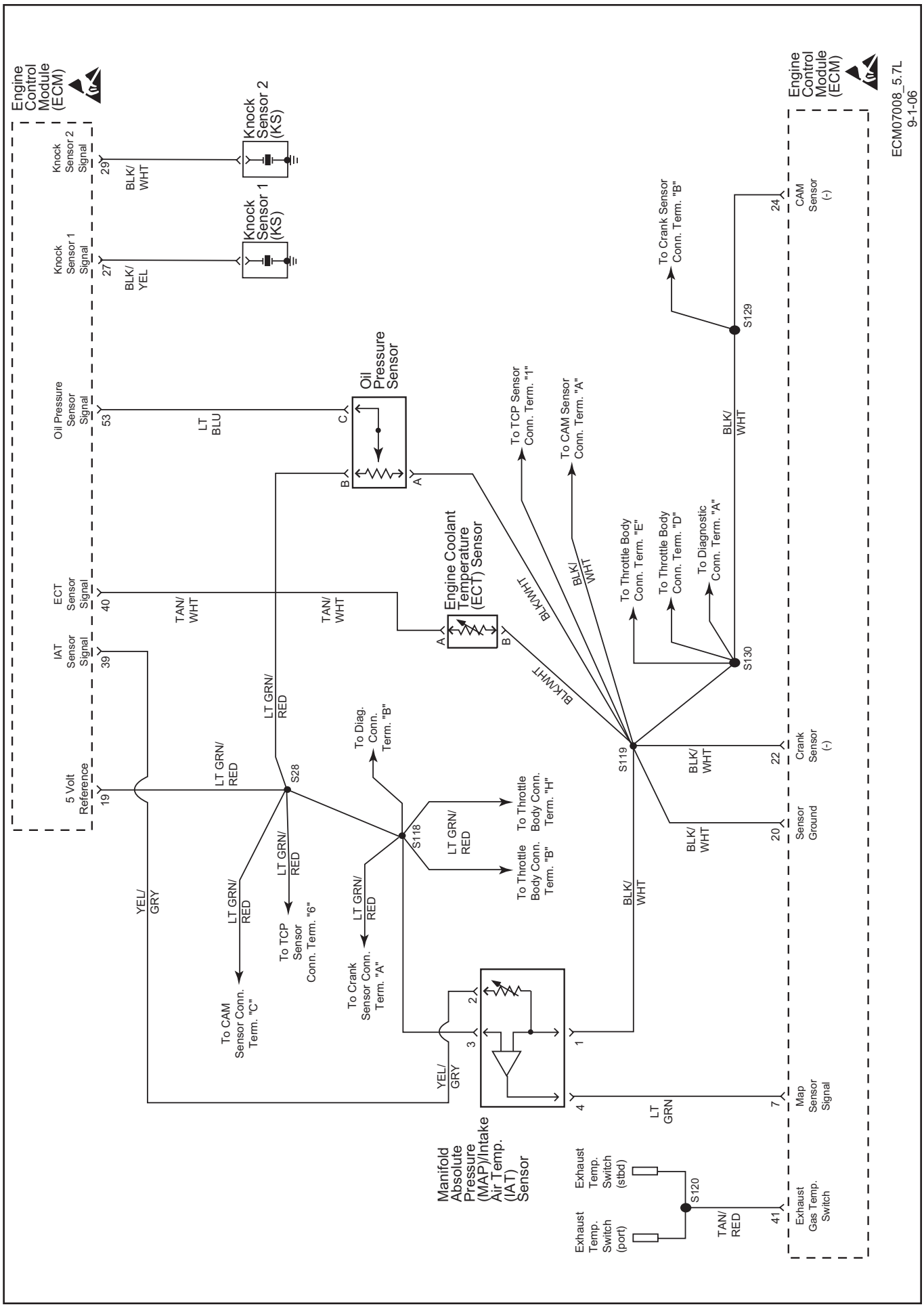
Engine Controls Wiring Schematics- 5.7L (5 of 10)

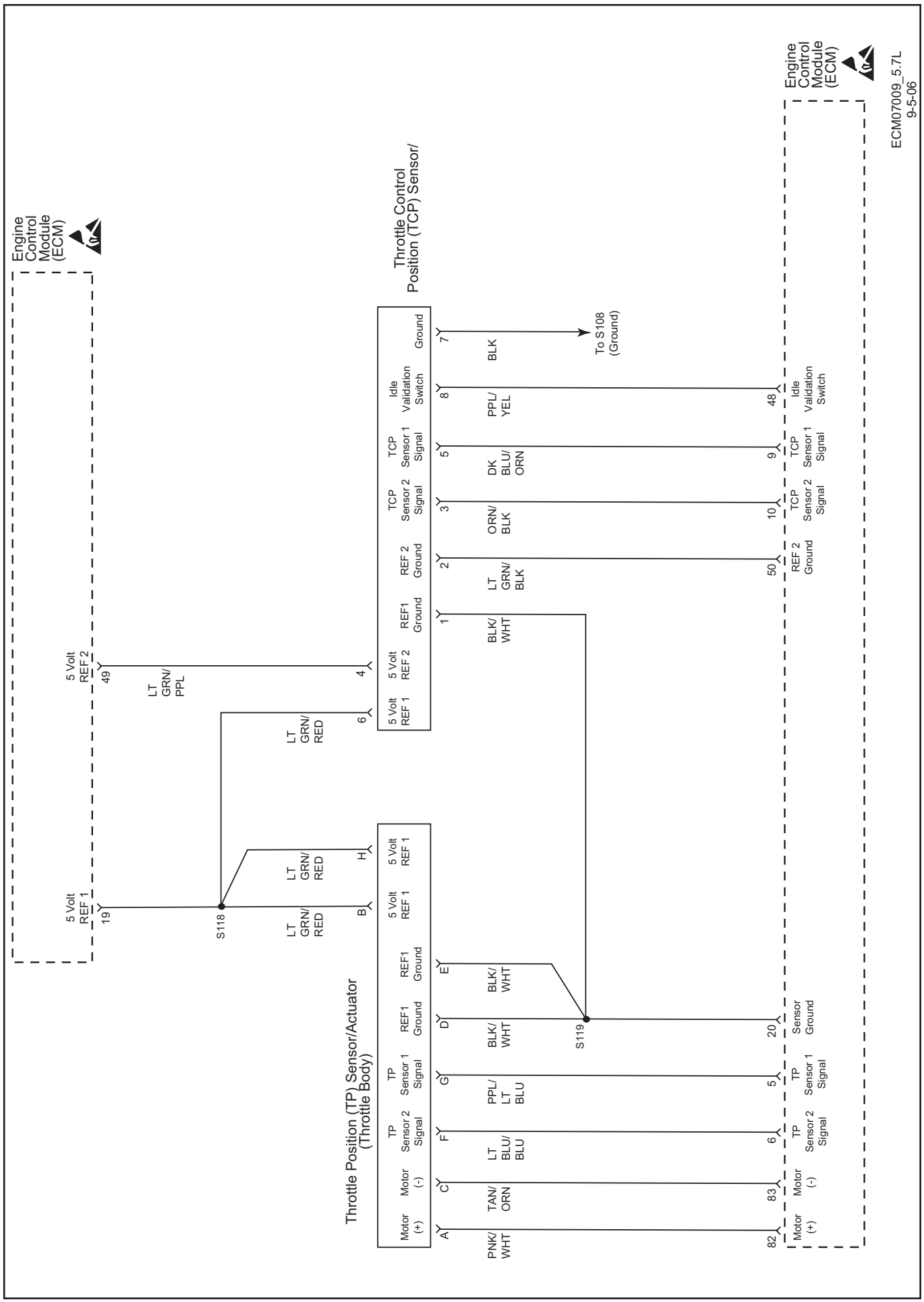


Engine Controls Wiring Schematics- 5.7L (6 of 10)

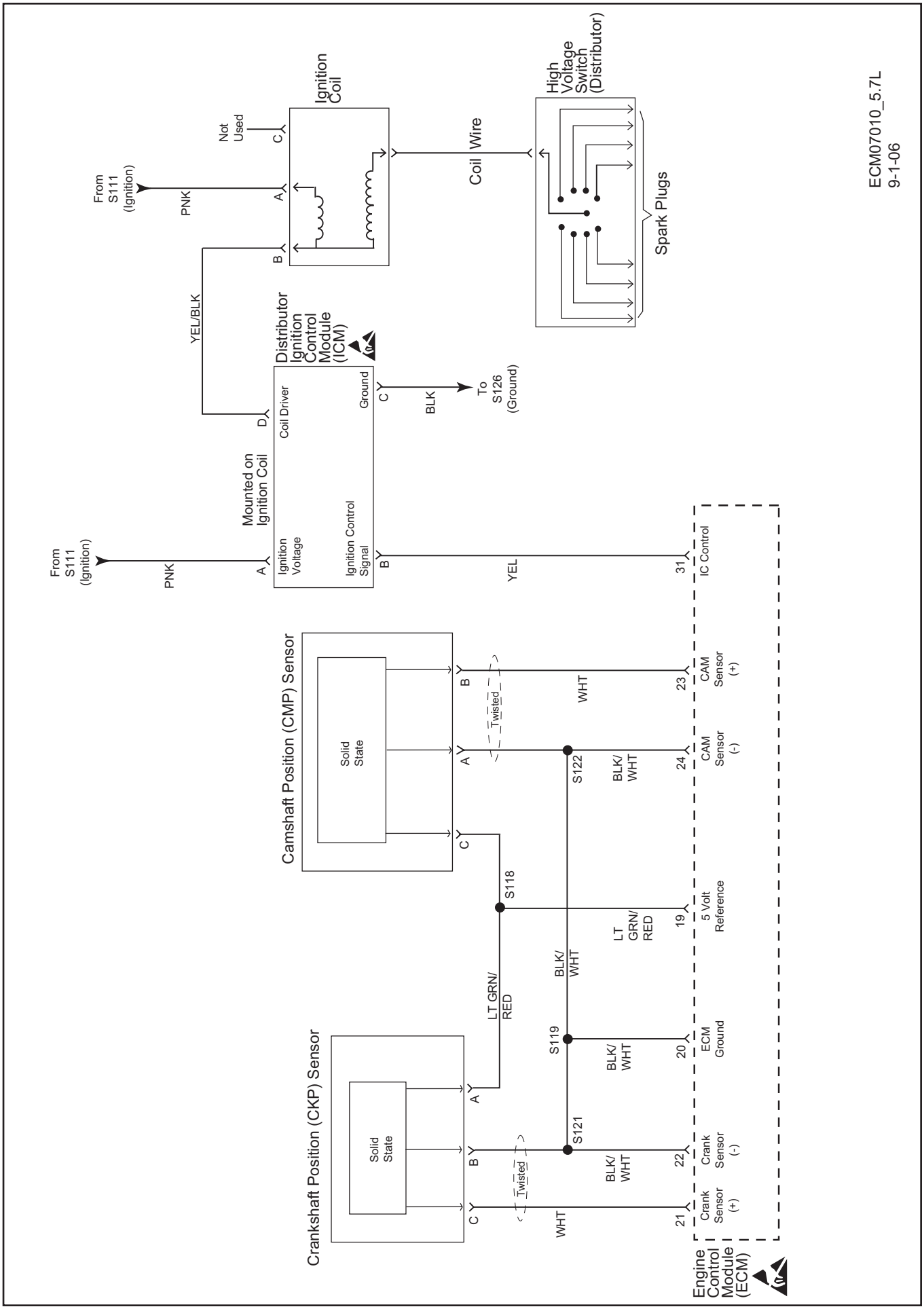


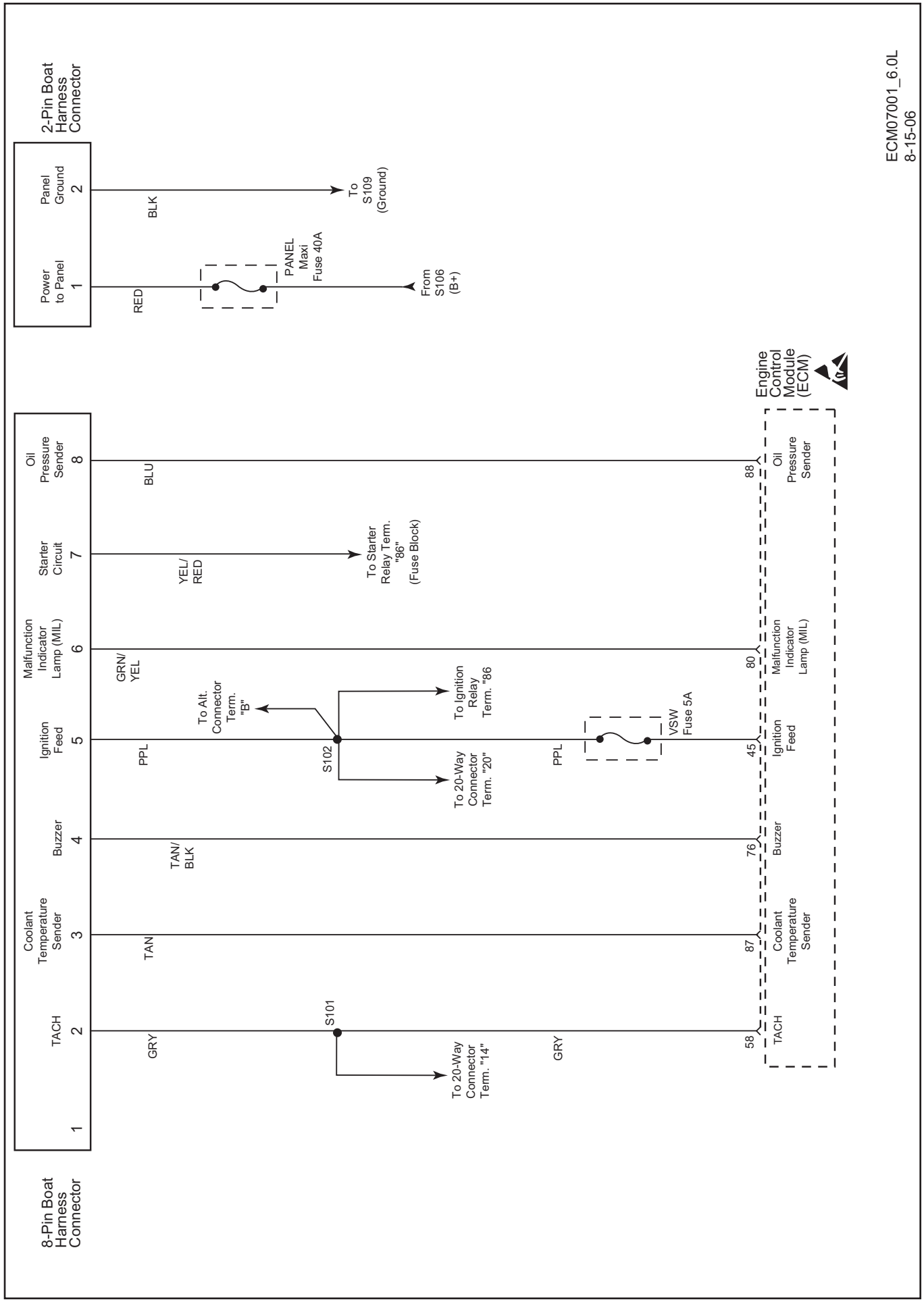

Engine Controls Wiring Schematics- 5.7L (7 of 10)
From Ignition Relay Term. "87
PNK/ DK GRN
S111
To Ignition Coil Connector Term. "A"
To Ignition Module Connector Term. "A"
S127
PNK/ DK GRN
Fuel Injector Cylinder #1
Fuel Injector Cylinder #3
Fuel Injector Cylinder #5
Fuel Injector Cylinder #7
Fuel Injector Cylinder #2
Fuel Injector Cylinder #4
Fuel Injector Cylinder #6
Fuel Injector Cylinder #8
TAN/ LT BLU
TAN/ YEL
TAN/ BRN
TAN/ GRN
GRY/ ORN
GRY/ WHT
GRY/ YEL
GRY/ BLU
61
64
66
67
68
63
65
62
Fuel Injector Driver 1
Fuel Injector Driver 4
Fuel Injector Driver 6
Fuel Injector Driver 7
Fuel Injector Driver 8
Fuel Injector Driver 3
Fuel Injector Driver 5
Fuel Injector Driver 2
Engine Control Module (ECM)
ECM07007_5.7L
8-21-06


Engine Controls Wiring Schematics- 5.7L (8 of 10)
Engine Control Module (ECM)
Knock Sensor 2 Signal
29
BLK/ WHT
Knock Sensor 2 (KS)
Knock Sensor 1 Signal
27
BLK/ YEL
Knock Sensor 1 (KS)
Oil Pressure Sensor Signal
53
LT BLU
Oil Pressure Sensor
ECT Sensor Signal
40
TAN/ WHT
Engine Coolant Temperature (ECT) Sensor
IAT Sensor Signal
39
5 Volt Reference
19
LT GRN/ RED
S28
YEL/ GRY
To CAM Sensor Conn. Term. "C"
To TCP Sensor Conn. Term. "6"
To Crank Sensor Conn. Term. "A"
To Diag. Conn. Term. "B"
S118
To Throttle Body Conn. Term. "B"
To Throttle Body Conn. Term. "H"
Manifold Absolute Pressure (MAP)/Intake Air Temp. (IAT) Sensor
Map Sensor Signal
4
LT GRN
Exhaust Temp. Switch (port)
Exhaust Temp. Switch (stbd)
S120
TAN/ RED
41
Exhaust Gas Temp. Switch
To TCP Sensor Conn. Term. "1"
To CAM Sensor Conn. Term. "A"
To Throttle Body Conn. Term. "E"
To Throttle Body Conn. Term. "D"
To Diagnostic Conn. Term. "A"
BLK/WHT
S130
S129
To Crank Sensor Conn. Term. "B"
S119
BLK/ WHT
22
Crank Sensor (-)
20
Sensor Ground
24
CAM Sensor (-)
ECM07008_5.7L
9-1-06

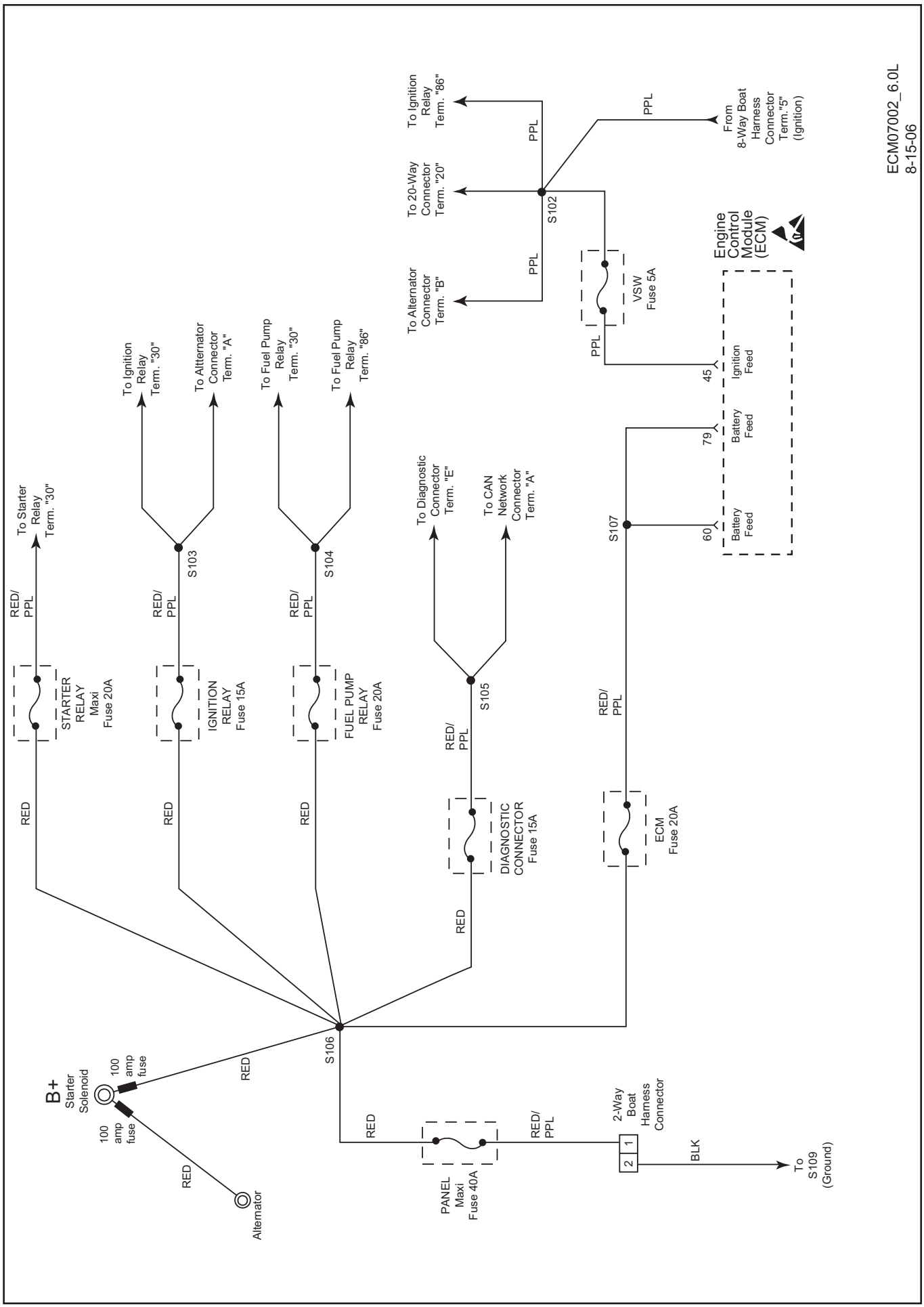

Engine Controls Wiring Schematics- 5.7L (9 of 10)
Engine Control Module (ECM)
5 Volt REF 1
19
5 Volt REF 2
49
LT GRN/ PPL
S118
LT GRN/ RED
LT GRN/ RED
B
H
LT GRN/ RED
6
4
Throttle Position (TP) Sensor/Actuator (Throttle Body)
Motor (+)
Motor (-)
TP Sensor 2 Signal
TP Sensor 1 Signal
REF1 Ground
5 Volt REF 1
A
C
F
G
D
E
PNK/ WHT
TAN/ ORN
LT BLU/ BLU
PPL/ LT BLU
BLK/ WHT
BLK/ WHT
S119
82
83
6
5
20
Throttle Control Position (TCP) Sensor/
5 Volt REF 1
5 Volt REF 2
REF1 Ground
REF 2 Ground
TCP Sensor 2 Signal
TCP Sensor 1 Signal
Idle Validation Switch
Ground
1
2
3
5
8
7
BLK/ WHT
LT GRN/ BLK
ORN/ BLK
DK BLU/ ORN
PPL/ YEL
BLK
To S108 (Ground)
50
10
9
48
Engine Control Module (ECM)
Motor (+)
Motor (-)
TP Sensor 2 Signal
TP Sensor 1 Signal
Sensor Ground
REF 2 Ground
TCP Sensor 2 Signal
TCP Sensor 1 Signal
Idle Validation Switch
ECM07009_5.7L
9-5-06

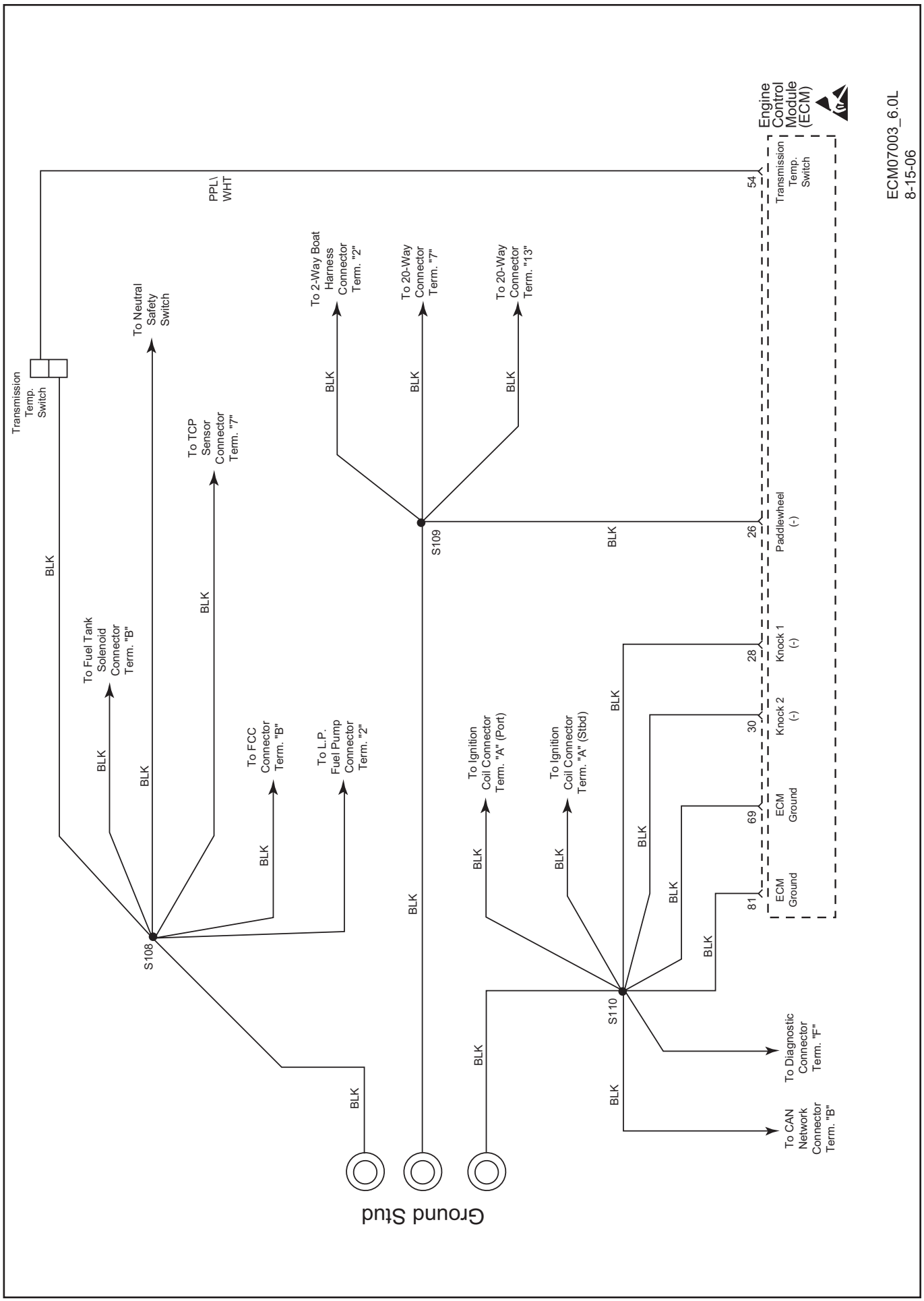
Engine Controls Wiring Schematics- 5.7L (10 of 10)

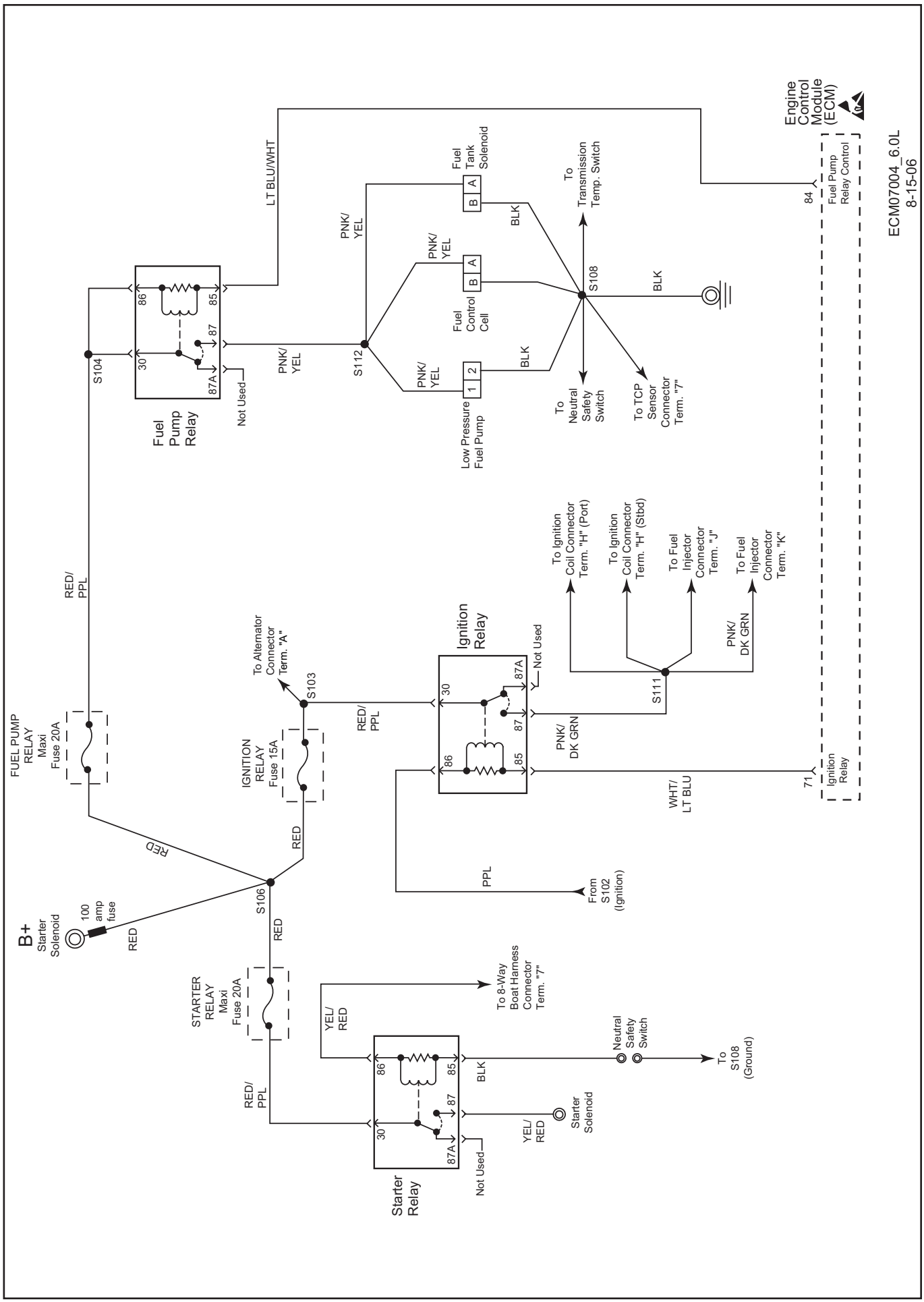



Engine Controls Wiring Schematics- 6.0L (1 of 15)
8-Pin Boat Harness Connector
1 TACH
2 Coolant Temperature Sender
3 Buzzer
4 Ignition Feed
5 Malfunction Indicator Lamp (MIL)
6 Starter Circuit
7 Oil Pressure Sender
8
GRY
TAN
TAN/ BLK
PPL
GRN/ YEL
YEL/ RED
BLU
S101
S102
To 20-Way Connector Term. "14"
To Alt. Connector Term. "B"
To 20-Way Connector Term. "20"
To Ignition Relay Term. "86
To Starter Relay Term. "86" (Fuse Block)
2-Pin Boat Harness Connector
1 Power to Panel
2 Panel Ground
RED
BLK
PANEL Maxi Fuse 40A
VSW Fuse 5A
From S106 (B+)
To S109 (Ground)
Engine Control Module (ECM)
58 TACH
87 Coolant Temperature Sender
76 Buzzer
45 Ignition Feed
80 Malfunction Indicator Lamp (MIL)
88 Oil Pressure Sender
ECM07001_6.0L
8-15-06

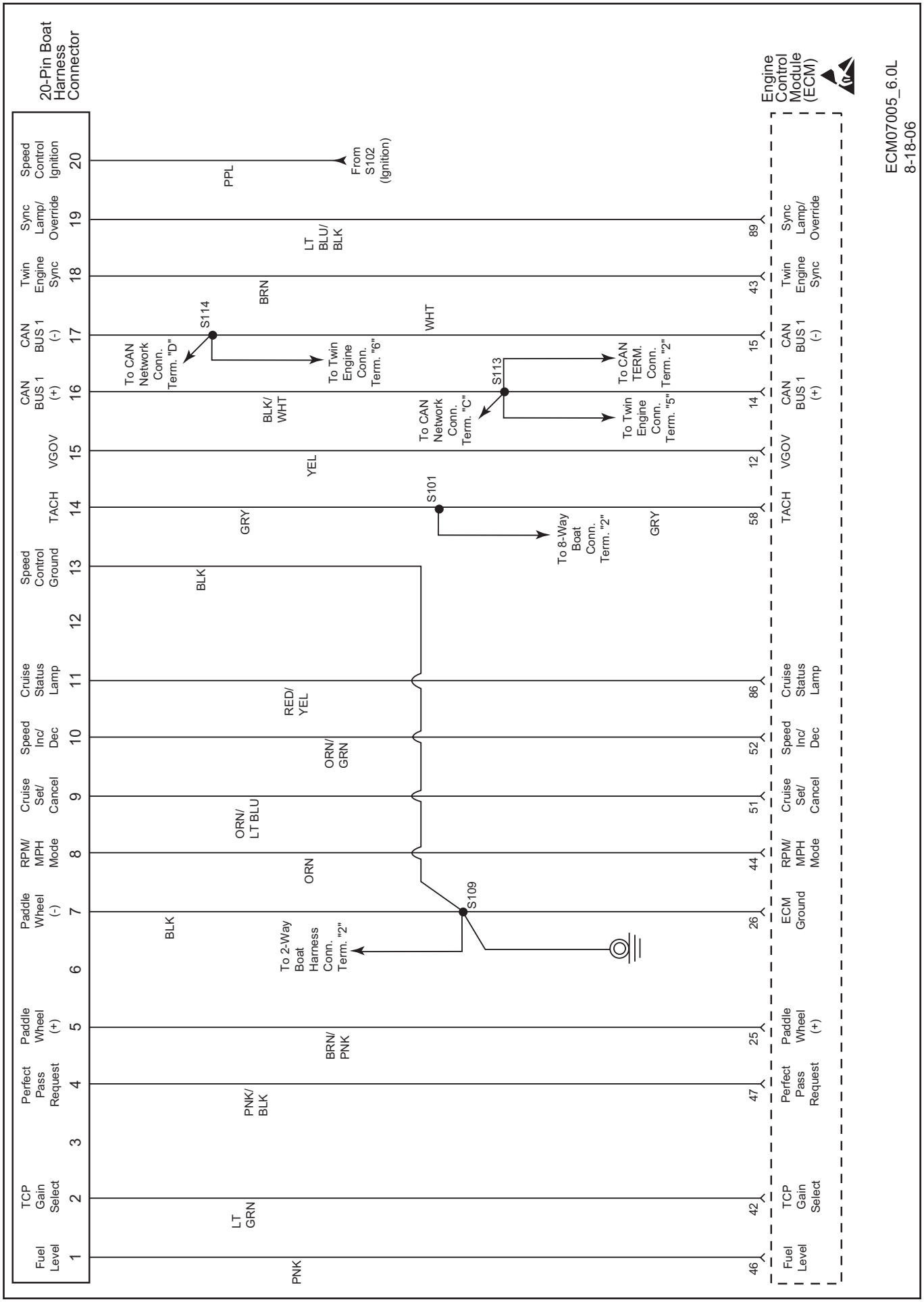
Engine Controls Wiring Schematics- 6.0L (2 of 15)



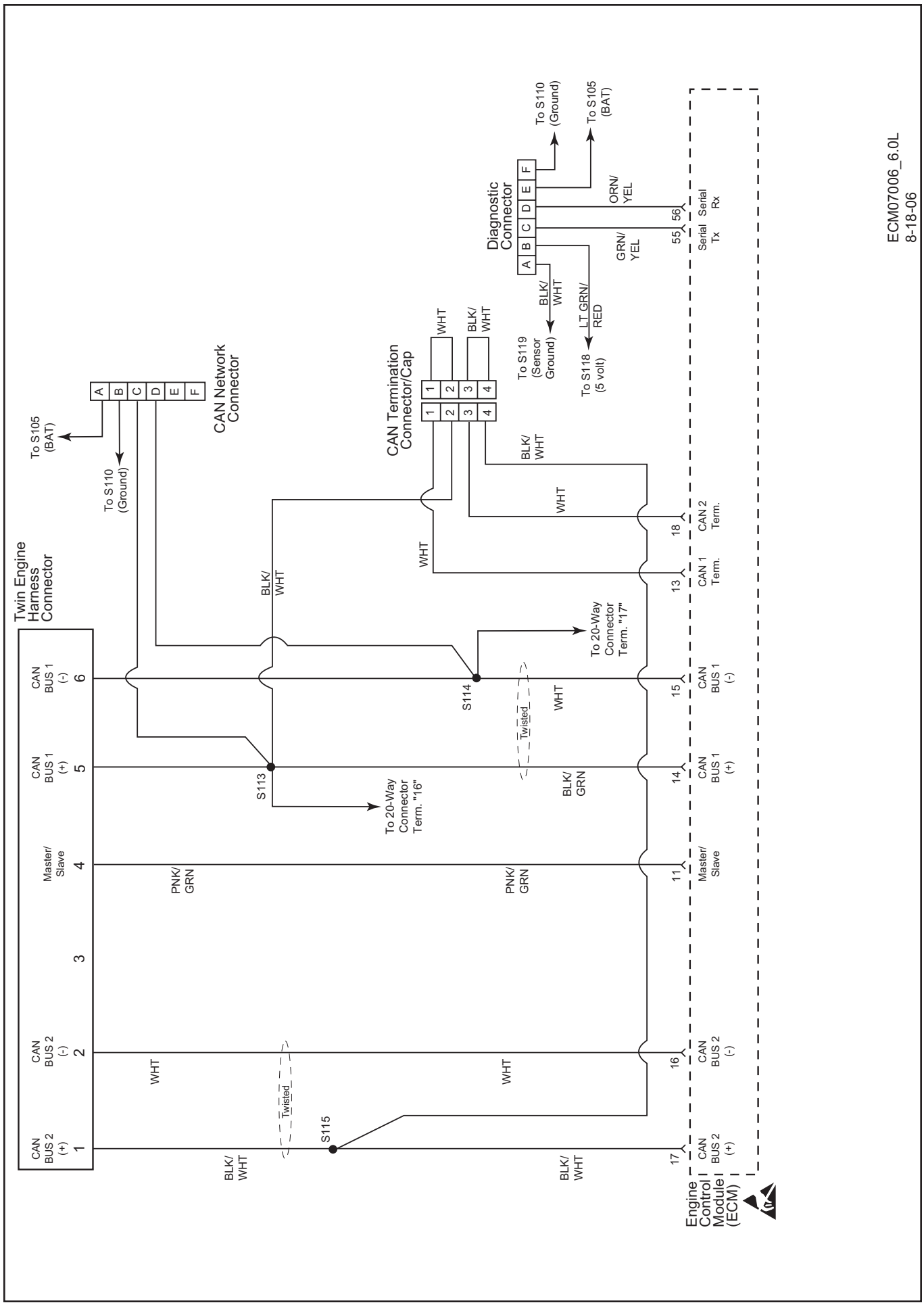

Engine Controls Wiring Schematics- 6.0L (3 of 15)
Engine Control Module (ECM)
ECM07003_6.0L
8-15-06
Transmission Temp. Switch
54
PPL\ WHT
To Neutral Safety Switch
To 2-Way Boat Harness Connector Term. "2"
To 20-Way Connector Term. "7"
To 20-Way Connector Term. "13"
To TCP Sensor Connector Term. "7"
BLK
S109
26
Paddlewheel (-)
To Fuel Tank Solenoid Connector Term. "B"
To FCC Connector Term. "B"
To L.P. Fuel Pump Connector Term. "2"
S108
28
Knock 1 (-)
30
Knock 2 (-)
69
ECM Ground
81
ECM Ground
To Ignition Coil Connector Term. "A" (Port)
To Ignition Coil Connector Term. "A" (Stbd)
S110
To Diagnostic Connector Term. "F"
To CAN Network Connector Term. "B"
Ground Stud

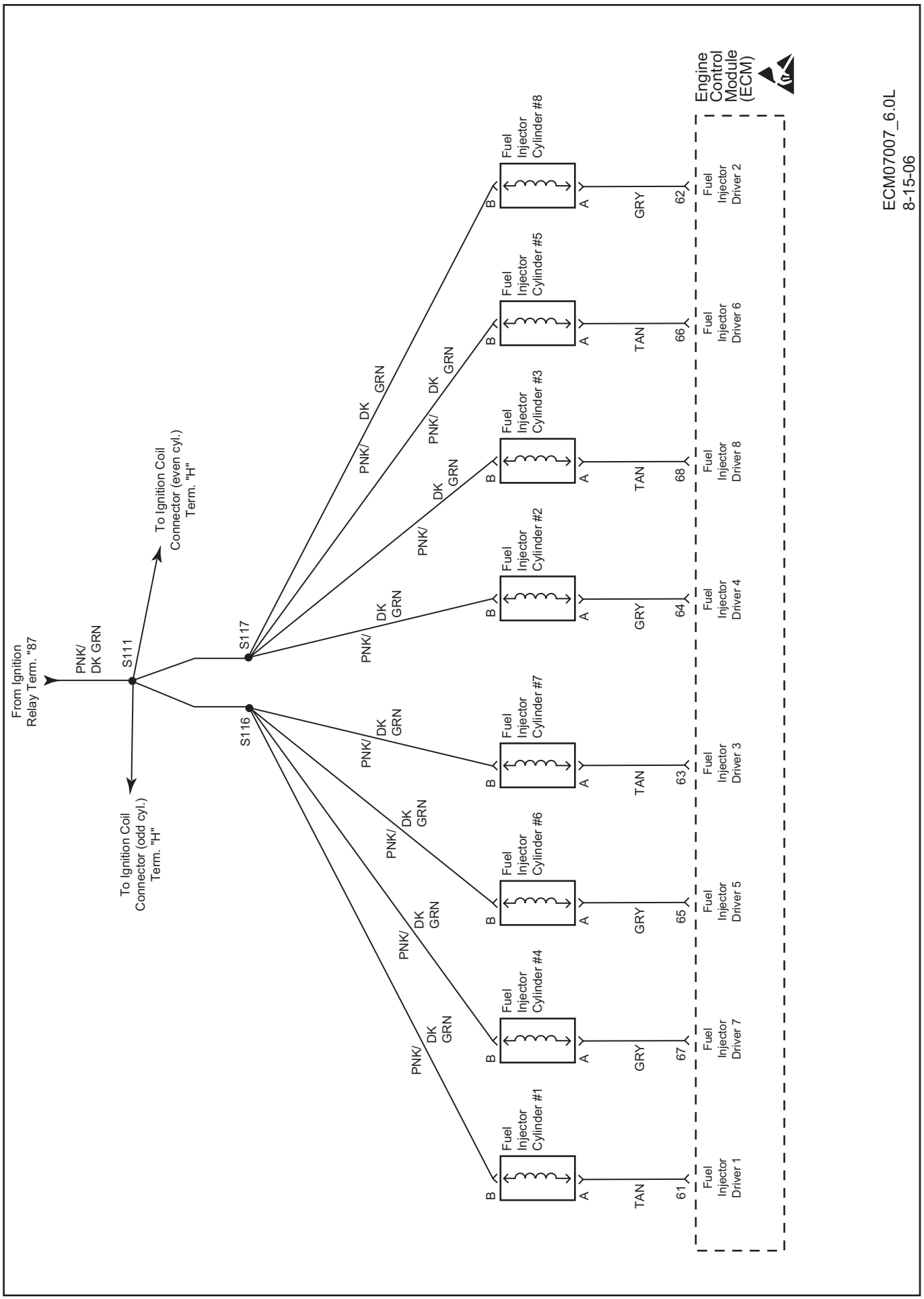

Engine Controls Wiring Schematics- 6.0L (4 of 15)
Engine Control Module (ECM)
ECM07004_6.0L 8-15-06
Fuel Pump Relay Control
84
Ignition Relay
71
LT BLU/WHT
Fuel Pump Relay
86
85
87
30
87A
Not Used
S104
PNK/YEL
S112
Fuel Tank Solenoid
Fuel Control Cell
Low Pressure Fuel Pump
B
A
1
2
BLK
S108
To Transmission Temp. Switch
To Neutral Safety Switch
To TCP Sensor Connector Term. "7"
RED/PPL
FUEL PUMP RELAY Maxi Fuse 20A
IGNITION RELAY Fuse 15A
RED
S106
B+
Starter Solenoid
100 amp fuse
To Alternator Connector Term. "A"
S103
Ignition Relay
PNK/DK GRN
S111
To Ignition Coil Connector Term. "H" (Port)
To Ignition Coil Connector Term. "H" (Stbd)
To Fuel Injector Connector Term. "J"
To Fuel Injector Connector Term. "K"
WHT/LT BLU
PPL
From S102 (Ignition)
STARTER RELAY Maxi Fuse 20A
YEL/RED
To 8-Way Boat Harness Connector Term. "7"
Neutral Safety Switch
To S108 (Ground)
Starter Relay
Starter Solenoid

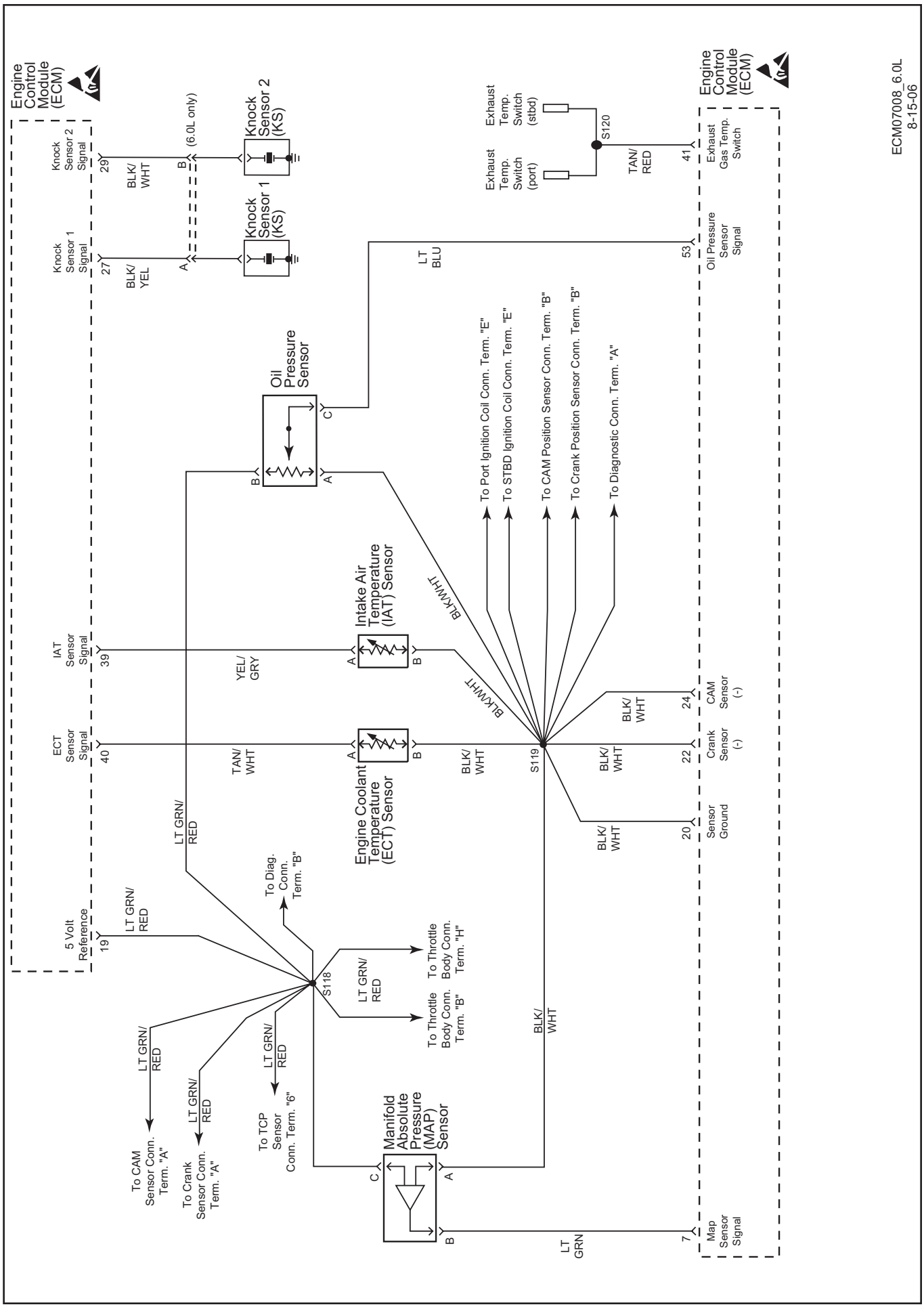
Engine Controls Wiring Schematics- 6.0L (5 of 15)

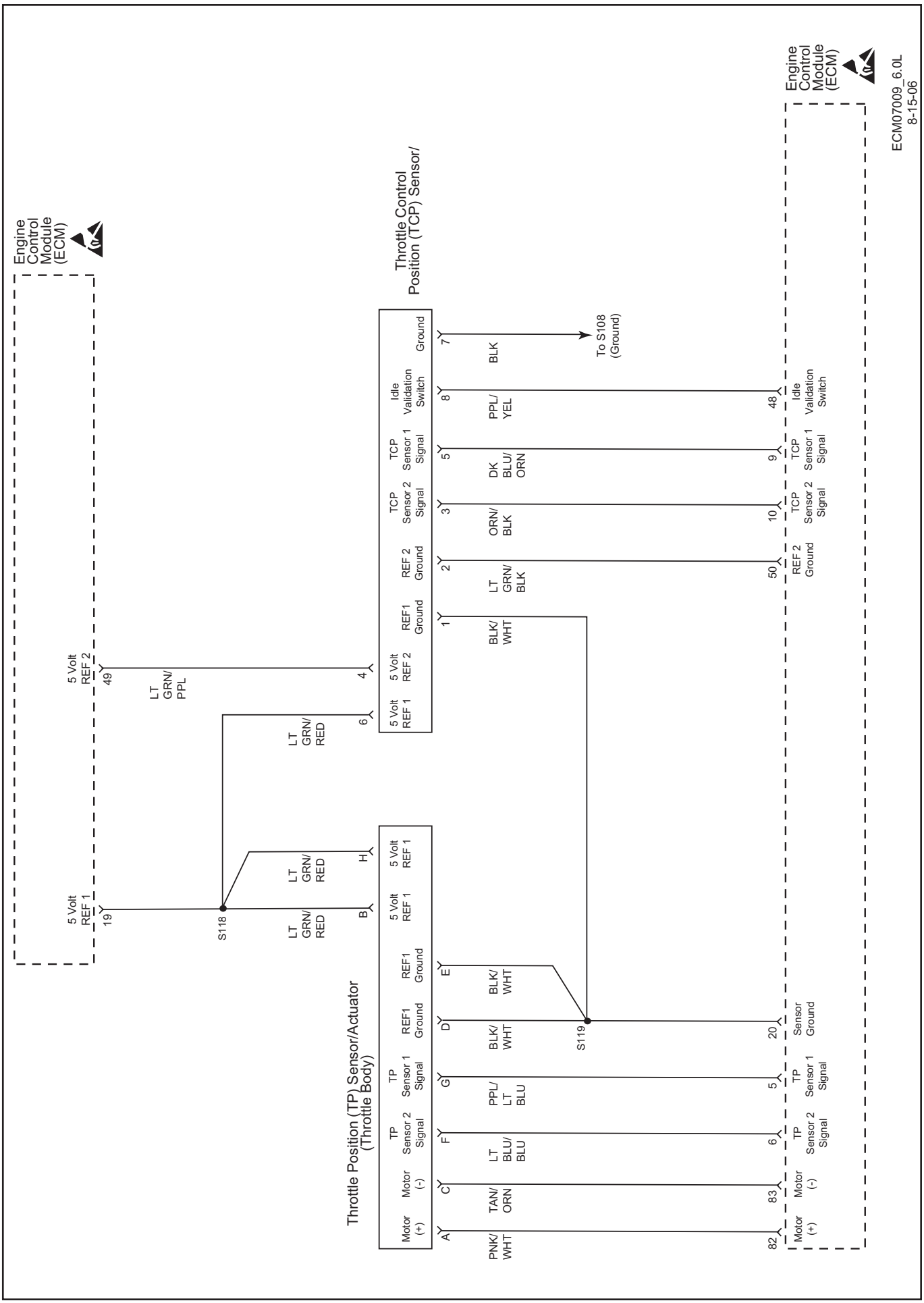


Engine Controls Wiring Schematics- 6.0L (6 of 15)

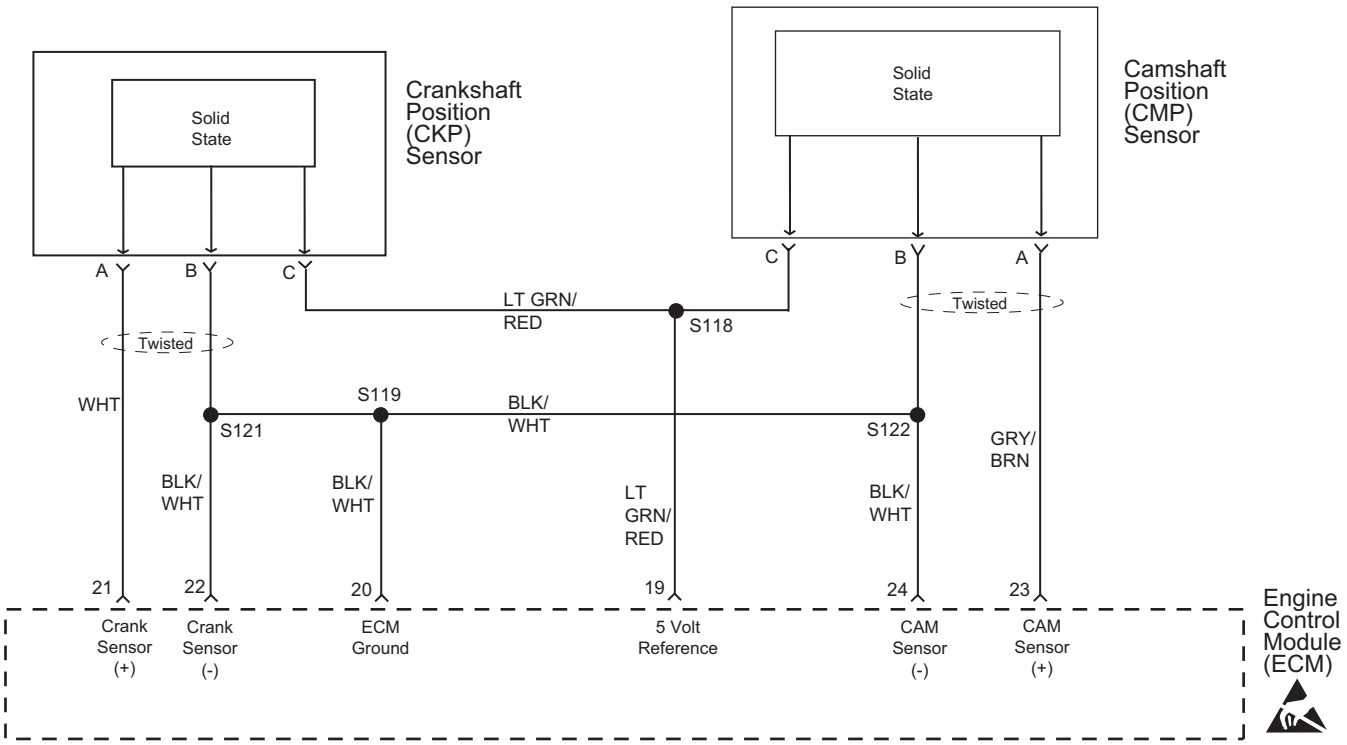



Engine Controls Wiring Schematics- 6.0L (7 of 15)
From Ignition Relay Term. "87
PNK/ DK GRN
S111
To Ignition Coil Connector (odd cyl.) Term. "H"
To Ignition Coil Connector (even cyl.) Term. "H"
S116
S117
PNK/ DK GRN
Fuel Injector Cylinder #1
Fuel Injector Cylinder #2
Fuel Injector Cylinder #3
Fuel Injector Cylinder #4
Fuel Injector Cylinder #5
Fuel Injector Cylinder #6
Fuel Injector Cylinder #7
Fuel Injector Cylinder #8
B
A
TAN
GRY
61
62
63
64
65
66
67
68
Fuel Injector Driver 1
Fuel Injector Driver 2
Fuel Injector Driver 3
Fuel Injector Driver 4
Fuel Injector Driver 5
Fuel Injector Driver 6
Fuel Injector Driver 7
Fuel Injector Driver 8
Engine Control Module (ECM)
ECM07007_6.0L
8-15-06


Engine Controls Wiring Schematics- 6.0L (8 of 15)
Engine Control Module (ECM)
Knock Sensor 2 Signal
29
BLK/ WHT
(6.0L only)
Knock Sensor 2 (KS)
Knock Sensor 1 Signal
27
BLK/ YEL
Knock Sensor 1 (KS)
Exhaust Temp. Switch (port)
Exhaust Temp. Switch (stbd)
S120
TAN/ RED
41
Exhaust Gas Temp. Switch
Oil Pressure Sensor
LT BLU
53
Oil Pressure Sensor Signal
To Port Ignition Coil Conn. Term. "E"
To STBD Ignition Coil Conn. Term. "E"
To CAM Position Sensor Conn. Term. "B"
To Crank Position Sensor Conn. Term. "B"
To Diagnostic Conn. Term. "A"
BLK/WHT
IAT Sensor Signal
39
YEL/ GRY
Intake Air Temperature (IAT) Sensor
ECT Sensor Signal
40
TAN/ WHT
Engine Coolant Temperature (ECT) Sensor
BLK/ WHT
S119
24
CAM Sensor (-)
22
Crank Sensor (-)
20
Sensor Ground
5 Volt Reference
19
LT GRN/ RED
To Diag. Conn. Term. "B"
S118
To Throttle Body Conn. Term. "H"
To Throttle Body Conn. Term. "B"
To CAM Sensor Conn. Term. "A"
To Crank Sensor Conn. Term. "A"
To TCP Sensor Conn. Term. "6"
Manifold Absolute Pressure (MAP) Sensor
LT GRN
7
Map Sensor Signal
Engine Control Module (ECM)
ECM07008_6.0L
8-15-06

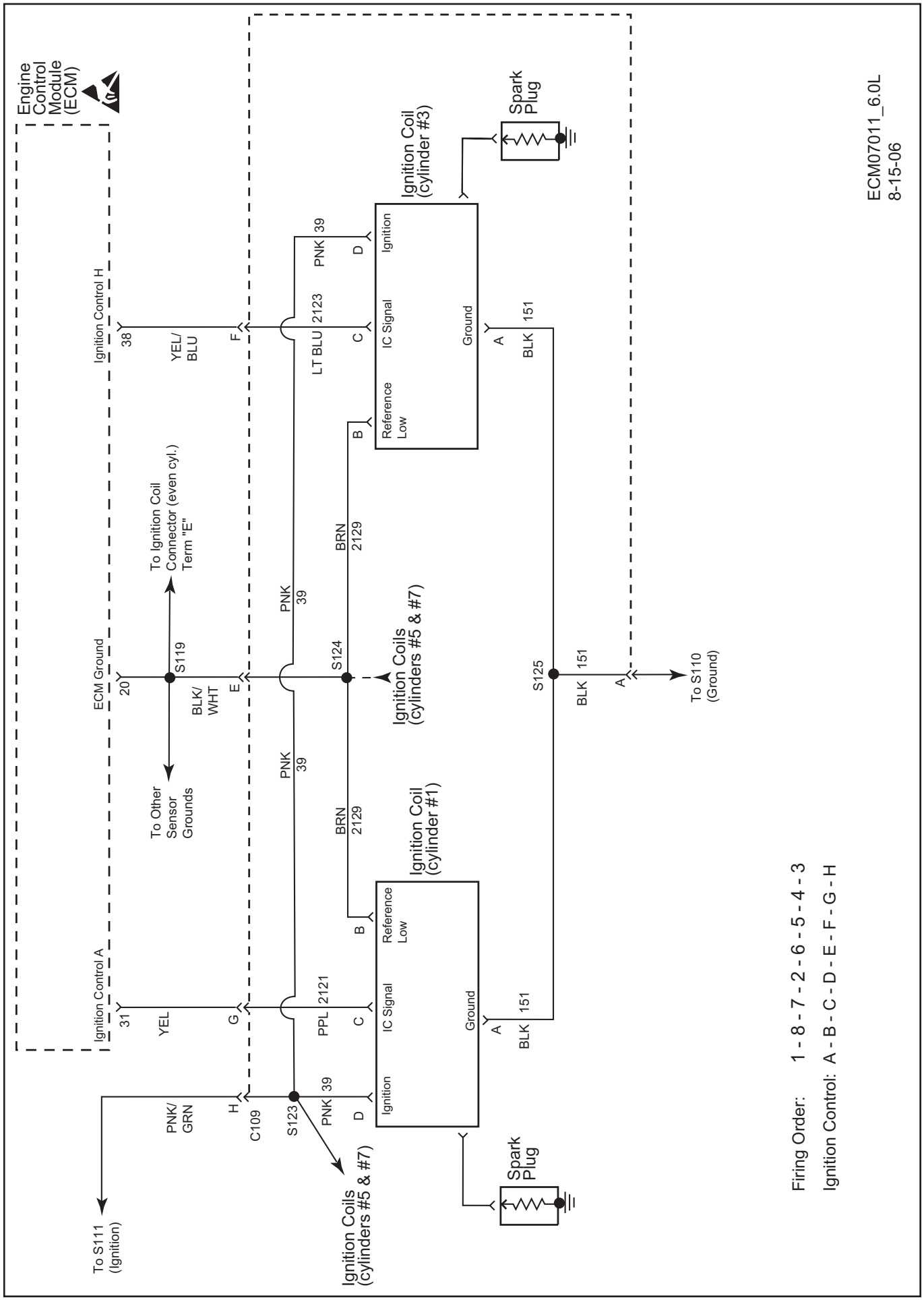

Engine Controls Wiring Schematics- 6.0L (9 of 15)
Engine Control Module (ECM)
5 Volt REF 1
19
5 Volt REF 2
49
S118
LT GRN/ RED
LT GRN/ PPL
Throttle Position (TP) Sensor/Actuator (Throttle Body)
Motor (+)
Motor (-)
TP Sensor 2 Signal
TP Sensor 1 Signal
REF1 Ground
5 Volt REF 1
A
C
F
G
D
E
H
B
PNK/ WHT
TAN/ ORN
LT BLU/ BLU
PPL/ LT BLU
BLK/ WHT
S119
Throttle Control Position (TCP) Sensor/
5 Volt REF 1
5 Volt REF 2
REF1 Ground
REF 2 Ground
TCP Sensor 2 Signal
TCP Sensor 1 Signal
Idle Validation Switch
Ground
1
2
3
5
8
7
4
6
LT GRN/ BLK
ORN/ BLK
DK BLU/ ORN
PPL/ YEL
BLK
To S108 (Ground)
82
83
6
5
20
50
10
9
48
Sensor Ground
ECM07009_6.0L
8-15-06

Engine Controls Wiring Schematics- 6.0L (10 of 15)

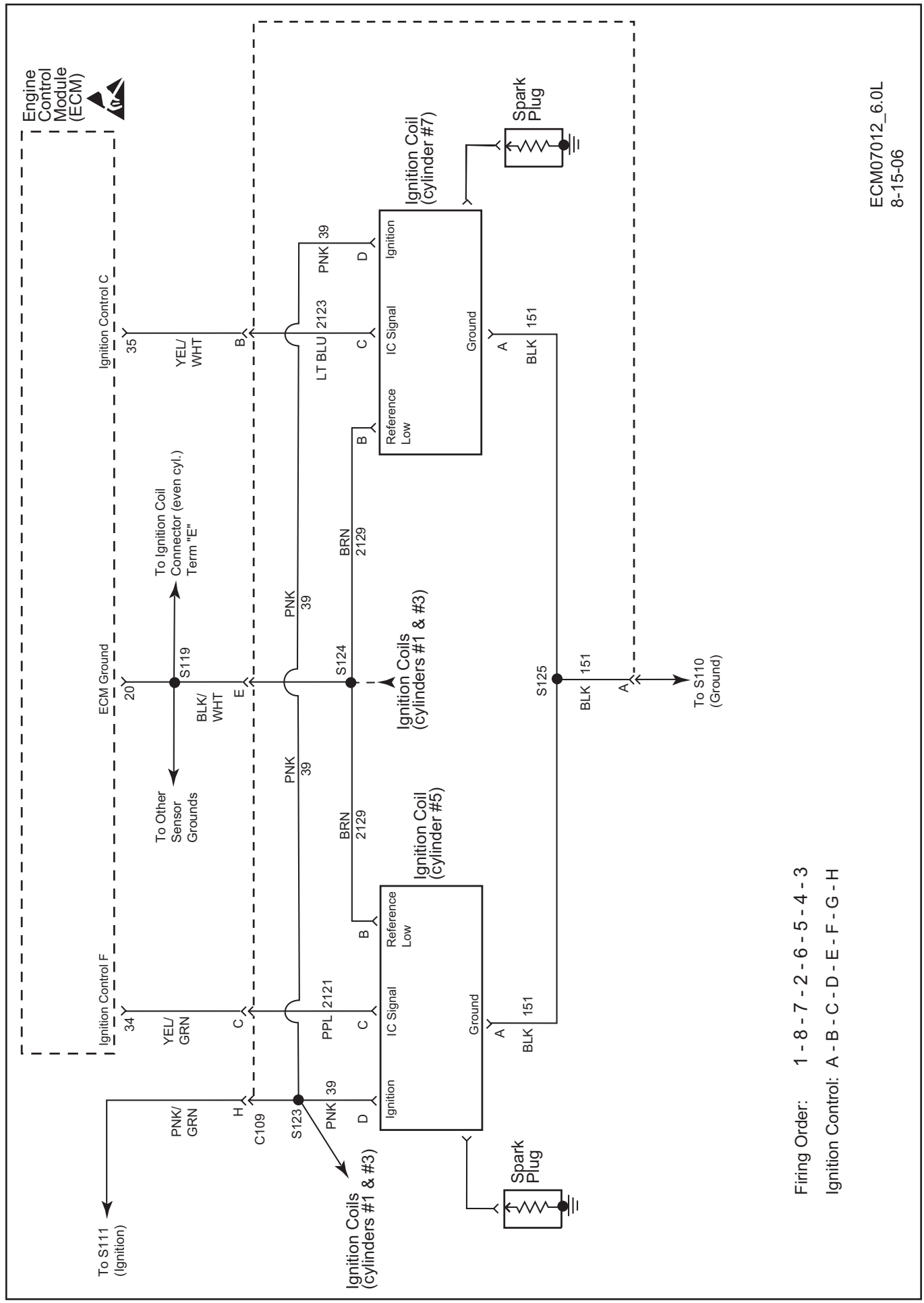


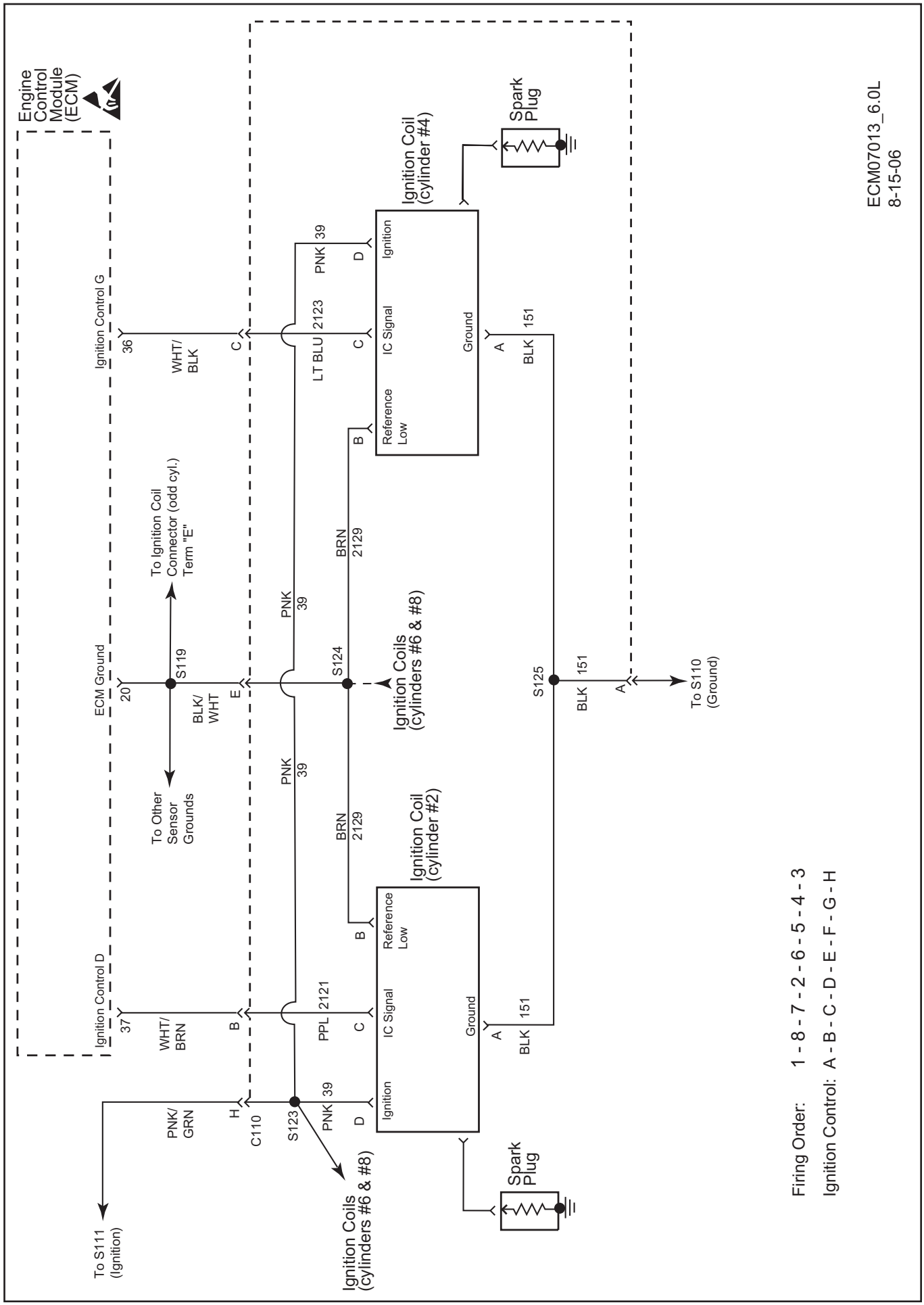
6.0L Engine

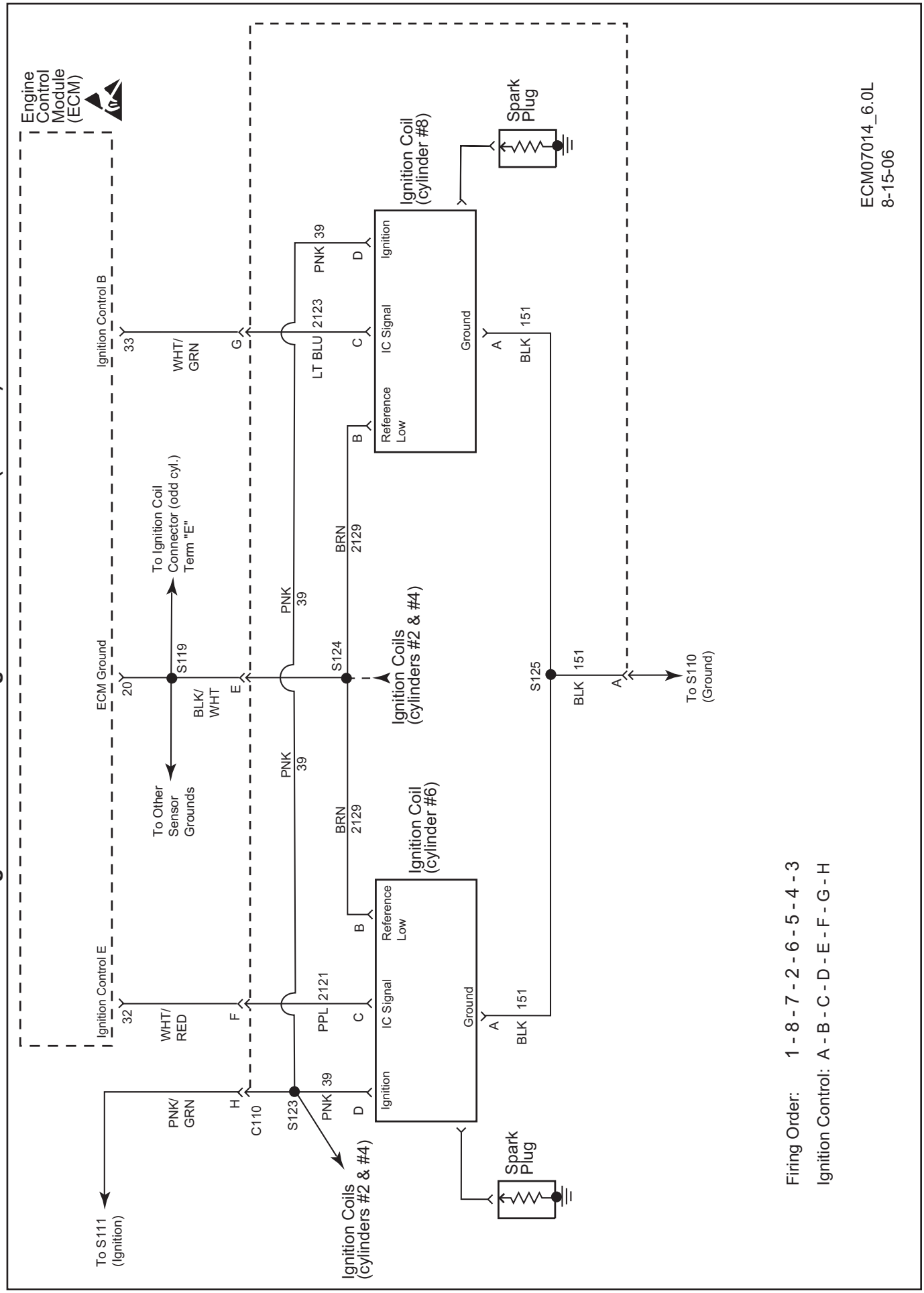
ECM07010_6.0L
8-2-06


Engine Controls Wiring Schematics- 6.0L (11 of 15)
Engine Control Module (ECM)
Ignition Control H
38
YEL/ BLU
F
Ignition Control A
31
YEL
G
ECM Ground
20
BLK/ WHT
E
S119
To Ignition Coil Connector (even cyl.) Term "E"
To Other Sensor Grounds
PNK/ GRN
H
C109
S123
To S111 (Ignition)
PNK 39
D
PPL 2121
C
B
Reference Low
IC Signal
Ignition
Ground
A
BLK 151
Ignition Coil (cylinder #1)
Ignition Coils (cylinders #5 & #7)
BRN 2129
PNK 39
S124
LT BLU 2123
Ignition Coil (cylinder #3)
Spark Plug
S125
BLK 151
To S110 (Ground)
ECM07011_6.0L
8-15-06
Firing Order: 1 - 8 - 7 - 2 - 6 - 5 - 4 - 3
Ignition Control: A - B - C - D - E - F - G - H

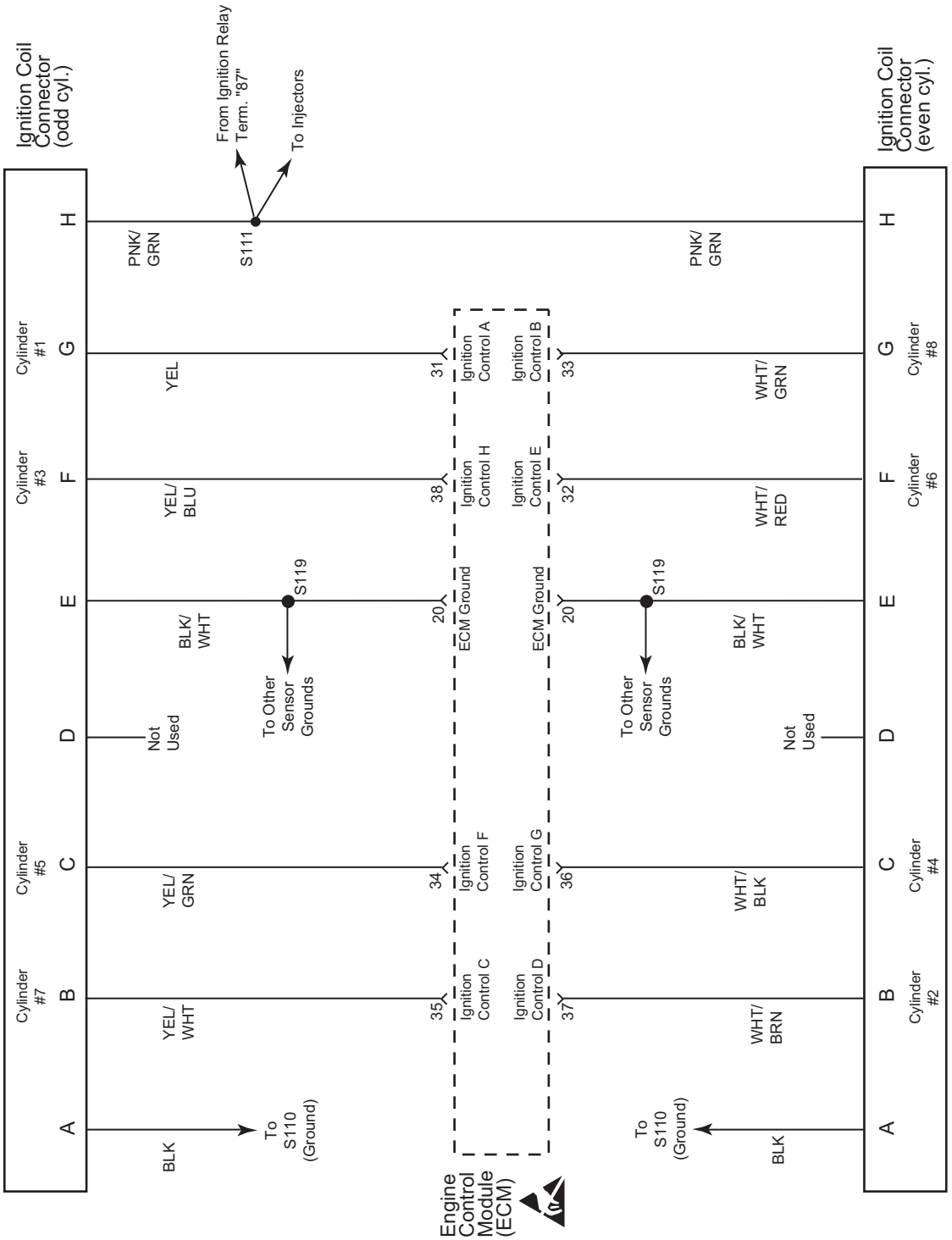
Engine Controls Wiring Schematics- 6.0L (12 of 15)




Engine Controls Wiring Schematics- 6.0L (13 of 15)
Engine Control Module (ECM)
Ignition Control G
Ignition Control D
ECM Ground
36
37
20
WHT/ BLK
WHT/ BRN
BLK/ WHT
C
B
E
To Ignition Coil Connector (odd cyl.) Term "E"
S119
To Other Sensor Grounds
PNK 39
BRN 2129
PPL 2121
LT BLU 2123
S124
S123
S125
Ignition Coils (cylinders #6 & #8)
Ignition Coil (cylinder #2)
Ignition Coil (cylinder #4)
Ignition
IC Signal
Reference Low
Ground
B
C
D
A
BLK 151
PNK/ GRN
H
C110
To S111 (Ignition)
To S110 (Ground)
Spark Plug
ECM07013_6.0L
8-15-06
Firing Order: 1 - 8 - 7 - 2 - 6 - 5 - 4 - 3
Ignition Control: A - B - C - D - E - F - G - H

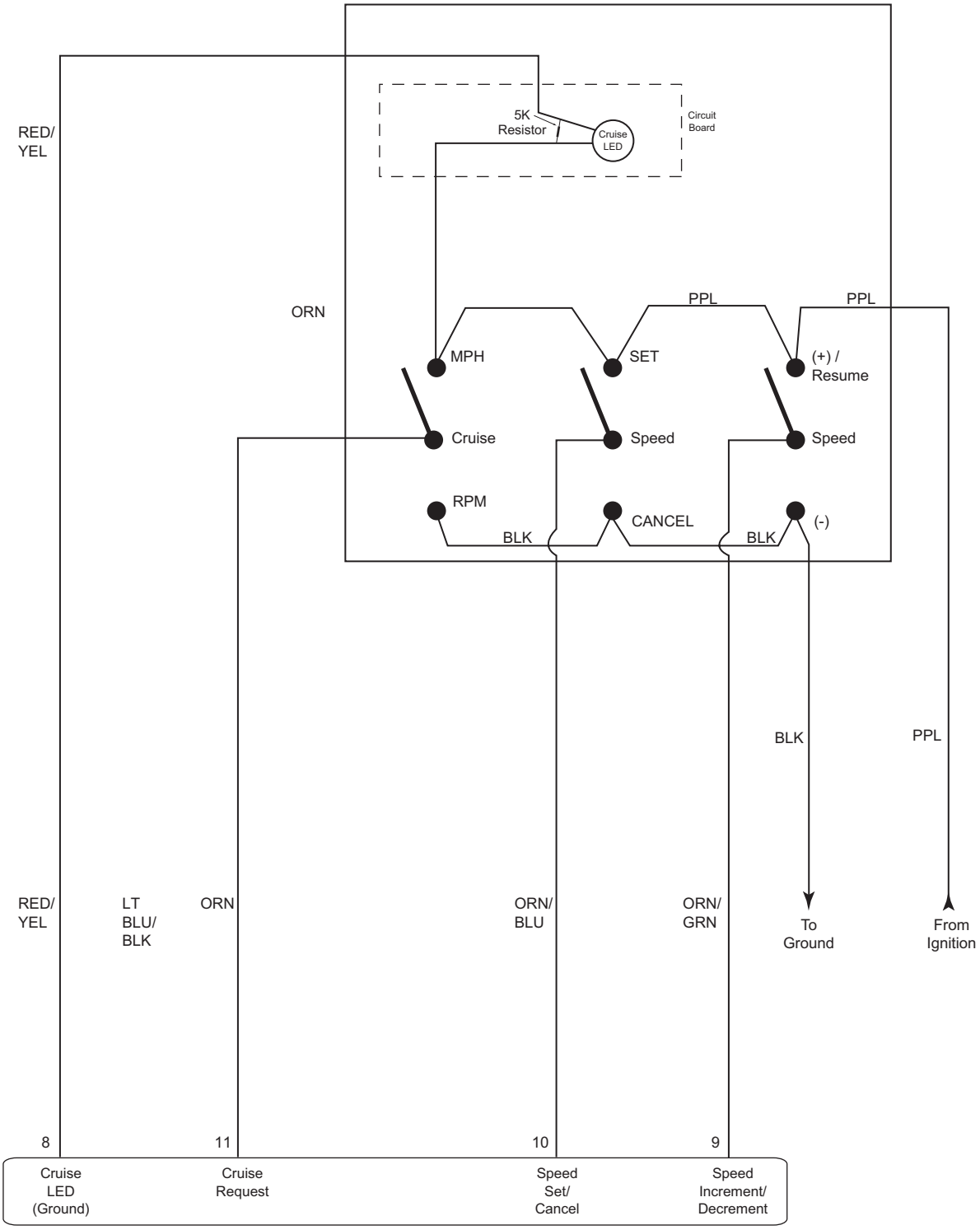

Engine Controls Wiring Schematics- 6.0L (14 of 15)
Engine Control Module (ECM)
Ignition Control B
Ignition Control E
ECM Ground
33
32
20
WHT/ GRN
WHT/ RED
BLK/ WHT
PNK/ GRN
G
F
E
H
C110
S119
S123
S124
S125
To Ignition Coil Connector (odd cyl.) Term "E"
To Other Sensor Grounds
To S111 (Ignition)
To S110 (Ground)
PNK 39
BRN 2129
PPL 2121
LT BLU 2123
BLK 151
Ignition Coil (cylinder #8)
Ignition Coil (cylinder #6)
Ignition Coils (cylinders #2 & #4)
Ignition Coils (cylinders #2 & #4)
Ignition
IC Signal
Reference Low
Ground
Spark Plug
Spark Plug
ECM07014_6.0L
8-15-06
Firing Order: 1 - 8 - 7 - 2 - 6 - 5 - 4 - 3
Ignition Control: A - B - C - D - E - F - G - H

Engine Controls Wiring Schematics- 6.0L (15 of 15)



ECM07015_6.0L
8-15-06

PCM Basic Cruise Switch Panel (RA152008)



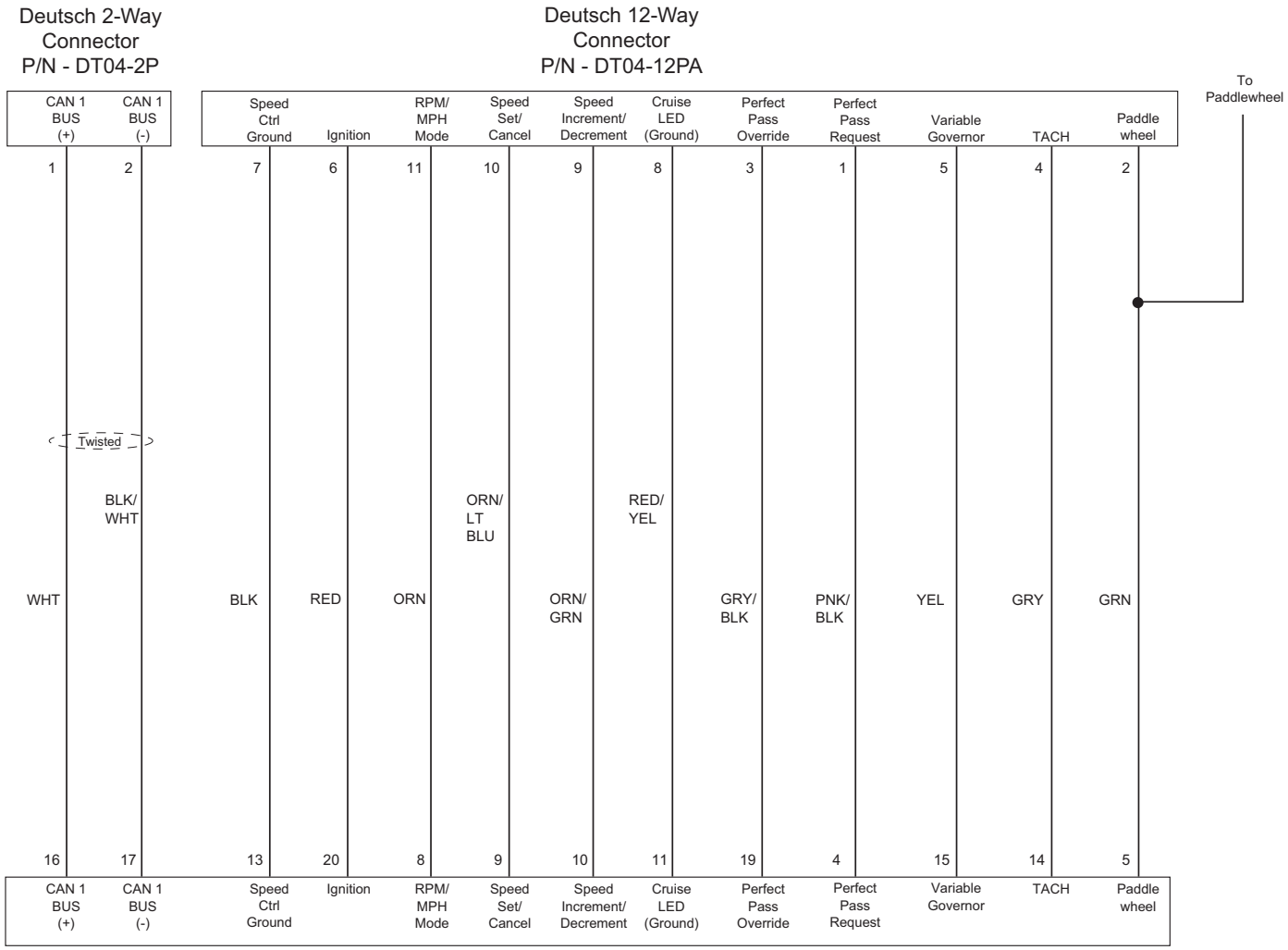
Deutsch 12-Way Connector
P/N - DT06-12S

Note: Panel 12-Way connector plugs directly into the following PCM supplied Boat Speed Control Harness:
RA121091B

***See the following pages for schematics of these harnesses.

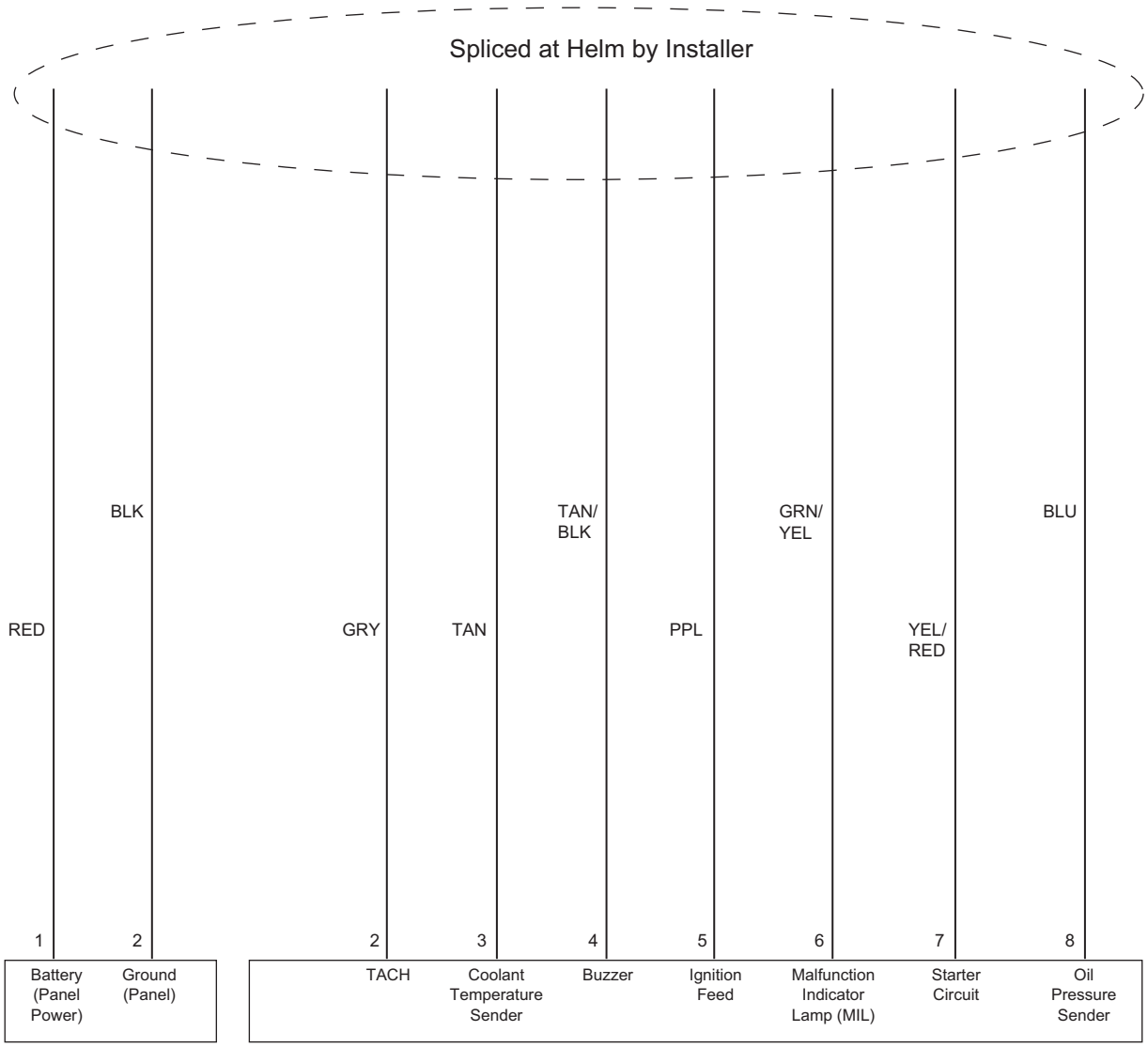
RA152008
10-2-06

PCM supplied Boat Speed Control Harness
RA121091B = 14 ft



RA121091B
9-28-06

PCM supplied Boat Extension Harnesses
RA121092 = 25 ft
***Extension harnesses are used to connect engine wiring to the helm.



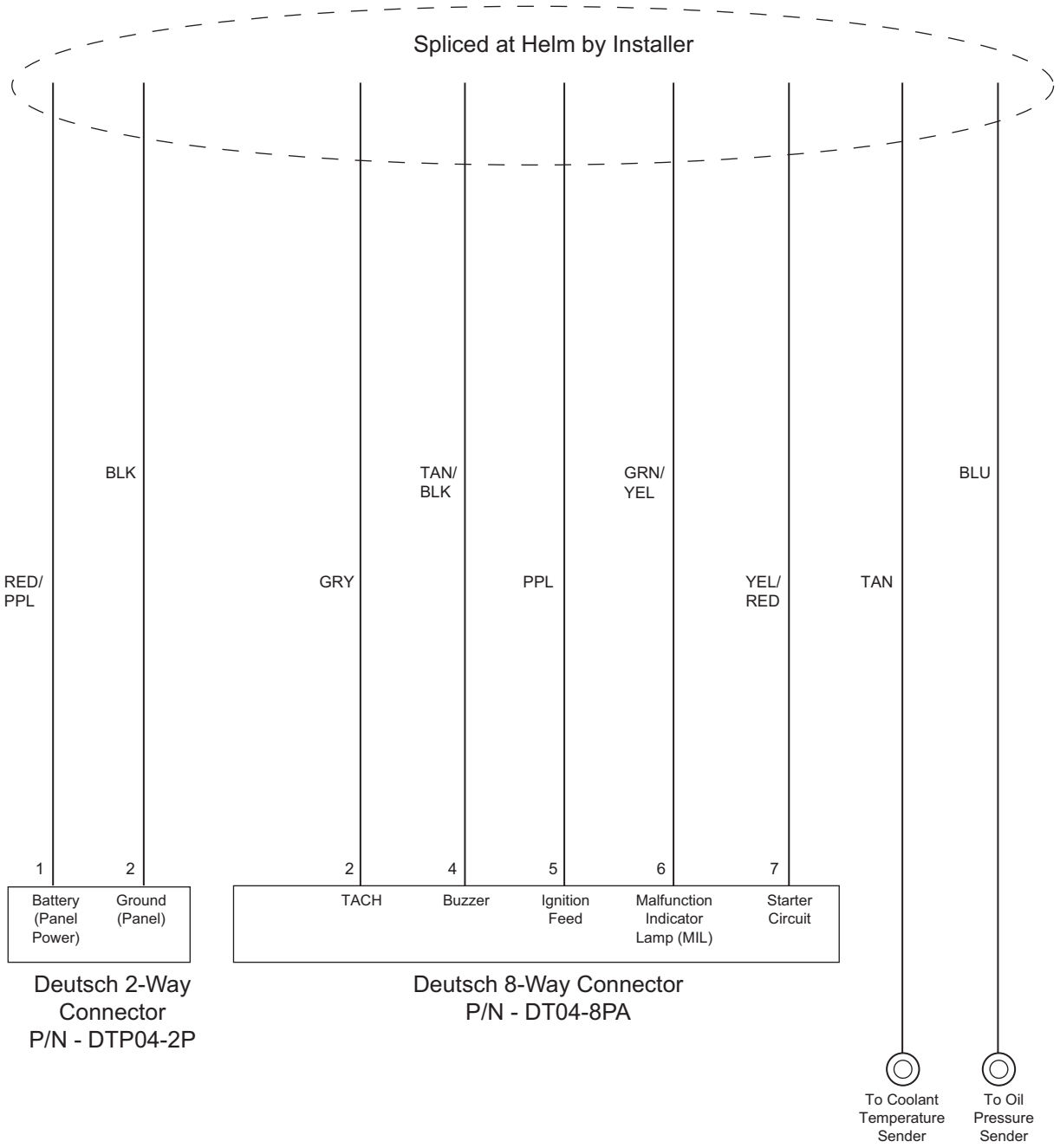
Deutsch 2-Way Connector
P/N - DTP04-2P

Deutsch 8-Way Connector
P/N - DT04-8PA

RA121092_PCM
9-28-06

PCM supplied Boat Extension Harness
RA121092C = 25 ft
***Extension harnesses are used to connect engine wiring to the helm.

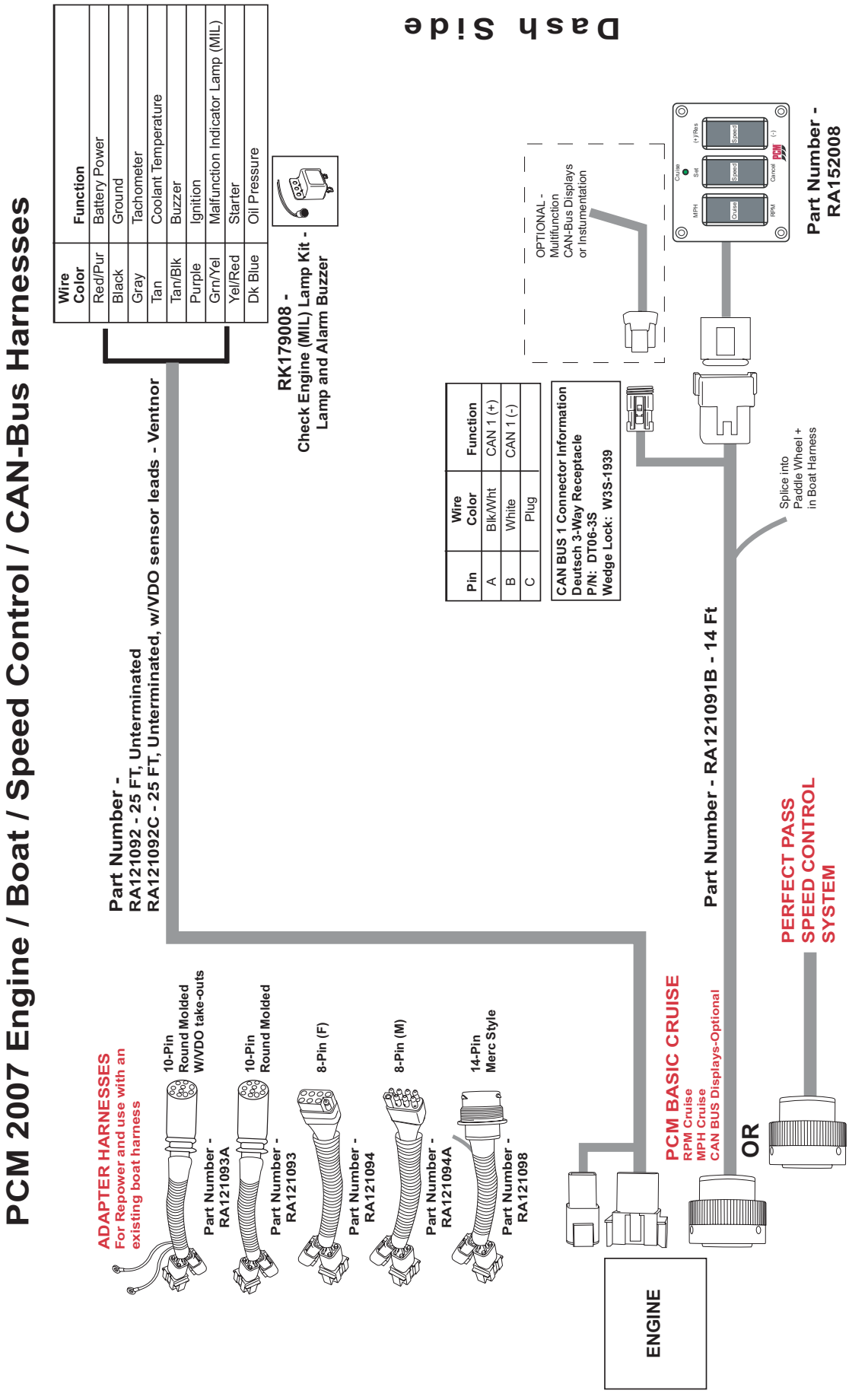
***This harness may be used if application requires additional oil and temp. sending units to be used.



Deutsch 2-Way Connector
P/N - DTP04-2P

Deutsch 8-Way Connector
P/N - DT04-8PA

RA121092C_PCM
9-28-06


PCM 2007 Engine / Boat / Speed Control / CAN-Bus Harnesses
Dash Side
Engine Side
Wire Color
Function
Red/Pur
Battery Power
Black
Ground
Gray
Tachometer
Tan
Coolant Temperature
Tan/Blk
Buzzer
Purple
Ignition
Grn/Yel
Malfunction Indicator Lamp (MIL)
Yel/Red
Starter
Dk Blue
Oil Pressure
RK179008 -
Check Engine (MIL) Lamp Kit -
Lamp and Alarm Buzzer
Part Number -
RA121092 - 25 FT, Unterminated
RA121092C - 25 FT, Unterminated, w/VDO sensor leads - Ventnor
ADAPTER HARNESSES
For Repower and use with an existing boat harness
10-Pin Round Molded W/VDO take-outs
Part Number - RA121093A
10-Pin Round Molded
Part Number - RA121093
8-Pin (F)
Part Number - RA121094
8-Pin (M)
Part Number - RA121094A
14-Pin Merc Style
Part Number - RA121098
ENGINE
PCM BASIC CRUISE
RPM Cruise
MPH Cruise
CAN BUS Displays-Optional
OR
PERFECT PASS SPEED CONTROL SYSTEM
Part Number - RA121091B - 14 Ft
Splice into Paddle Wheel + in Boat Harness
Pin
Wire Color
Function
A
Blk/Wht
CAN 1 (+)
B
White
CAN 1 (-)
C
Plug
CAN BUS 1 Connector Information
Deutsch 3-Way Receptacle
P/N: DT06-3S
Wedge Lock: W3S-1939
OPTIONAL - Multifunction CAN-Bus Displays or Instumentation
Part Number - RA152008

PCM MASTER ENGINE SPECIFICATIONS - 2007

MODEL (Horsepower)	MP 5.0L (275 HP)	MP 5.7L (330 HP)	MP 6.0L (375 HP)
Displacement	5.0L (305 CID)	5.7L (350 CID)	6.0L (364 CID)
Bore	3.75 in. (95.0 mm)	4.0 in. (101.6 mm)	4.0007 in. (101.618 mm)
Stroke	3.48 in. (88.3 mm)	3.48 in. (88.3 mm)	3.622 in. (92.0 mm)
Compression Ratio	9.4:1	9.4:1	9.4:1
Compression Pressure	130 - 215 psi	130 - 215 psi	130 - 215 psi
WOT Operating RPM **Preferred WOT RPM**	4600-5000 4800	4800 - 5200 5000	4800 - 5300 5200
Cruising RPM (Max)	3800	4000	4000
Idle RPM (In Gear)	650 (Not Adjustable)	650 (Not Adjustable)	650 (Not Adjustable)
Oil Pressure @ 2000 RPM	25 - 60 psi (172 - 414 kPa)	25 - 60 psi (172 - 414 kPa)	25 - 80 psi (172 - 552 kPa)
Minimum Oil Pressure	10 psi (69 kPa) at Idle	10 psi (69 kPa) at Idle	10 psi (69 kPa) at Idle
Spark Plug P/N **Spark Plug Gap**	R030010 0.060 in.	R030010 0.060 in.	R030011 0.060 in.
Firing Order	1-8-4-3-6-5-7-2 (LH) 1-2-7-5-6-3-4-8 (RH)	1-8-4-3-6-5-7-2 (LH) 1-2-7-5-6-3-4-8 (RH)	1-8-7-2-6-5-4-3 (LH) NA
Thermostat	RWC 160˚F (61.7˚C) FWC 170˚F (76.7˚C)	RWC 160˚F (61.7˚C) FWC 170˚F (76.7˚C)	NA FWC 160˚F (61.7˚C)
Over- Temperature	220° F (104.8° C)	220° F (104.8° C)	220° F (104.8° C)
Electrical System	12 Volt Negative (-) Ground	12 Volt Negative (-) Ground	12 Volt Negative (-) Ground
Alternator Rating	100 Amps	100 Amps	100 Amps
Ignition Timing	Not Adjustable	Not Adjustable	Not Adjustable
CAM Retard	0-4 degrees	0-4 degrees	Not Adjustable
Battery Rating	650 CCA (Minimum) 120 Ah	650 CCA (Minimum) 120 Ah	650 CCA (Minimum) 120 Ah

PCM MASTER FUEL PRESSURE SPECIFICATIONS - 2007

MODEL (Horsepower)	MP 5.0L (275 HP)	MP 5.7L (330 HP)	MP 6.0L (375 HP)
Fuel Pressure STD. FCC	57-62 psi @ WOT	57-62 psi @ WOT	
Fuel Pressure - FCC Returnless to Rail			57-62 psi (WOT)
Fuel Pressure - LPFP ALL ENGINES	4 - 7 psi (WOT)	4 - 7 psi (WOT)	4 - 7 psi (WOT)

IMPORTANT: FUEL PRESSURE MEASUREMENT MUST BE MADE WITH THE ENGINE UNDER LOAD.

IMPORTANT: ***For Model Year 2007, the 5.0/5.7L MPI engines no longer use a vacuum biased fuel pressure regulator. The ports on the regulator and intake manifold should have covers on them. Do Not connect the regulator vacuum port to the intake manifold. Drivability problems may occur such as surging at idle, rough idle, stalling, or backfire. Idle fuel pressure for the 5.0/5.7L engines should be the same as wide open throttle.***

PCM MASTER WARNING/ALARM SPECIFICATIONS - 2007

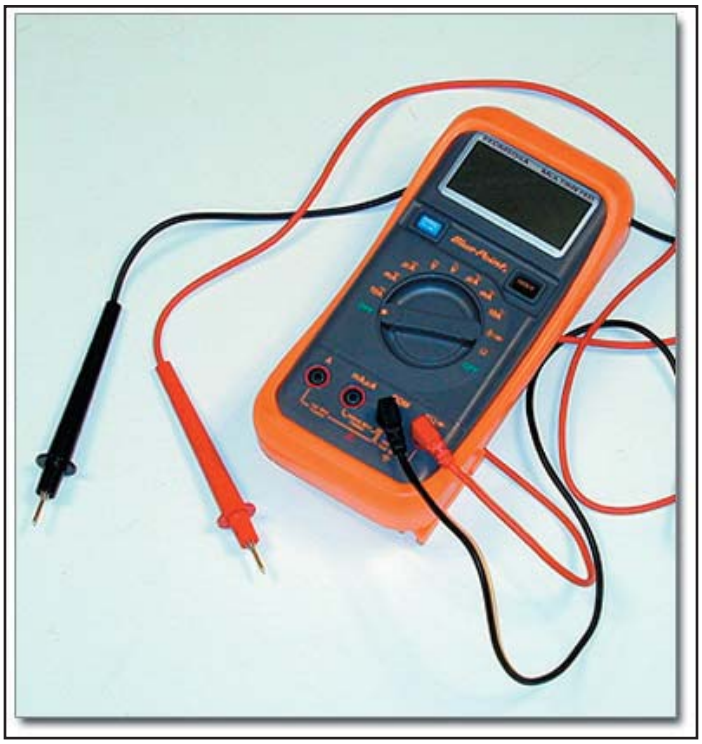
MODEL (Horsepower)	MP 5.0L (275 HP)	MP 5.7L (330 HP)	MP 6.0L (375 HP)
Coolant Over-Temperature Sensor	220° F (104.8° C) M.I.L. - DTC 116 Check Engine Lamp and/or Buzzer	220° F (104.8° C) M.I.L. - DTC 116 Check Engine Lamp and/or Buzzer	220° F (104.8° C) M.I.L. - DTC 116 Check Engine Lamp and/or Buzzer
Transmission Over-Temperature Switch	235° F ± 10° F M.I.L. - DTC 1542 Check Engine Lamp	235° F ± 10° F M.I.L. - DTC 1542 Check Engine Lamp	235° F ± 10° F M.I.L. - DTC 1542 Check Engine Lamp
Exhaust Over-Temperature Switch	248° F ± 5° F M.I.L. - DTC 2428 Check Engine Lamp and/or Buzzer	248° F ± 5° F M.I.L. - DTC 2428 Check Engine Lamp and/or Buzzer	248° F ± 5° F M.I.L. - DTC 2428 Check Engine Lamp and/or Buzzer
Low Oil Pressure Sensor	< 10 psi M.I.L. - DTC 524 Check Engine Lamp and/or Buzzer	< 10 psi M.I.L. - DTC 524 Check Engine Lamp and/or Buzzer	< 10 psi M.I.L. - DTC 524 Check Engine Lamp and/or Buzzer

IMPORTANT: ***For Model Year 2007, if there is an active Diagnostic Trouble Code stored in the ECM, at Key-ON-Engine-OFF, the MIL or Check Engine Lamp will flash. Normal operation of the MIL or Check Engine Lamp at Key-ON-Engine-OFF is the steady ON state.***

DIAGNOSTIC TOOLS

There are three (3) required tools that are essential in the diagnosis and maintenance of the PCM ECM-07. These are the same required tools used for troubleshooting other fuel injected engines.

The fuel pressure gauge (PCM P/N - RTK0078) is essential for reading the fuel pressure under all operating conditions when diagnosing a PCM engine.



The Digital Multi-Meter (DMM), with a minimum input impedance of 10 mega-ohms (Mohms) is essential to take various measurements on the engine's electrical system.

Diacom Diagnostic Software, Marine Edition, by Rinda Technologies, Inc. (PCM P/N - RT0086); and the Diacom CAN Network Adapter (PCM P/N - RT0088). This is a PC based software package that supports various ECMs used on fuel injected engines.

In the past, as new ECM's were introduced into the marine industry, Diacom evolved with each new generation. As the power of the ECMs has improved, new test capabilities became available through the Diacom Tests screens, making Diacom an increasingly useful tool for troubleshooting.

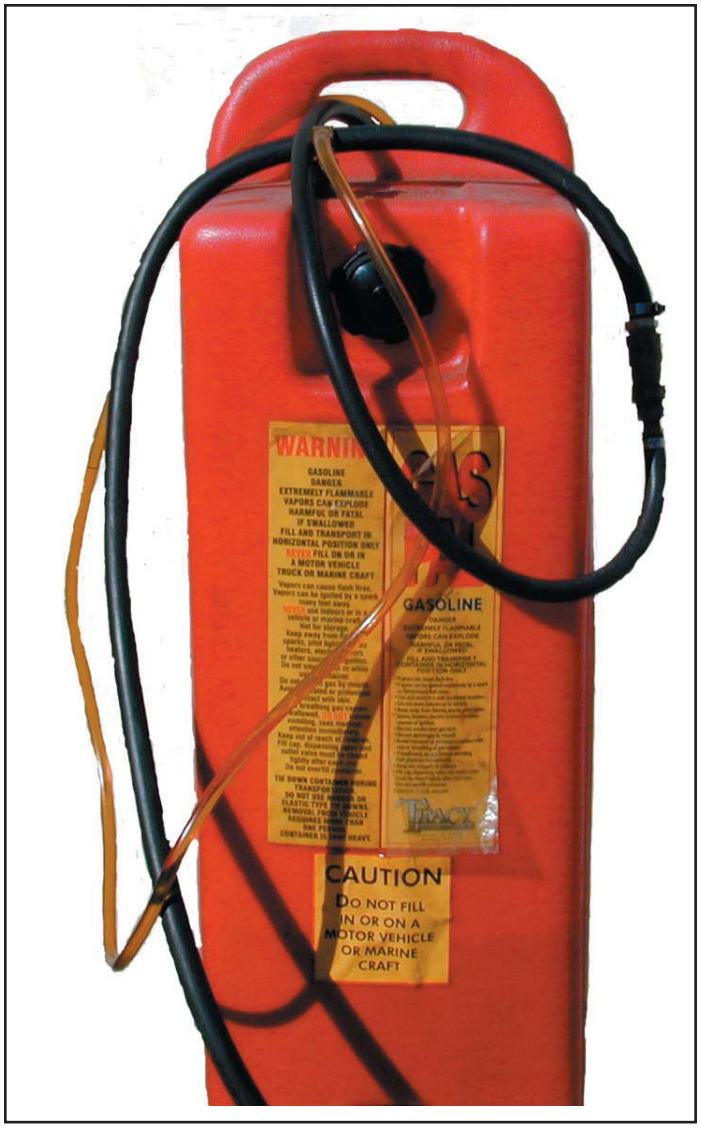
PCM's ECM-07 is no different than previous generation controllers. Not only has it provided improved engine control, it has increased diagnostic capability. When Diacom is connected, there are new features and tests available that have not been available with past generations of controllers.

DIAGNOSTIC AIDS

There are various and many different tools that you will find essential for troubleshooting, from time to time. Pictured below are some of the common items used. They include, but are not limited to, an inductive pickup timing light, test lamp, connector tools, injector test lamps, and various adapters and connector test harnesses.

Two of the most used diagnostic aids are the Remote Key Switch (RT0091) and an Auxiliary Fuel Tank equipped with both a fuel supply and fuel return line.

The Remote Key Switch (RT0091, for ECM-07 equipped engines), pictured above, is extremely useful for isolating the boat wiring from the engine wiring when trying to isolate electrical problems.



An Auxiliary Fuel Tank (dealer fabricated) is absolutely essential for troubleshooting drivability problems that may be fuel related. Ensure that your fuel tank is equipped with a fuel return line. The ability to completely isolate the boat fuel system from the engine's, using a known good fuel source, is essential for troubleshooting fuel system problems or perceived fuel system problems.

DIACOM

To utilize the full features and benefits of the Diacom program, when used on a PCM engine, it is essential that your current program and interface cable be upgraded to the 2007 requirement. This must be done through Rinda Technologies. Rinda may be contacted at ***(773) 736-6633.*** Be sure you identify yourself as a PCM Premier dealer. Upgrades to your interface cable will not only allow you to interface to ECM-07, but will give you the added capability of downloading calibration program enhancements, as required. If you are a multi-brand service center, you should notify Rinda of the other products carried so your diagnostic and download capability is not impaired for those other brands.

Once the Diacom program has been upgraded to the 2007 requirement, be sure to go to the Diacom Download web page, periodically, to check for updates to your Diacom program. Updates from this site are only valid for Diacom programs that have been updated to the 2007 requirements. Older versions of Diacom may not function properly if the update is downloaded and installed.

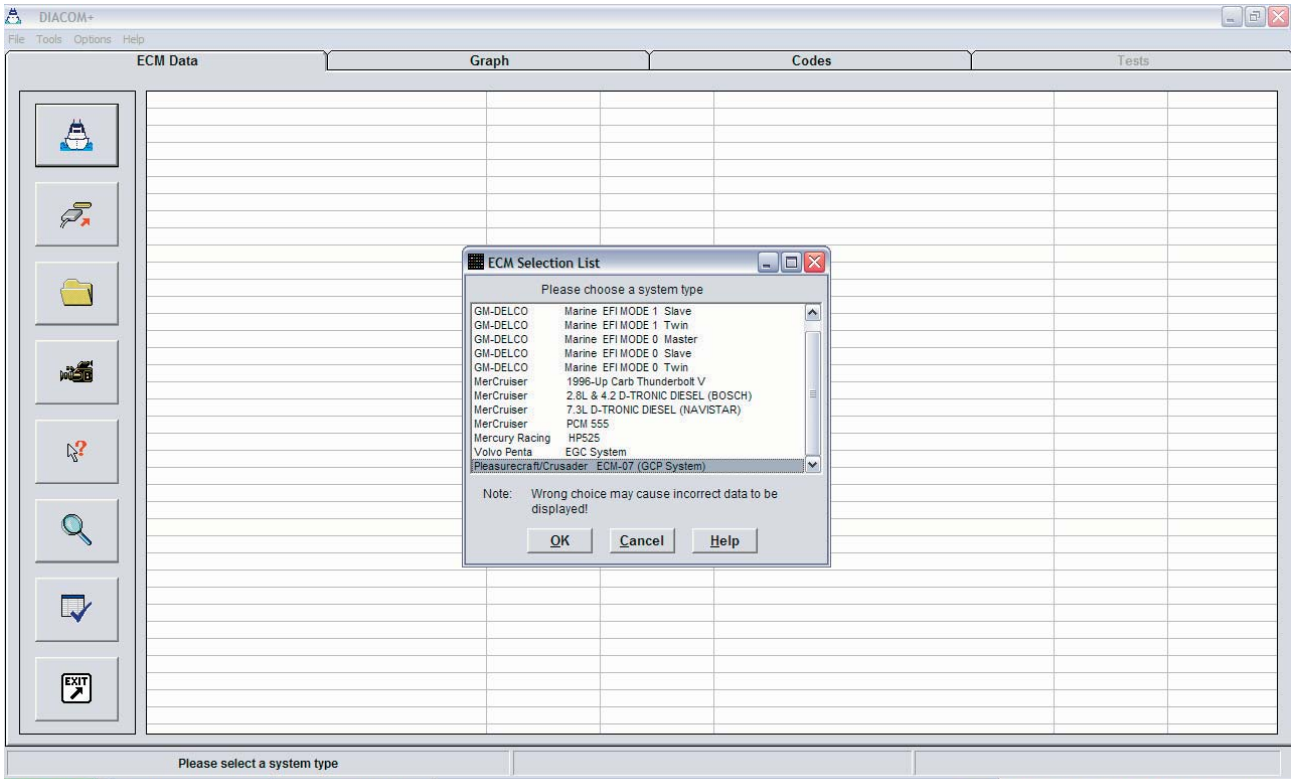
http://www.rinda.com/diacom_update.htm

Diacom still functions the same as it has in the past. When you open Diacom you will have to select Pleasurecraft/Crusader ECM-07 (GCP) to communicate with a 2007 engine. The following Diacom screens and accompanying text show you the various options now available with the ECM-07 controller, with Diacom connected.

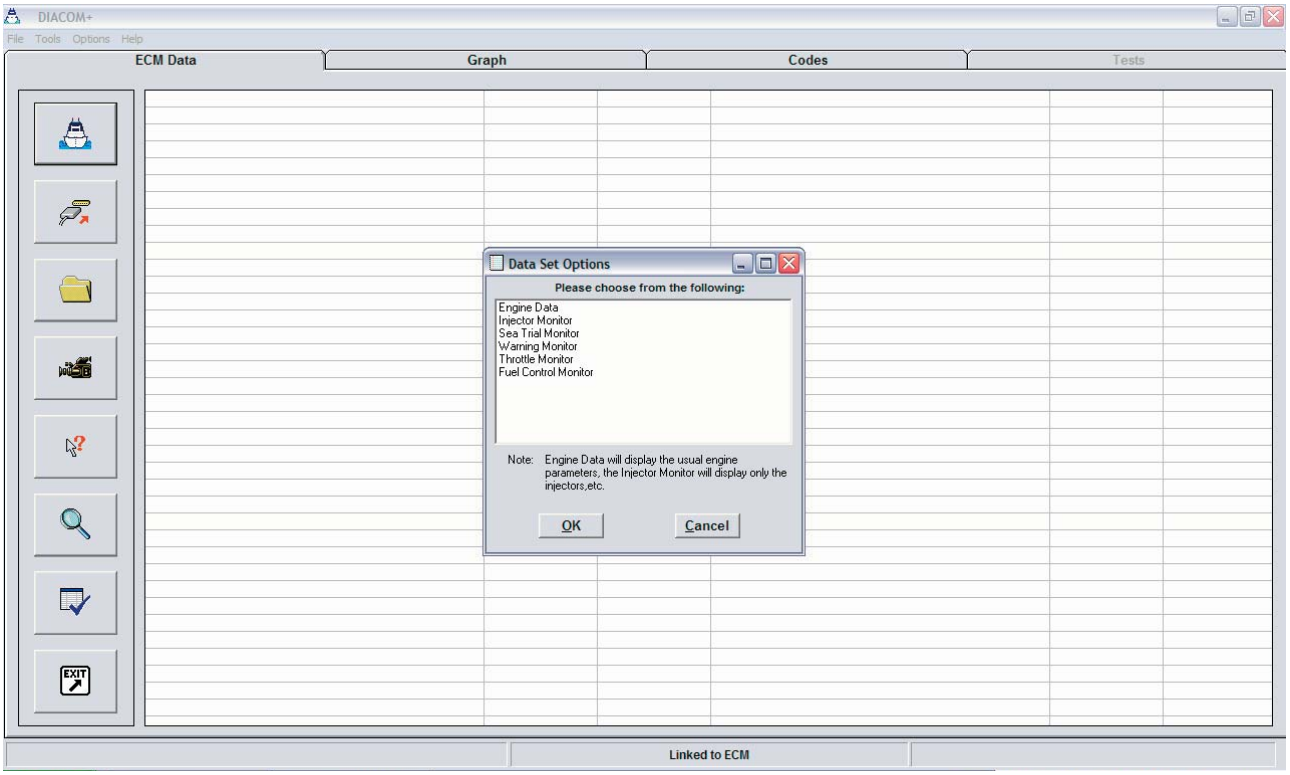
GETTING STARTED

Ensure you are using the latest version of Diacom. At this printing Version 1.5.98 (11-03-2006) was the current version. Go to **http://www.rinda.com/diacom_update.htm** to download and install the latest upgrades.

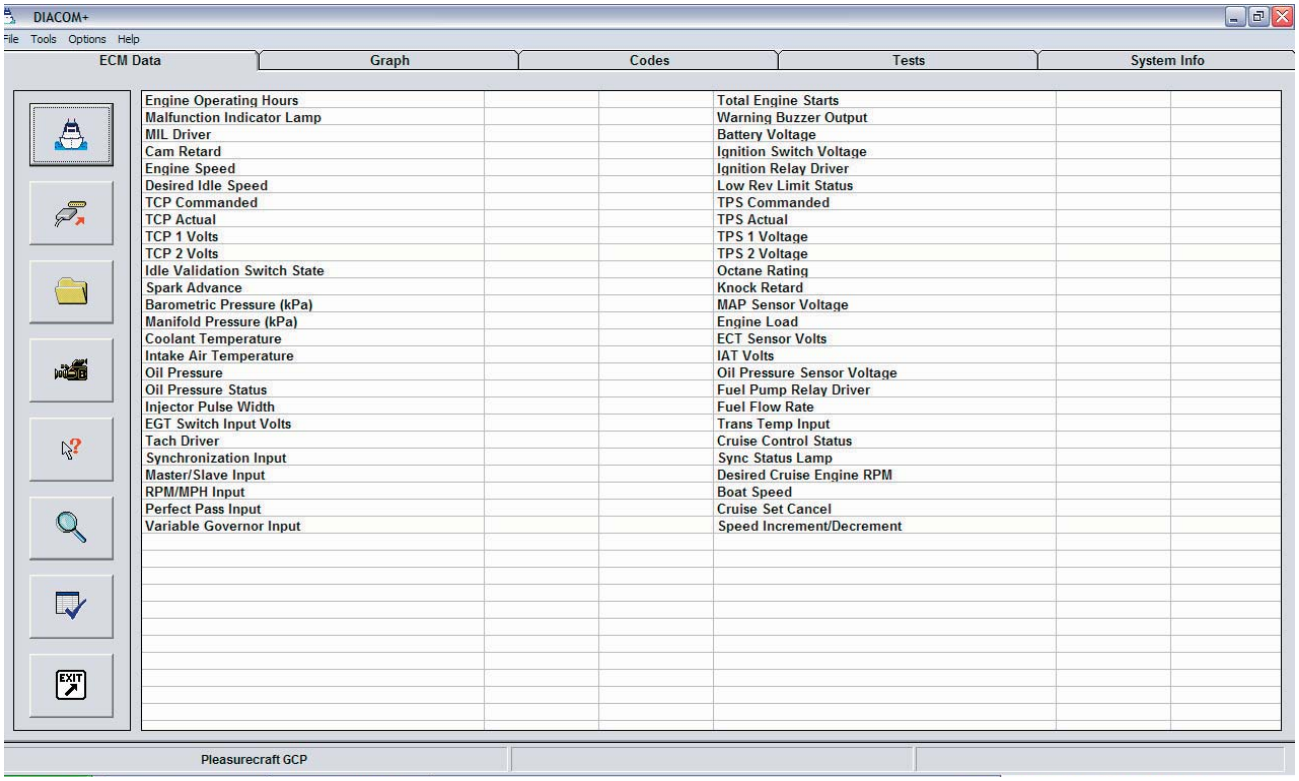
Left click on the 'boat' icon then select Pleasurecraft/Crusader ECM-07 (GCP)



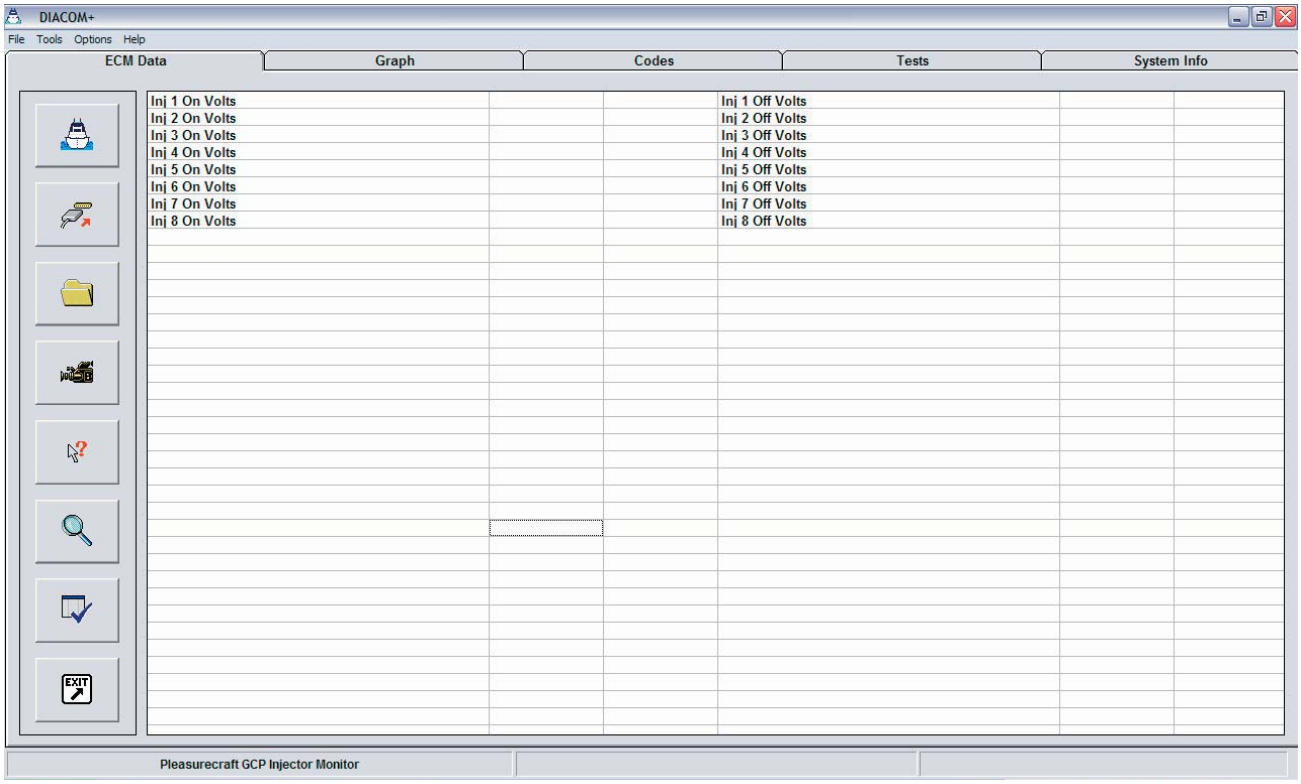
Select the data display that you require. **Engine Data** will be the display most often used.



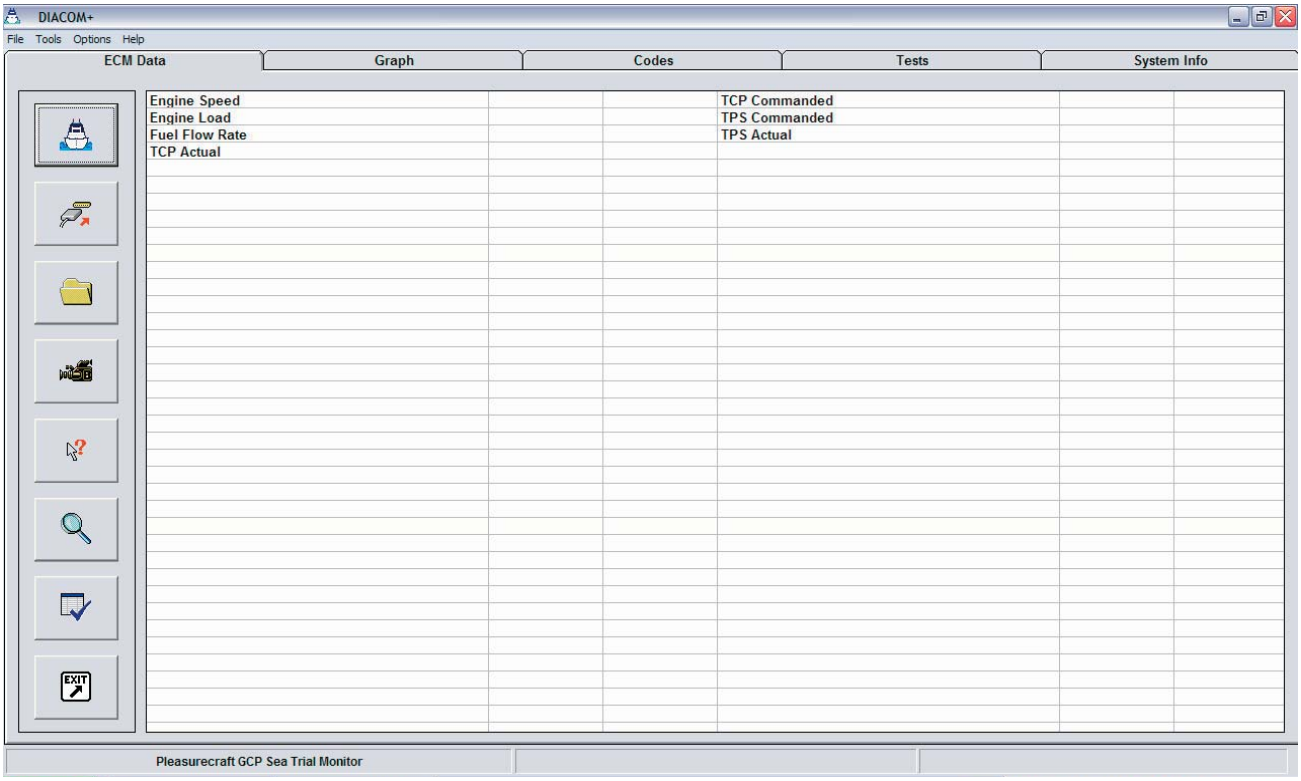
Engine Data display. This will be your most often used display. By default it should come up in the **PEG Preferred ECM-07** screen format.



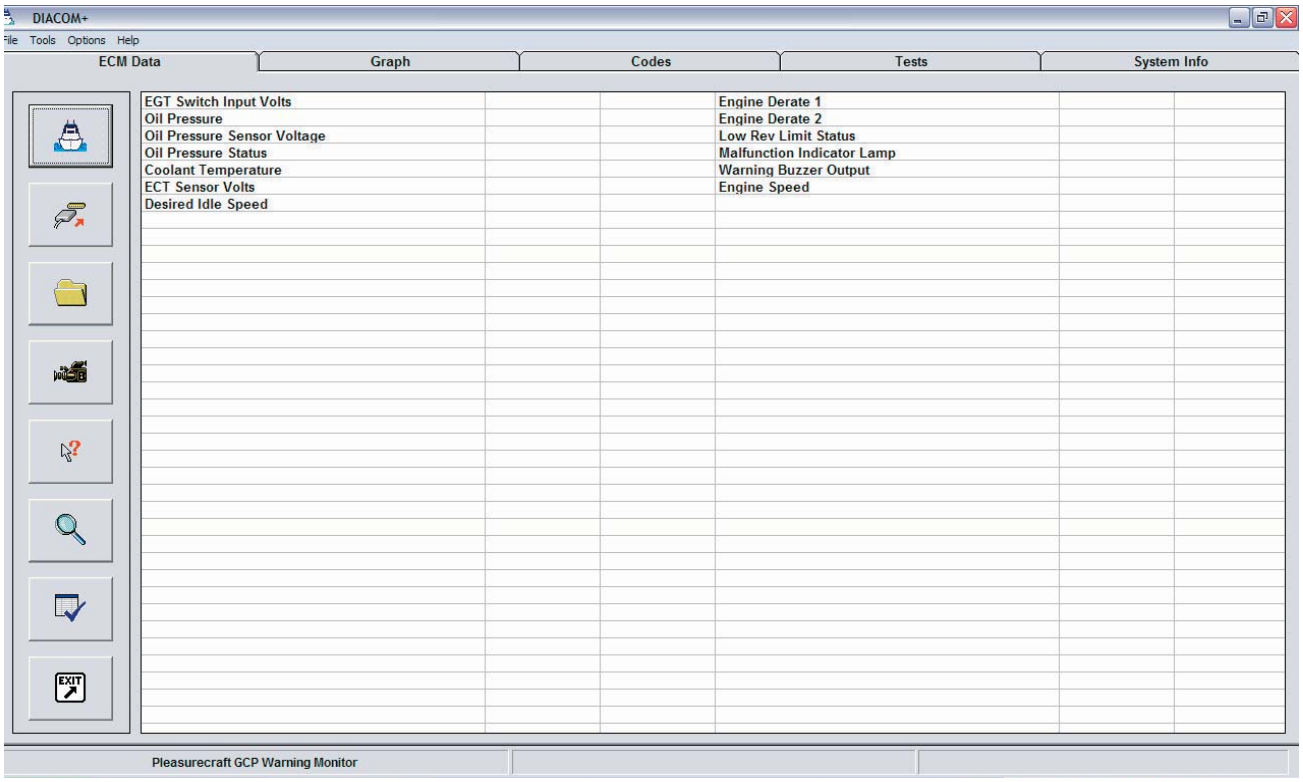
Injector Monitor display. Optional data display format. Displays only fuel injector data.



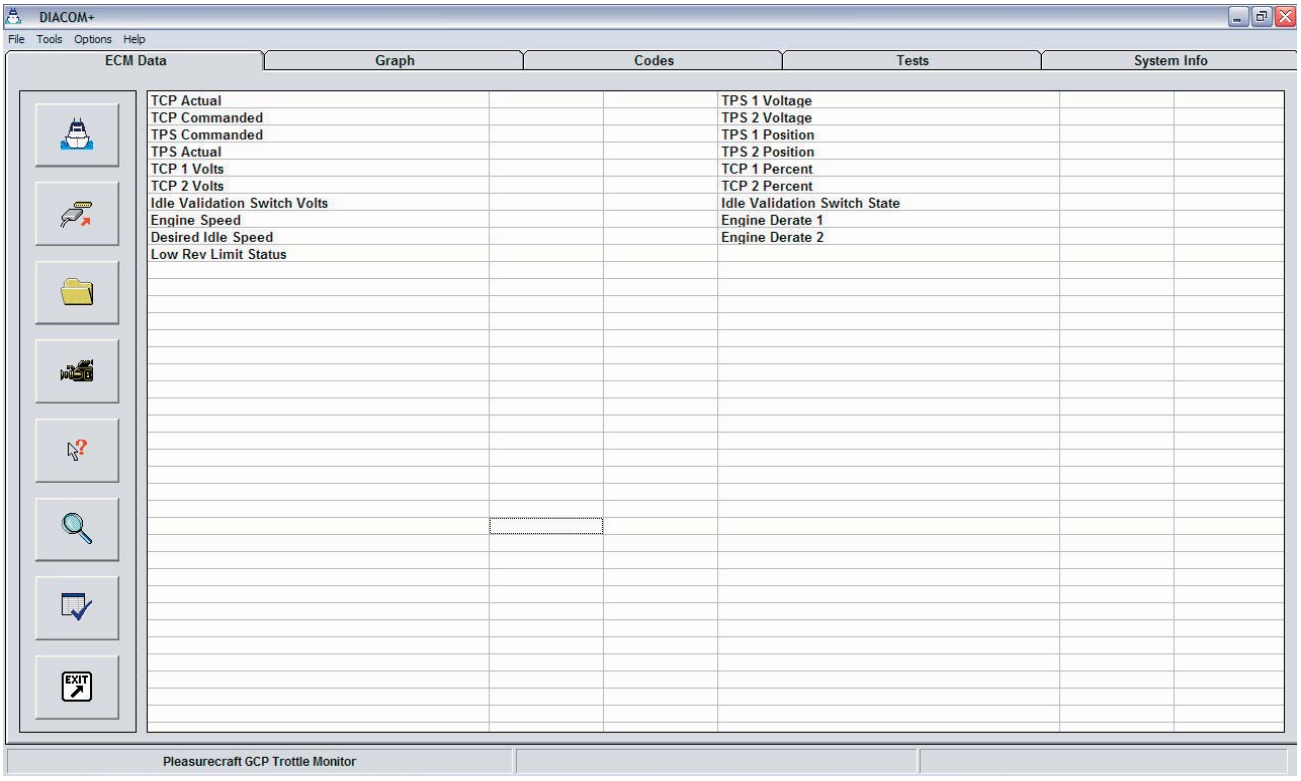
Sea Trial Monitor display. Optional data display format. Displays abridged data for Sea Trial testing. Primarily used for testing by OEM's of cruisers. Do not use this display for Pre-Delivery test runs.



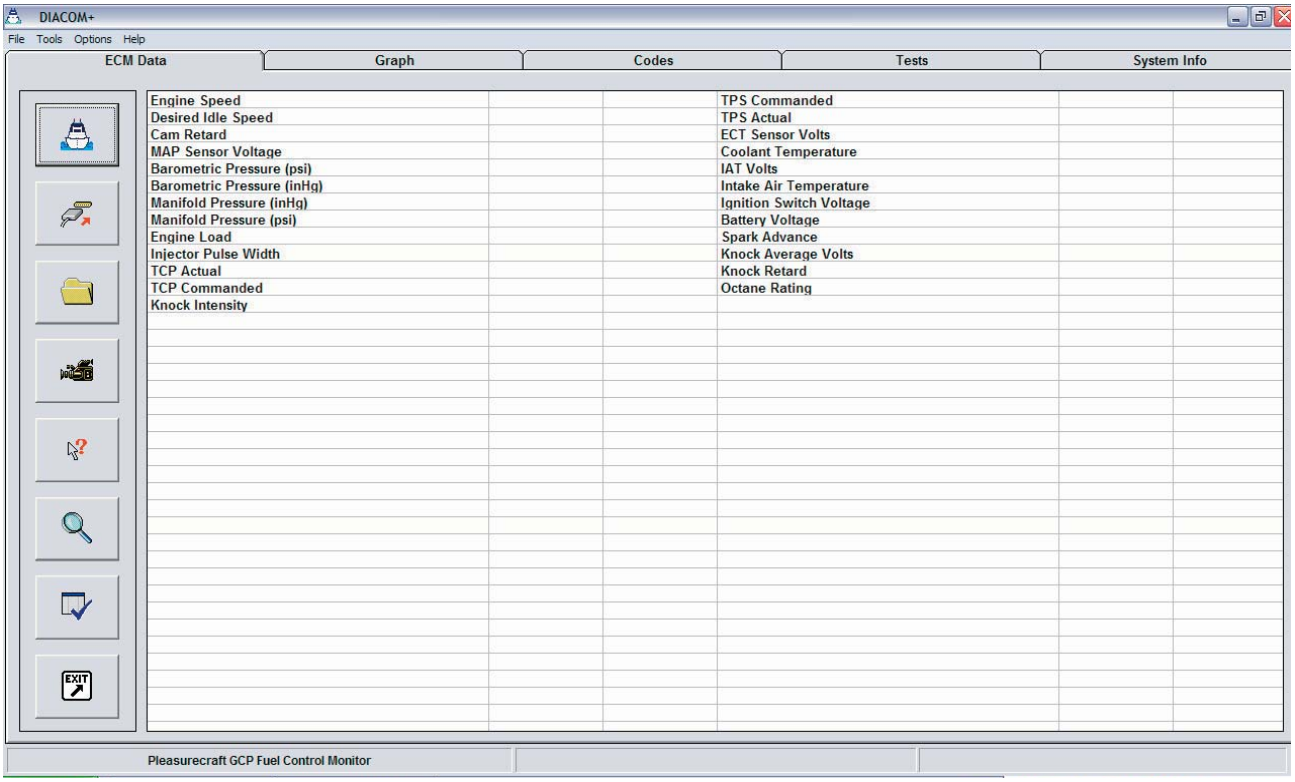
Warning Monitor display. Optional data display format. Displays data associated with warning monitor functions.



Throttle Monitor display. Optional data display format. Displays data associated with throttle functions.

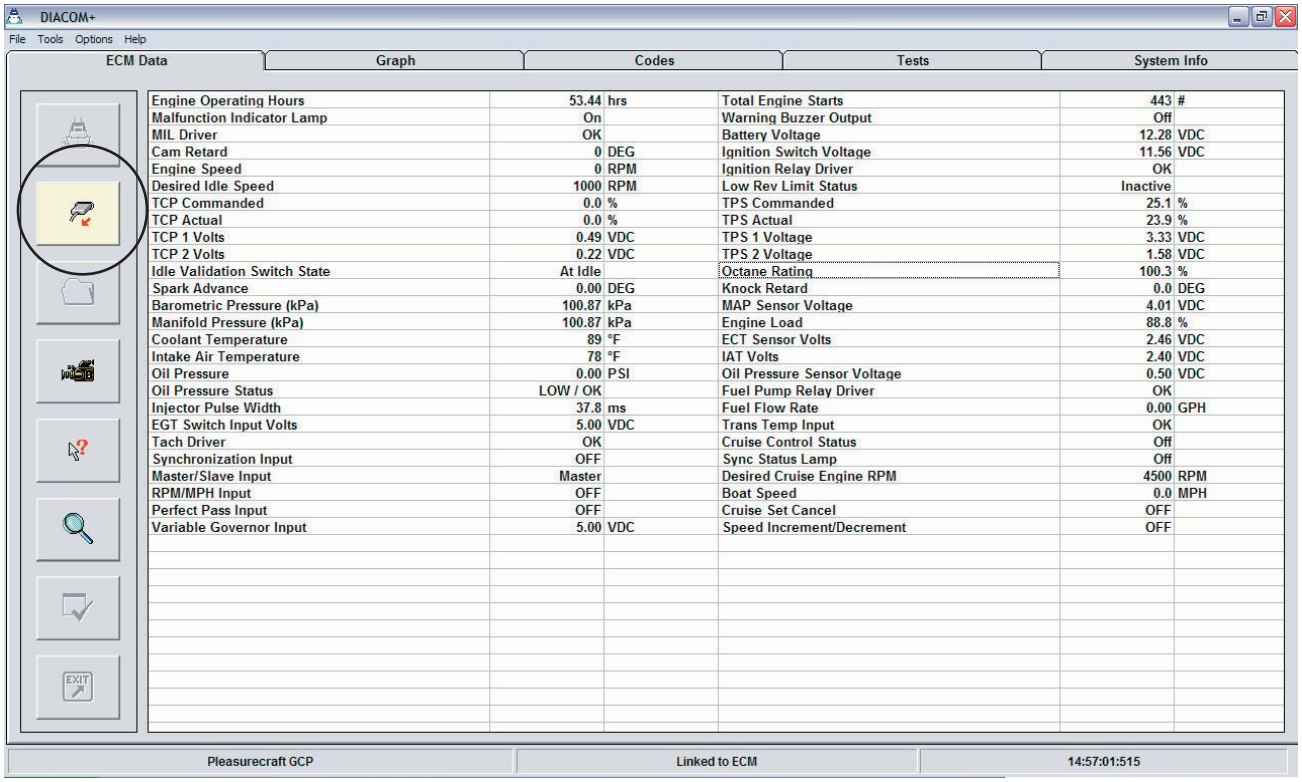


Fuel Control Monitor display. Optional data display format. Displays fuel function related data.



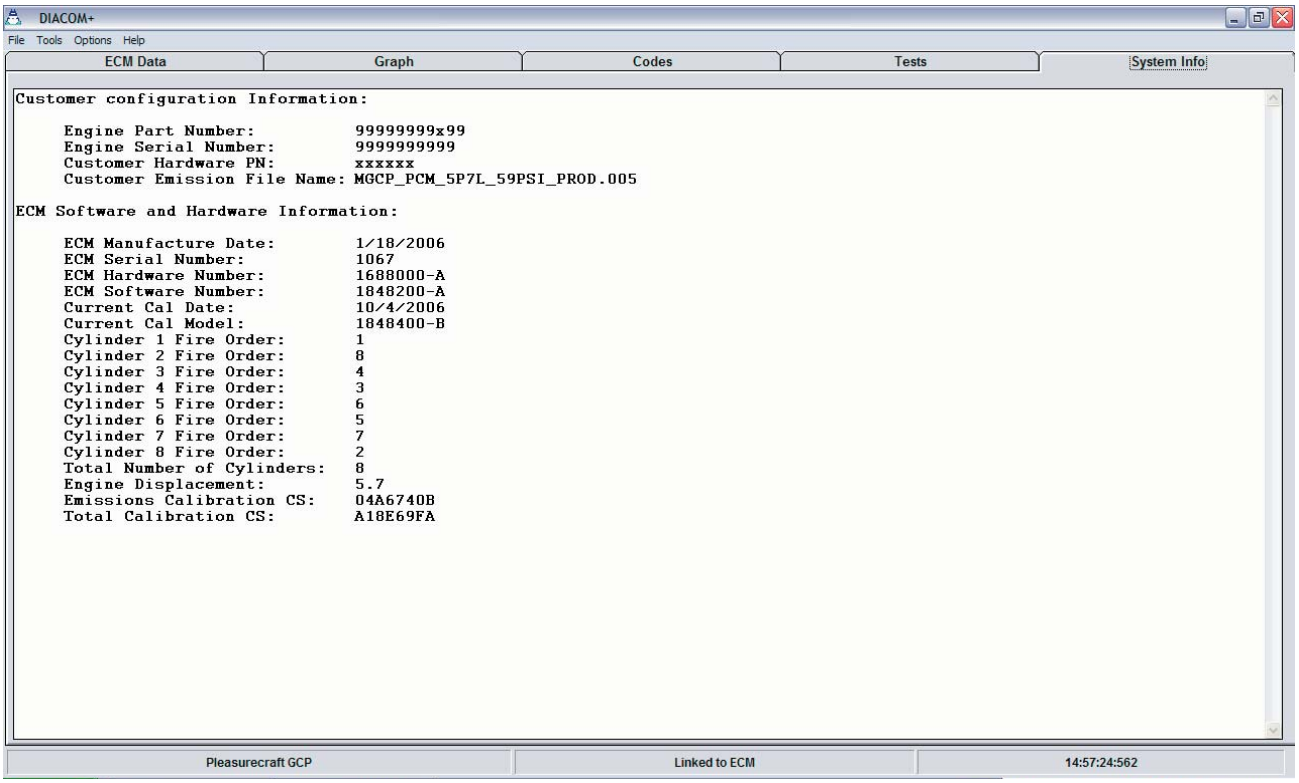
GETTING LINKED

Once you have selected your data set to display, Ensure the Diacom cable is connected to the DLC on the engine and, at a minimum, you have the engine set for Key ON Engine OFF operation. The KEY must be ON (engine running or off) for Diacom to link to the ECM.



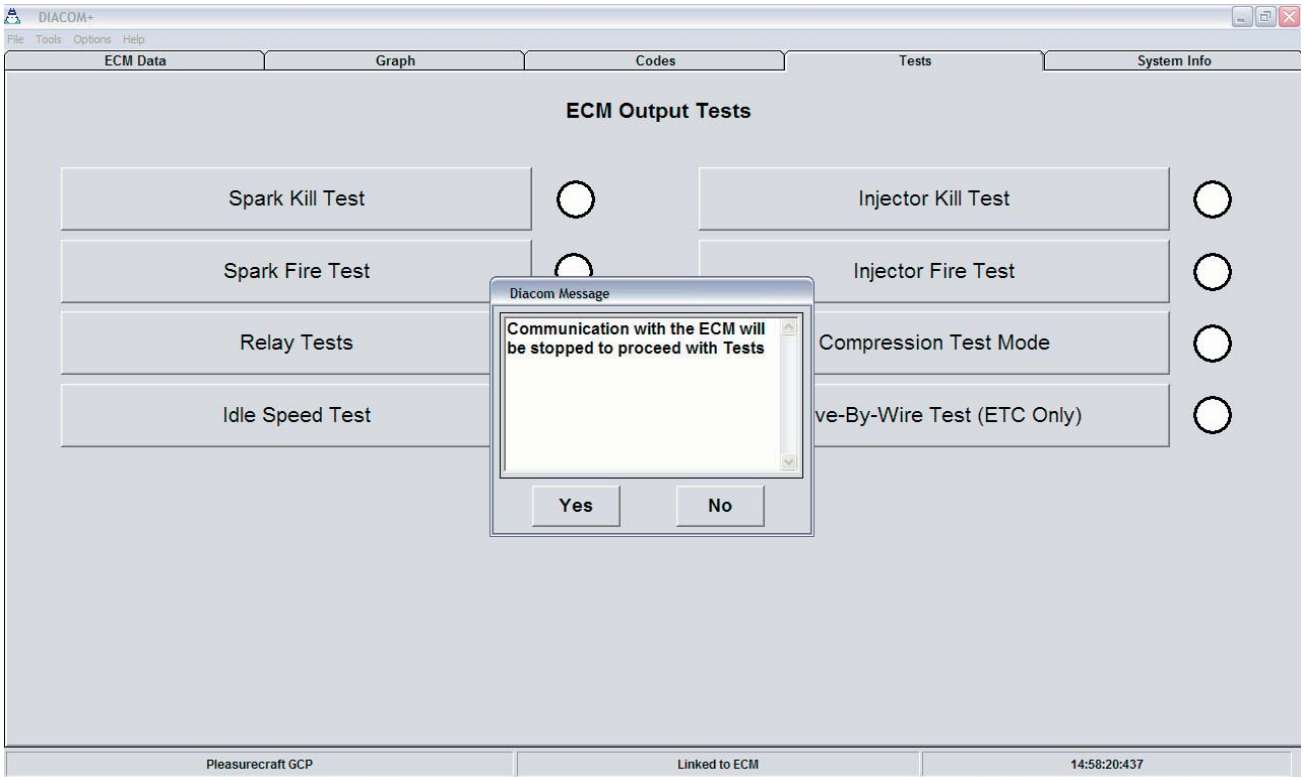
SYSTEM INFO

This is a new tab on the Diacom display for ECM-07. When this tab is selected you will get a screen containing all pertinent ECM information which includes: what engine the ECM is for, firing order, checksum, calibration file name, etc.



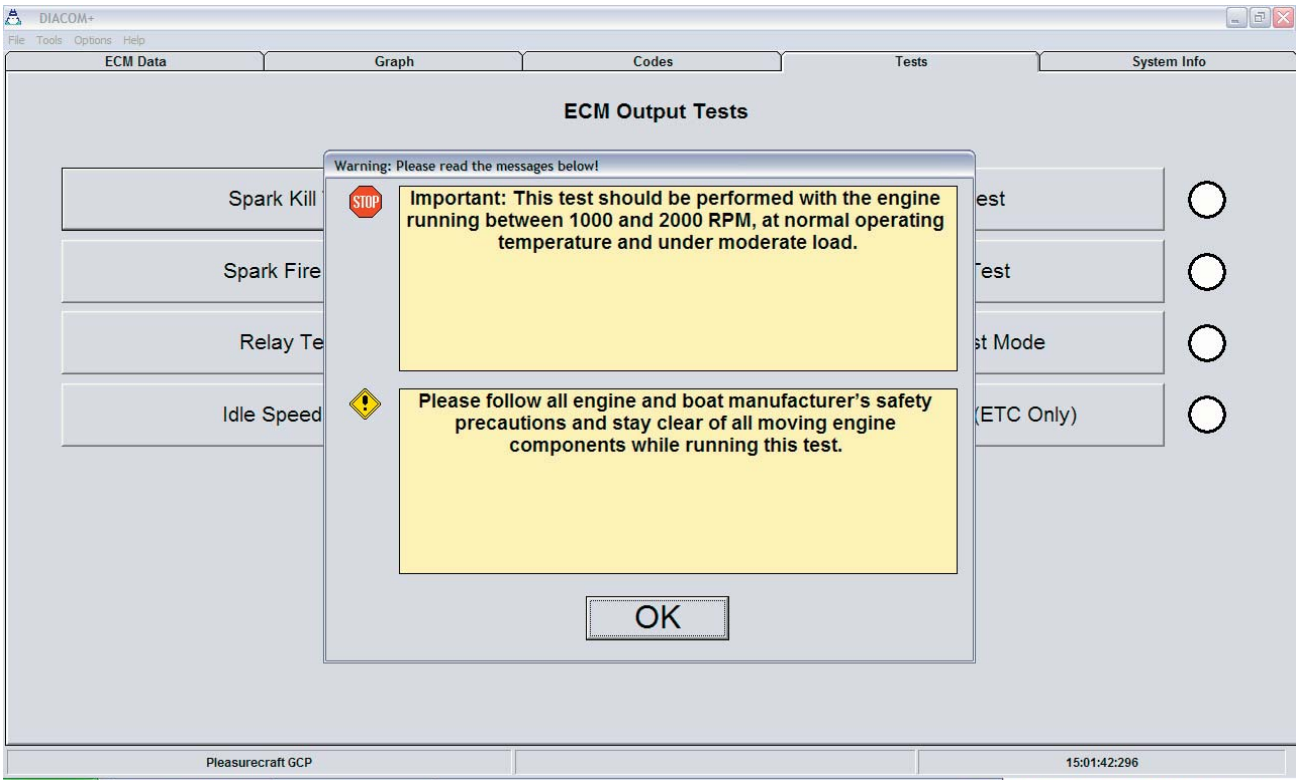
TESTS

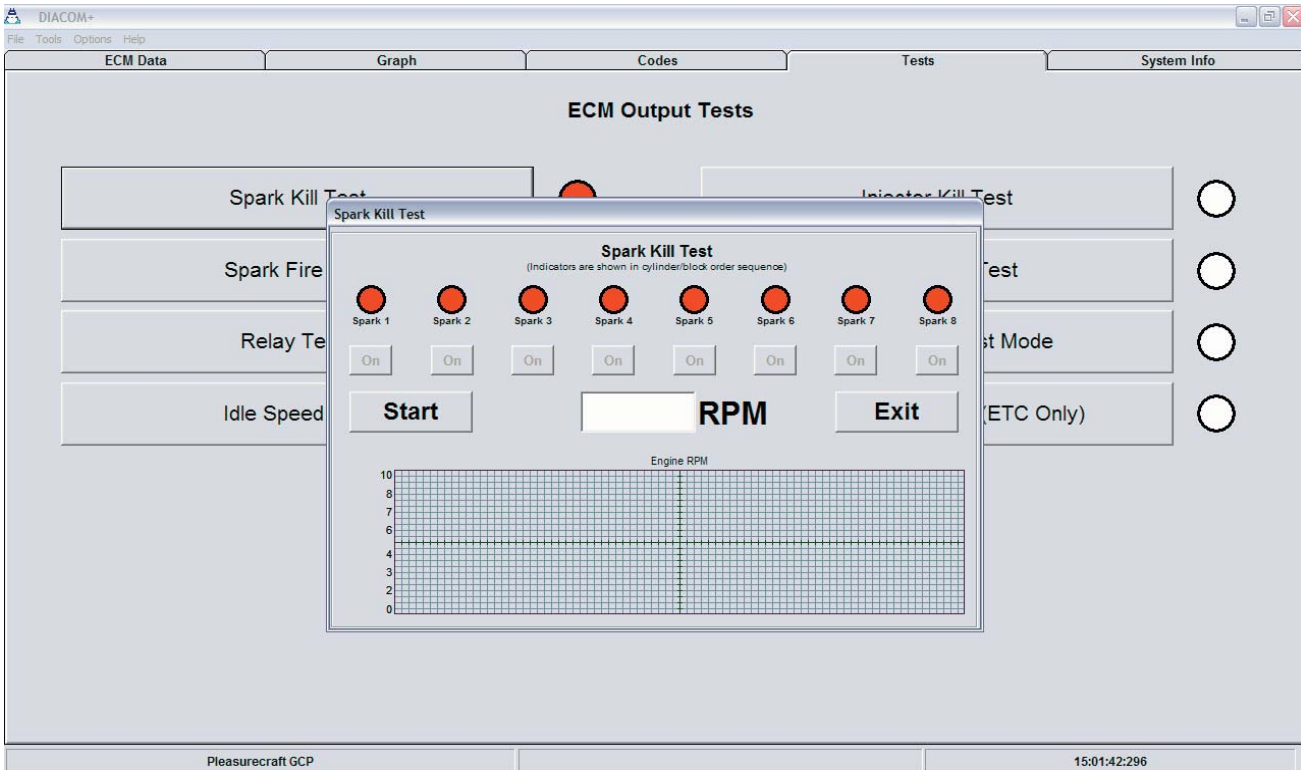
For ECM-07, Diacom has a new set of tests that may be performed. When you select the Tests tab on the Diacom display, the Tests menu will open. When the menu opens you will get the Diacom message informing you that Diacom is going to break the Link with the ECM to proceed. If you wish to continue with the test function select YES, if you wish to return to the ECM display select NO.



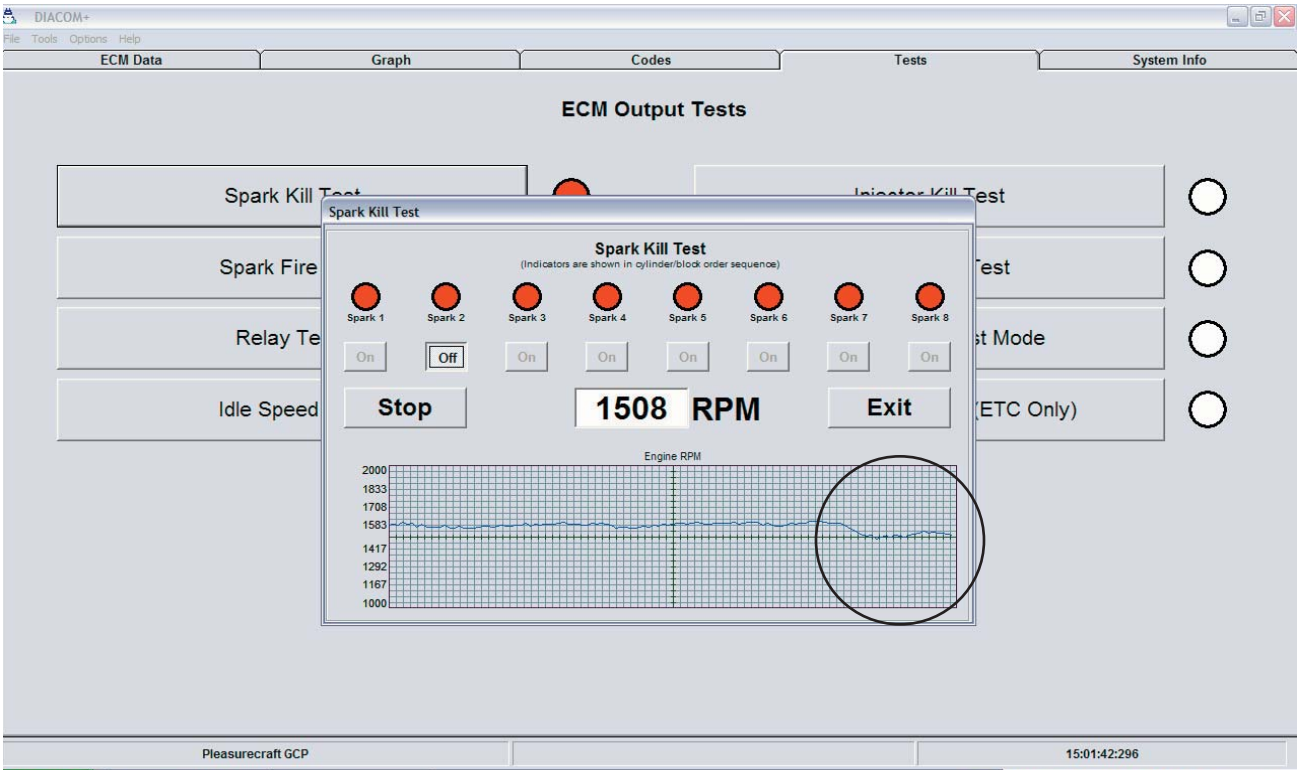
SPARK KILL TEST

This test and the Injector Kill Test are similar to the MEFI Power Balance Test. New with ECM-07 is the sequential fire of a cylinder. Only one cylinder is fueled at a time and only one cylinder is fired at a time. For the Spark Kill Test you will command the ECM to turn off the spark to a specified cylinder. If the cylinder is functioning normally you will see a reduction in RPM when the cylinder is turned OFF.



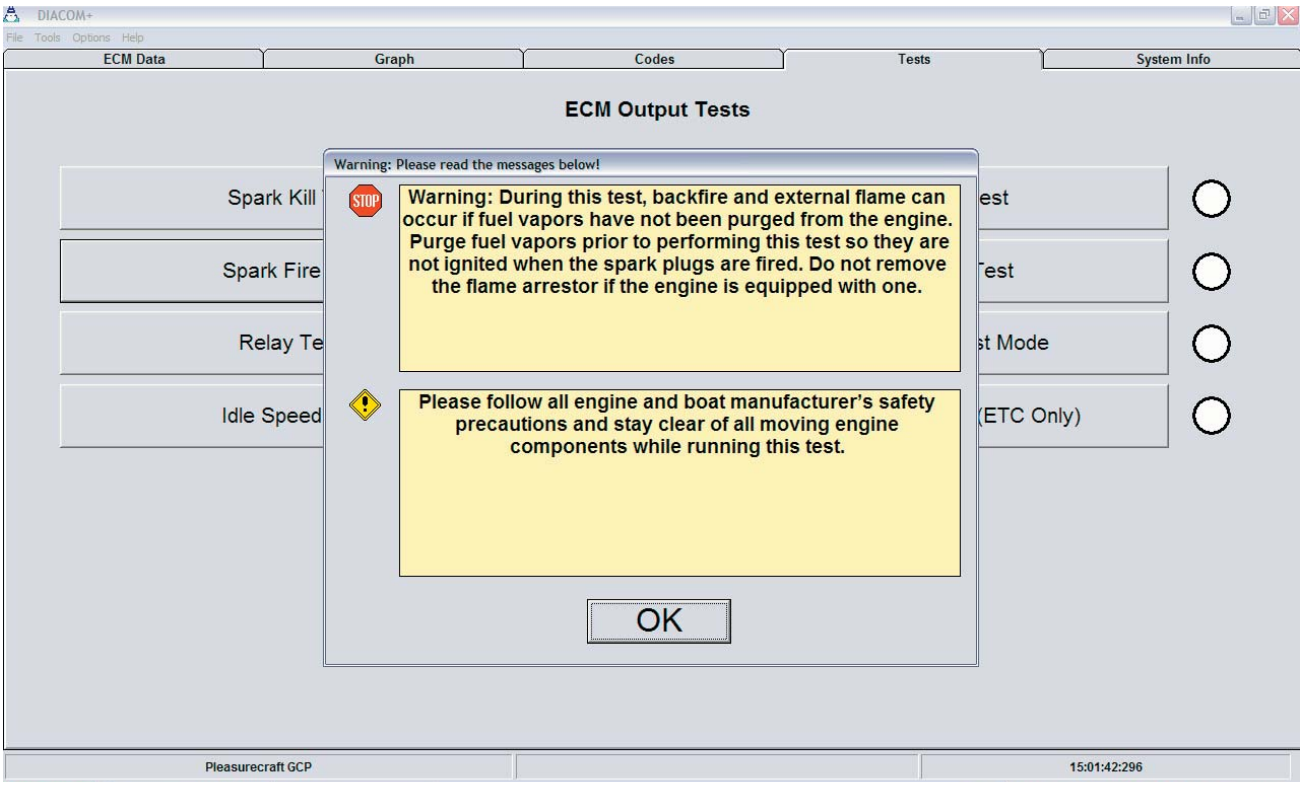


When spark is turned OFF, you should see a reduction in RPM. The spark will remain off 2-4 seconds then resume normal operation.

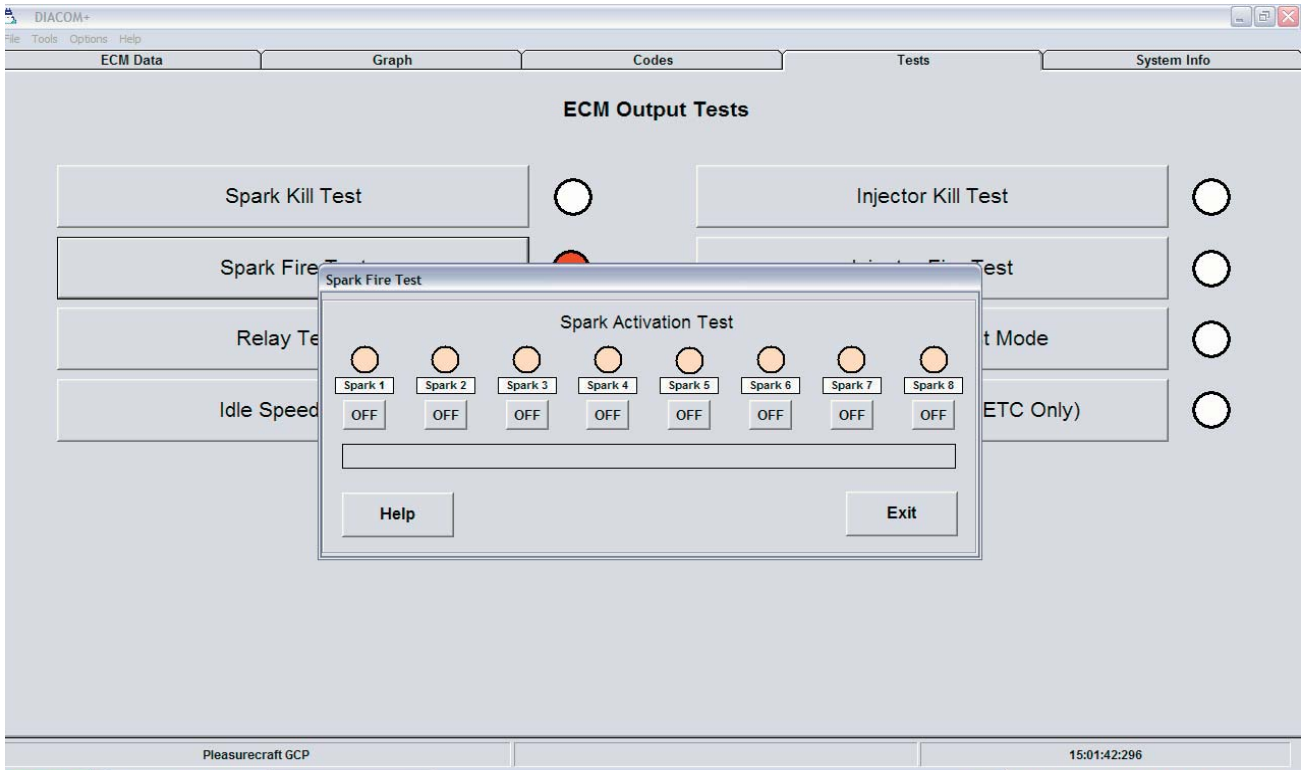


SPARK FIRE TEST

This test will test fire individual coils for the 6.0/81L engines. **It is highly recommended that this test not be used.** The 5.0/5.7L engines will fire the coil, without proper indexing of the distributor there is no way to predict which plug will fire. **Engine damage, Fire or Explosion** could occur during this test..

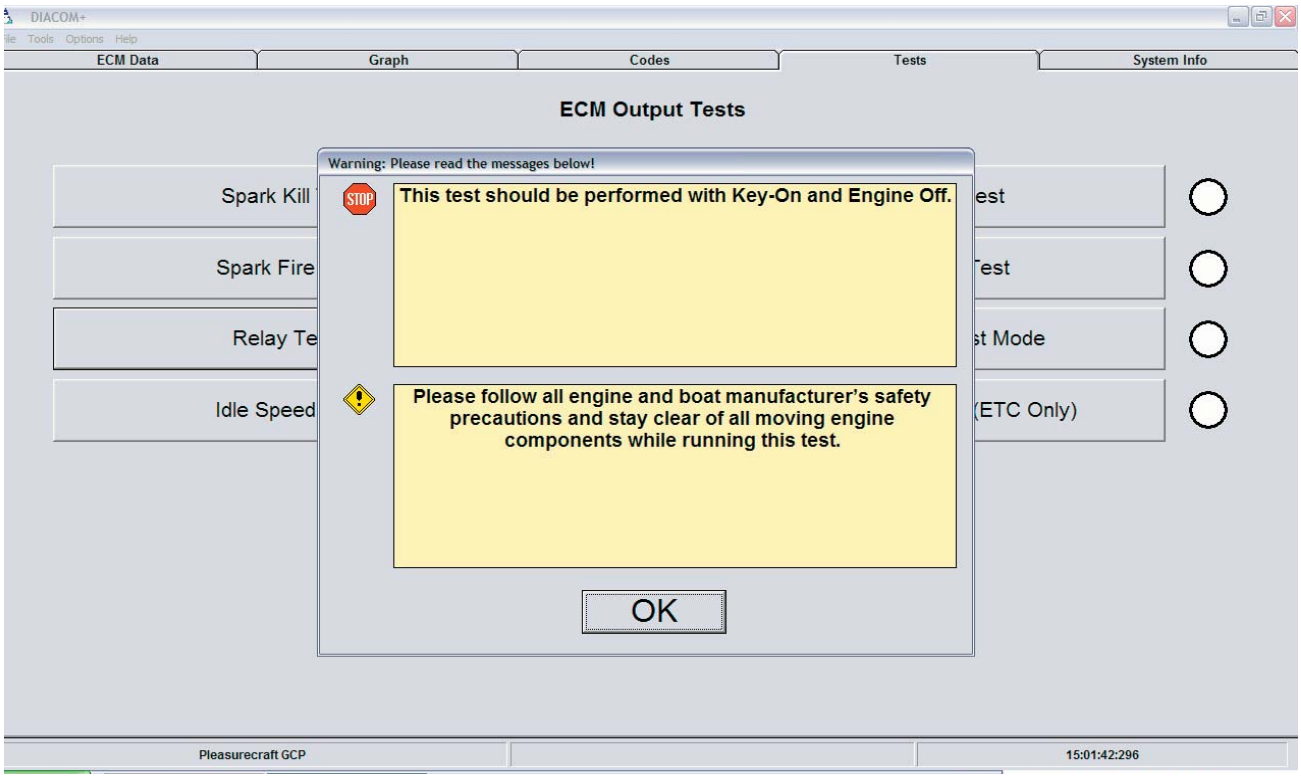


Spark Fire Test screen.

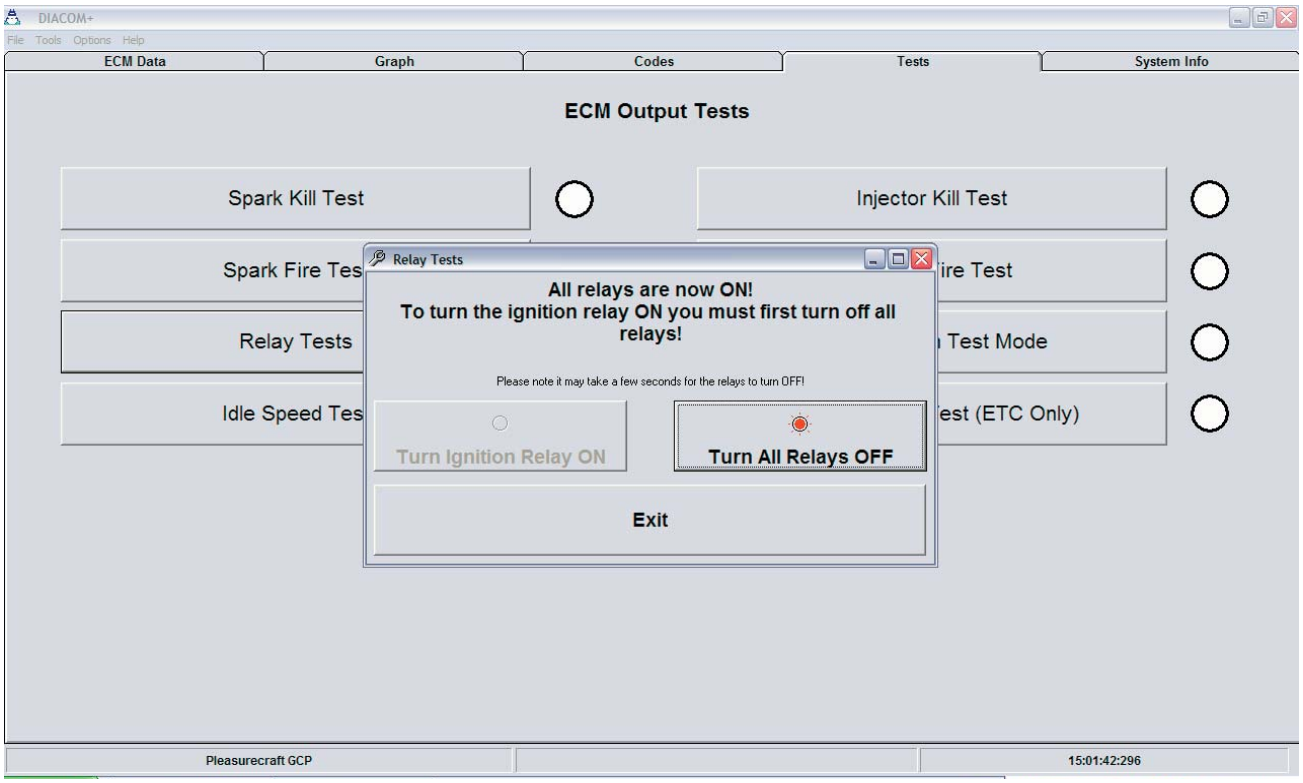


RELAY TEST

This test will energize the Ignition Relay or the Ignition and Fuel Pump Relays. This test is extremely useful for troubleshooting power problems or for priming the fuel system. New with the ECM-07 controller is the fact that the Ignition and Fuel Pump relays will time out after 2-4 seconds with the Key ON Engine OFF.

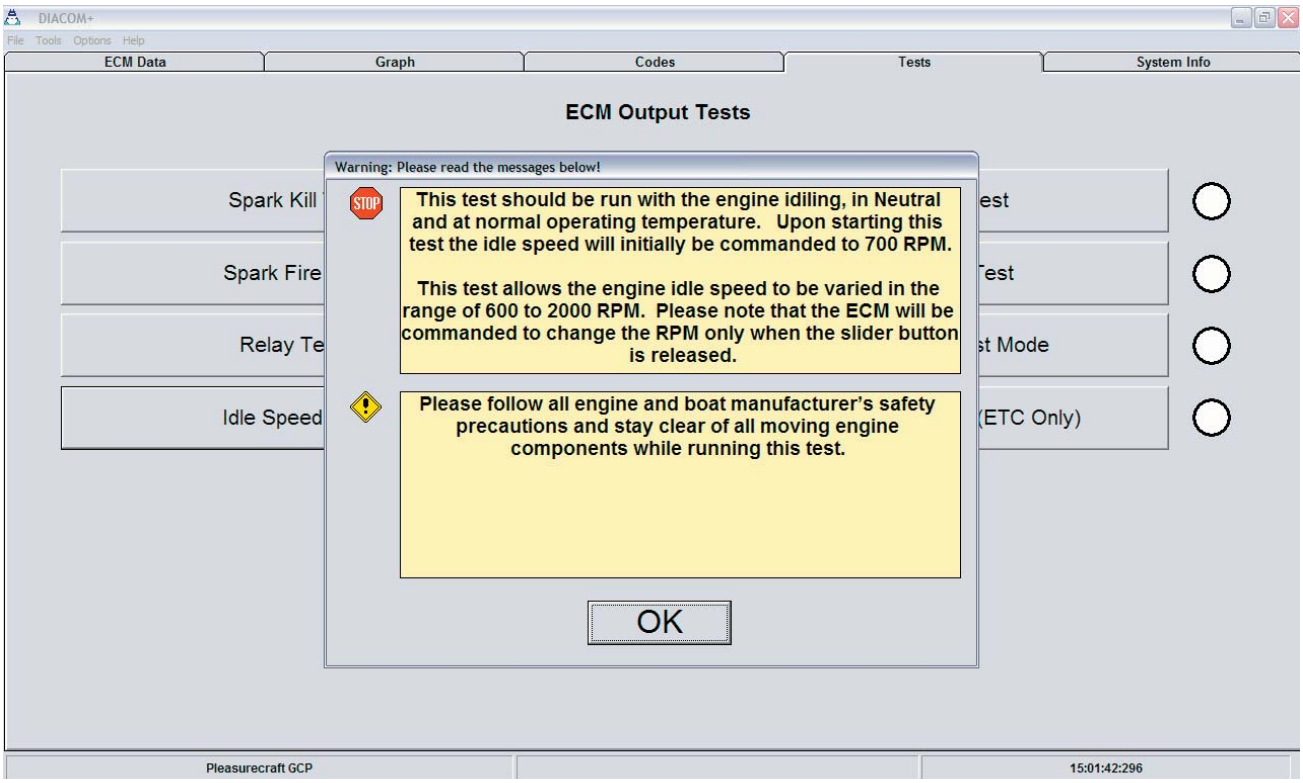


RELAY TEST SCREEN

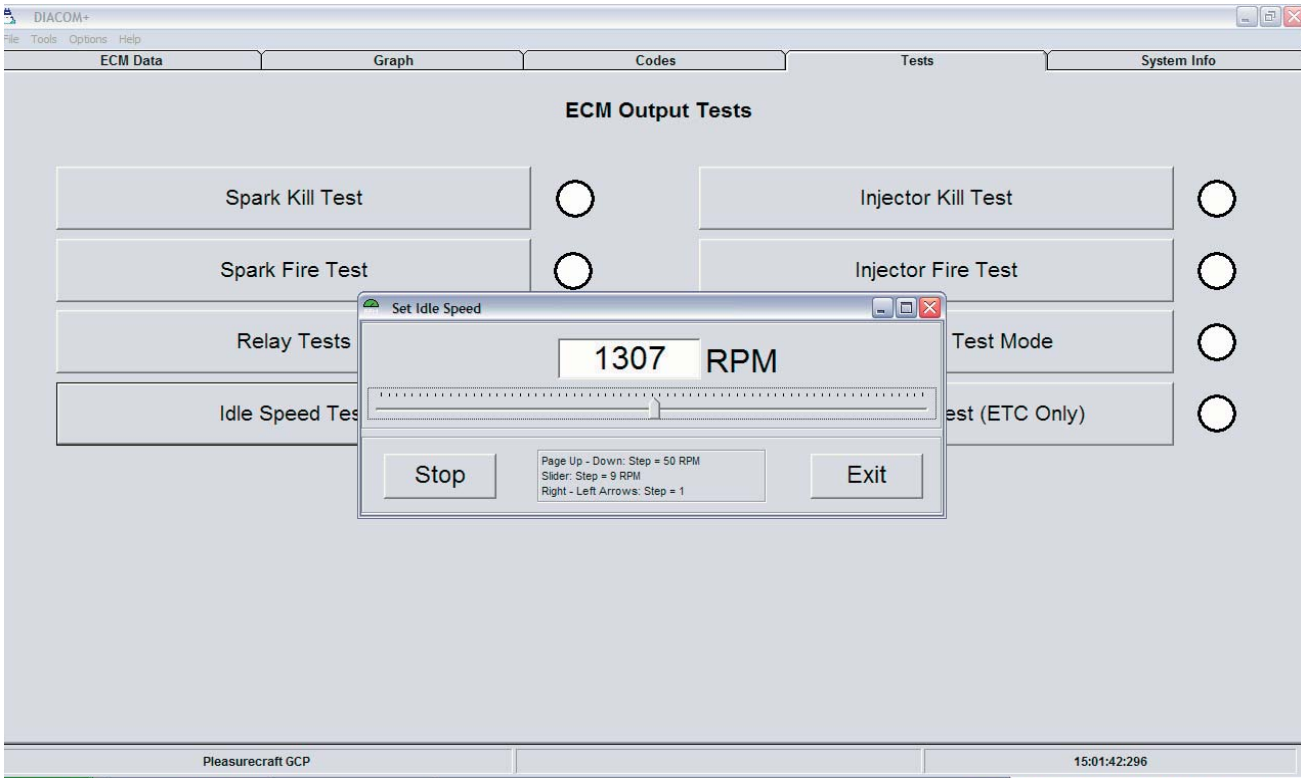


IDLE SPEED TEST

This test should be run with the engine idling, in neutral and at normal operating temperature. This test allows the idle speed to be varied in the range of 600 to 2000 RPM.

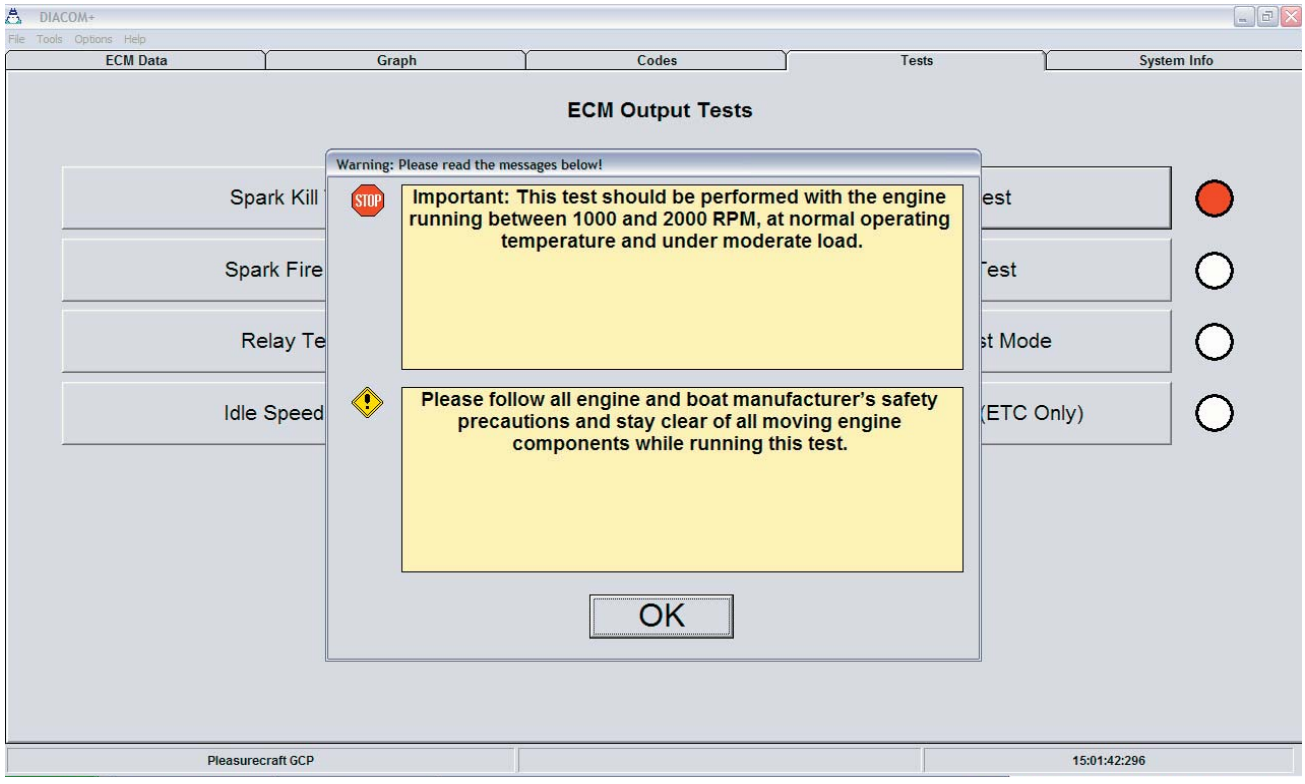


IDLE SPEED TEST SCREEN

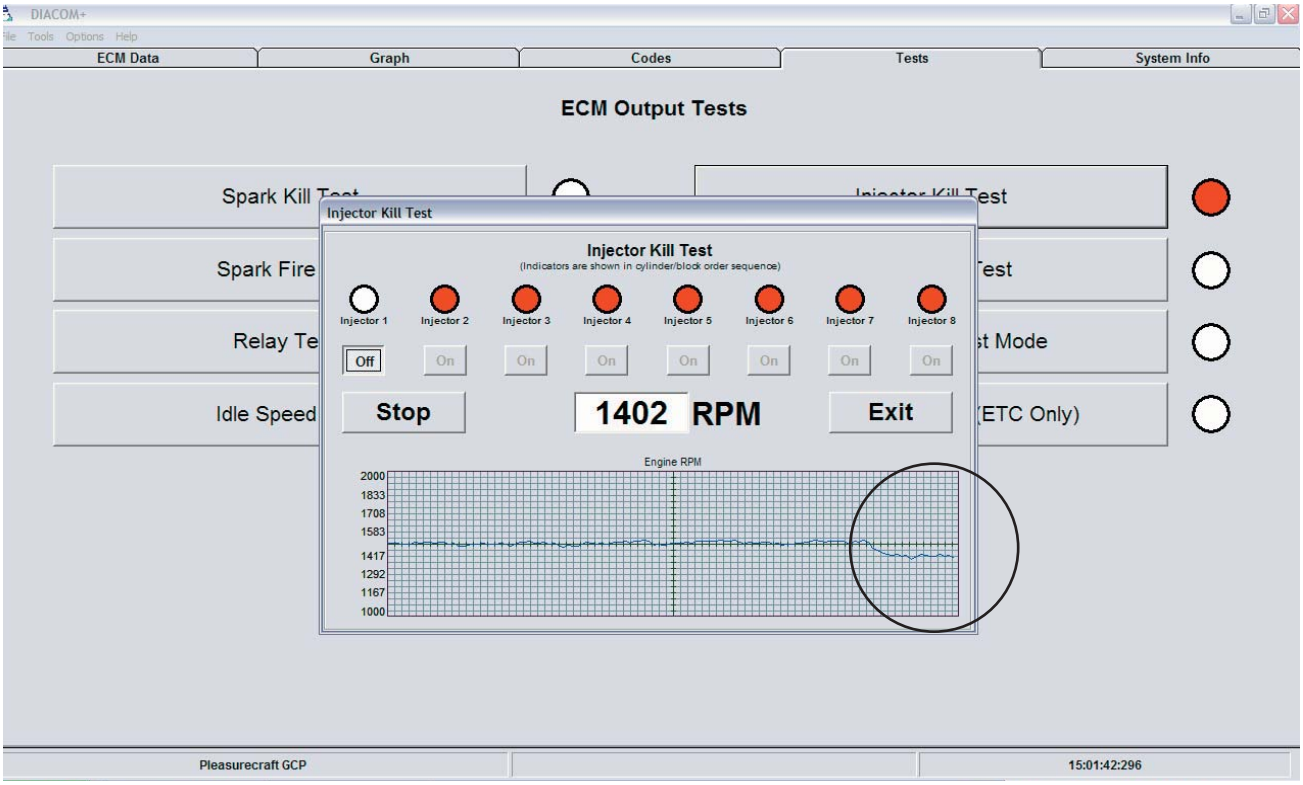


INJECTOR KILL TEST

This test and the Spark Kill Test are similar to the MEFI Power Balance Test. New with ECM-07 is the sequential fire of a cylinder. Only one cylinder is fueled at a time and only one cylinder is fired at a time. For the Injector Kill Test you will command the ECM to turn off the fuel to a specified cylinder. If the cylinder is functioning normally you will see a reduction in RPM when the cylinder is turned OFF.

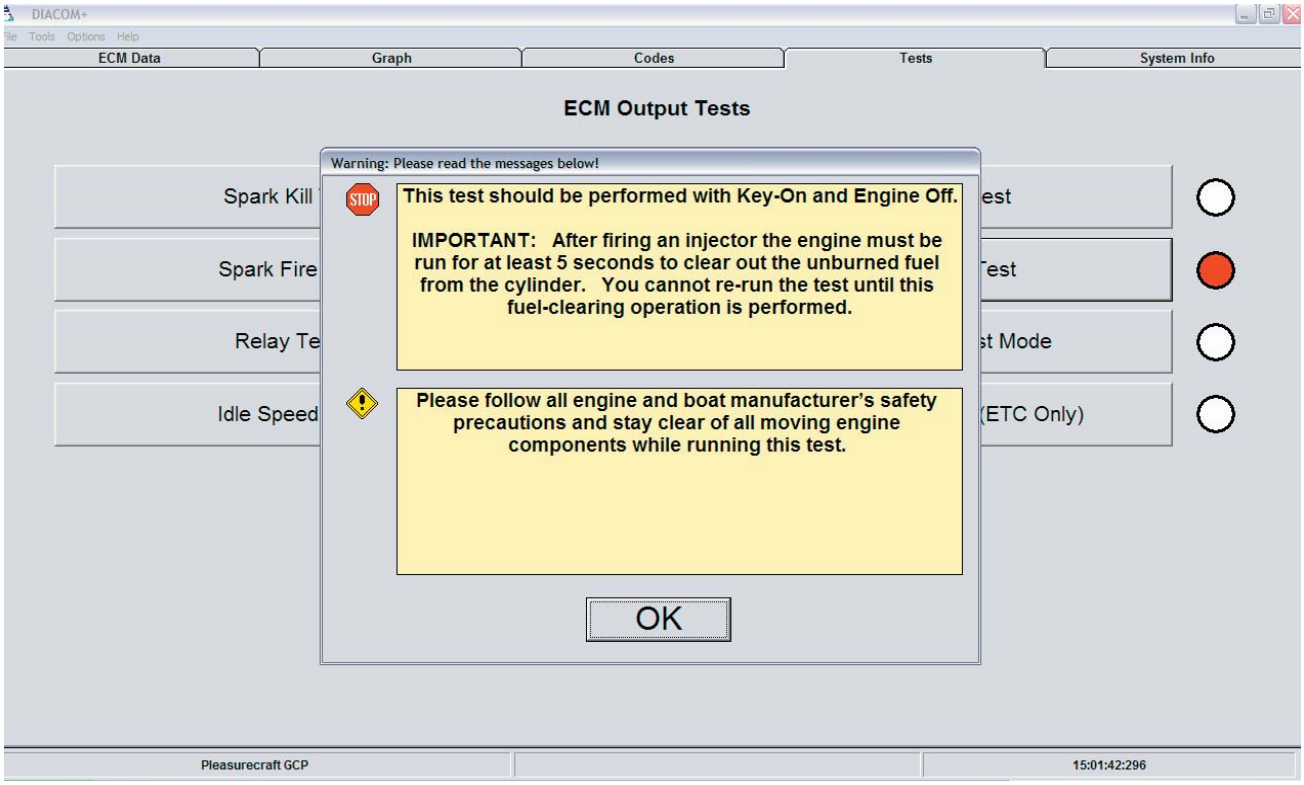


INJECTOR KILL TEST SCREEN

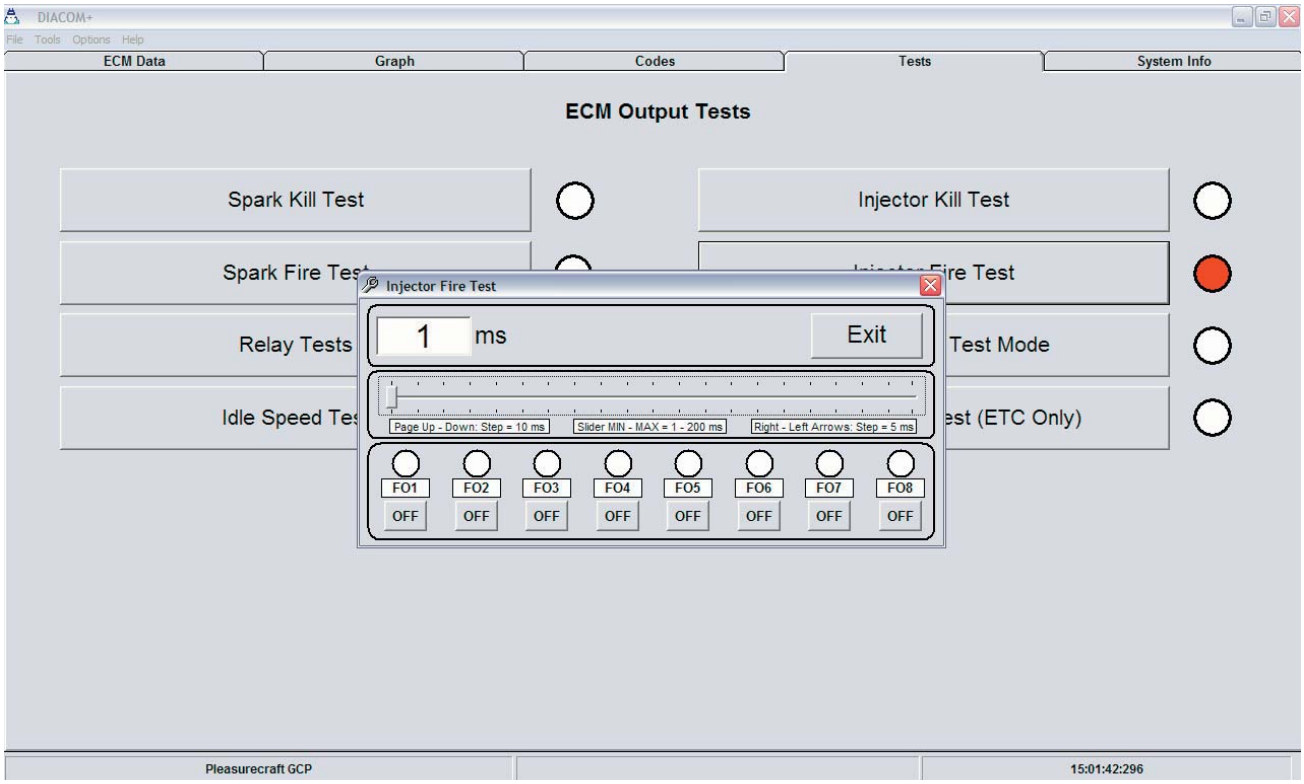


INJECTOR FIRE TEST

This test will fire individual injectors. The test is performed with the Key ON Engine OFF. Be sure to observe all warnings associated with this test. The engine should be run for at least 5 minutes after firing an injector to clear out the unburned fuel. Extreme care must be taken to prevent hydrostatically locking a cylinder with fuel by performing this test

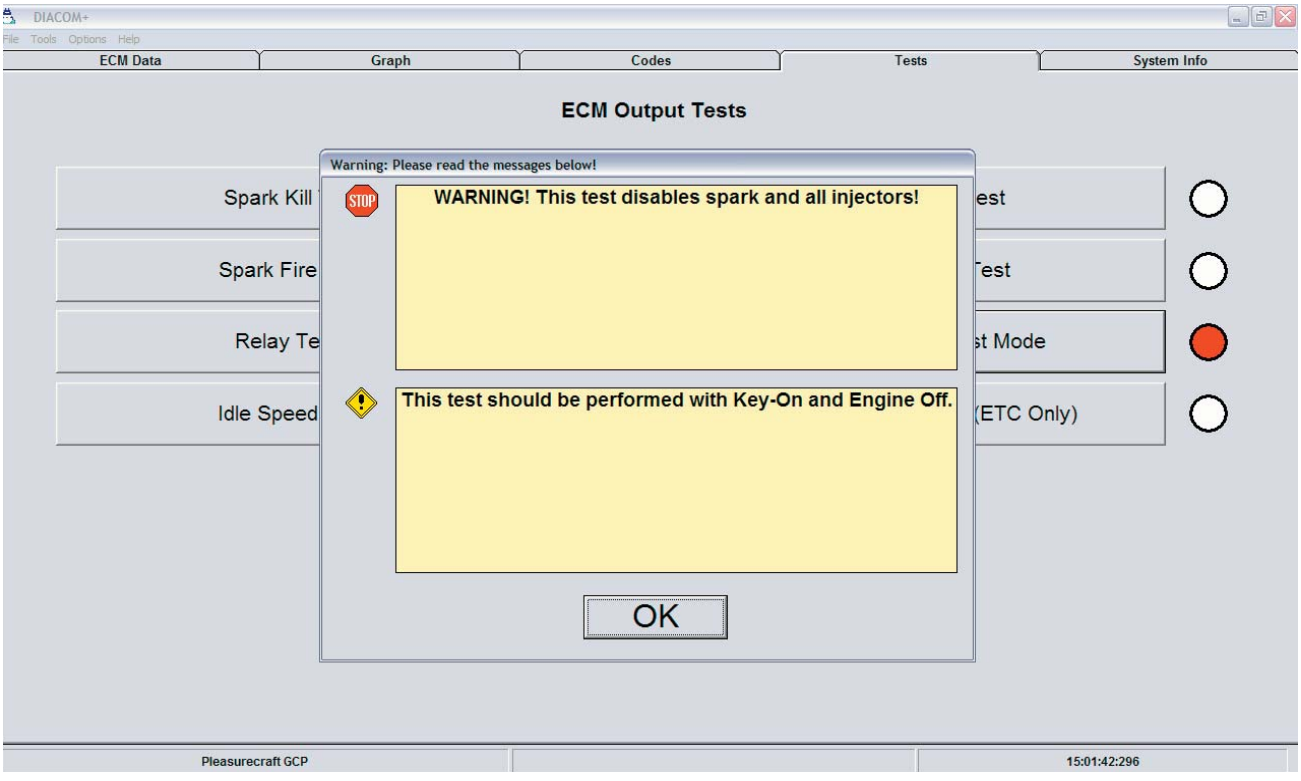


INJECTOR FIRE TEST SCREEN

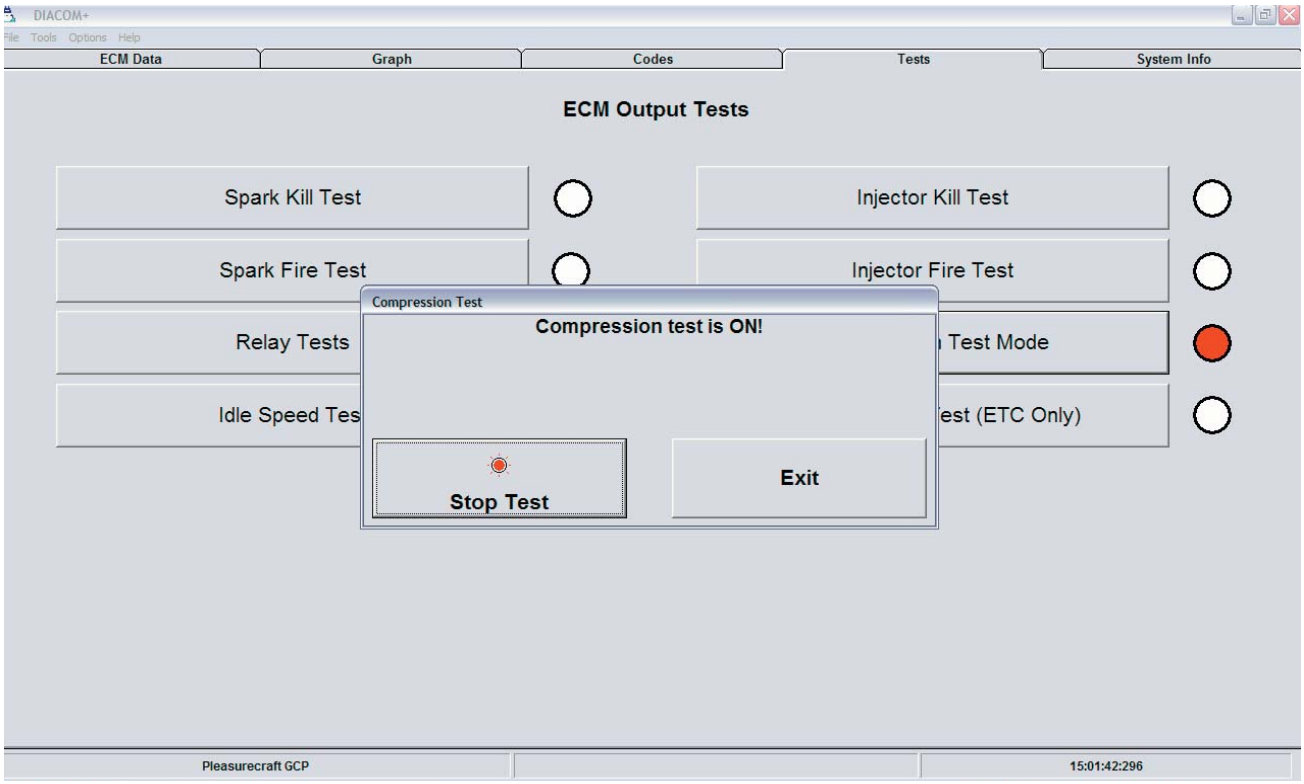


COMPRESSION TEST MODE

When selected this test will disable spark and fuel to the engine so a cylinder compression test may be performed.

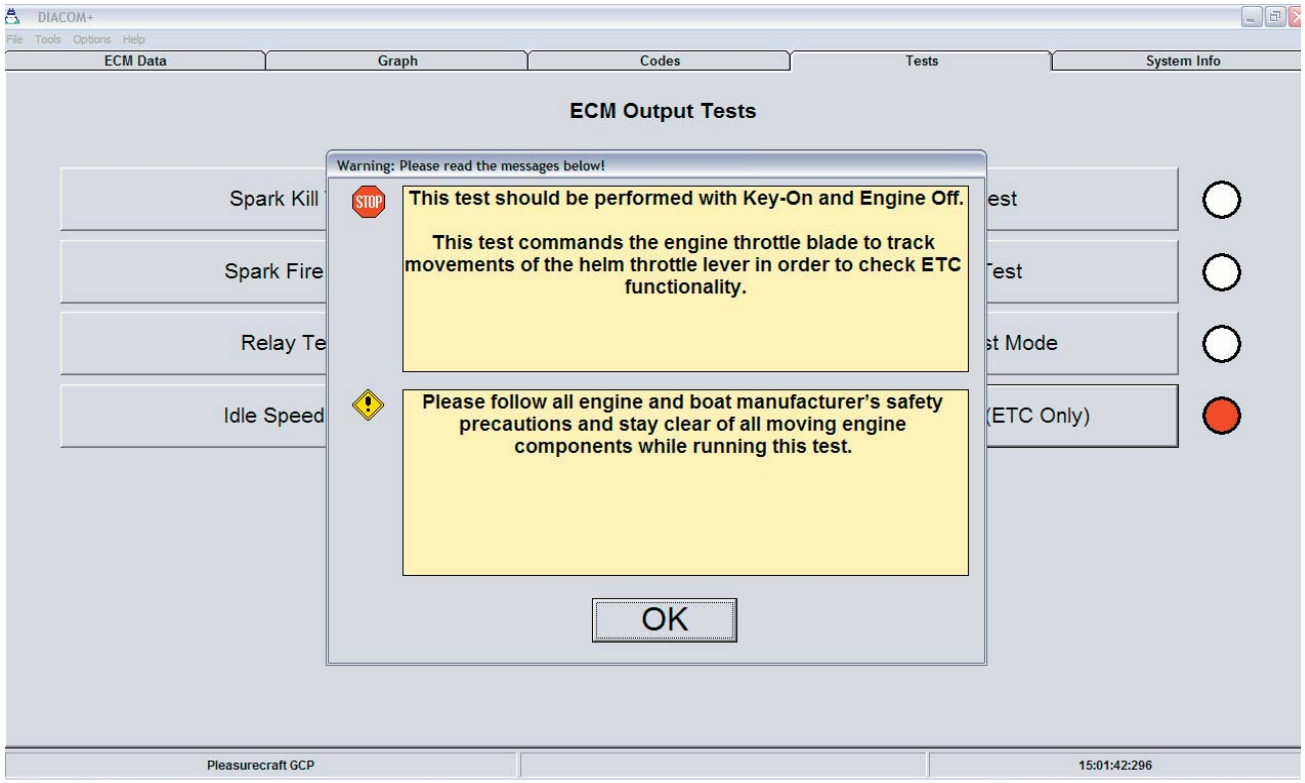


COMPRESSION TEST MODE SCREEN

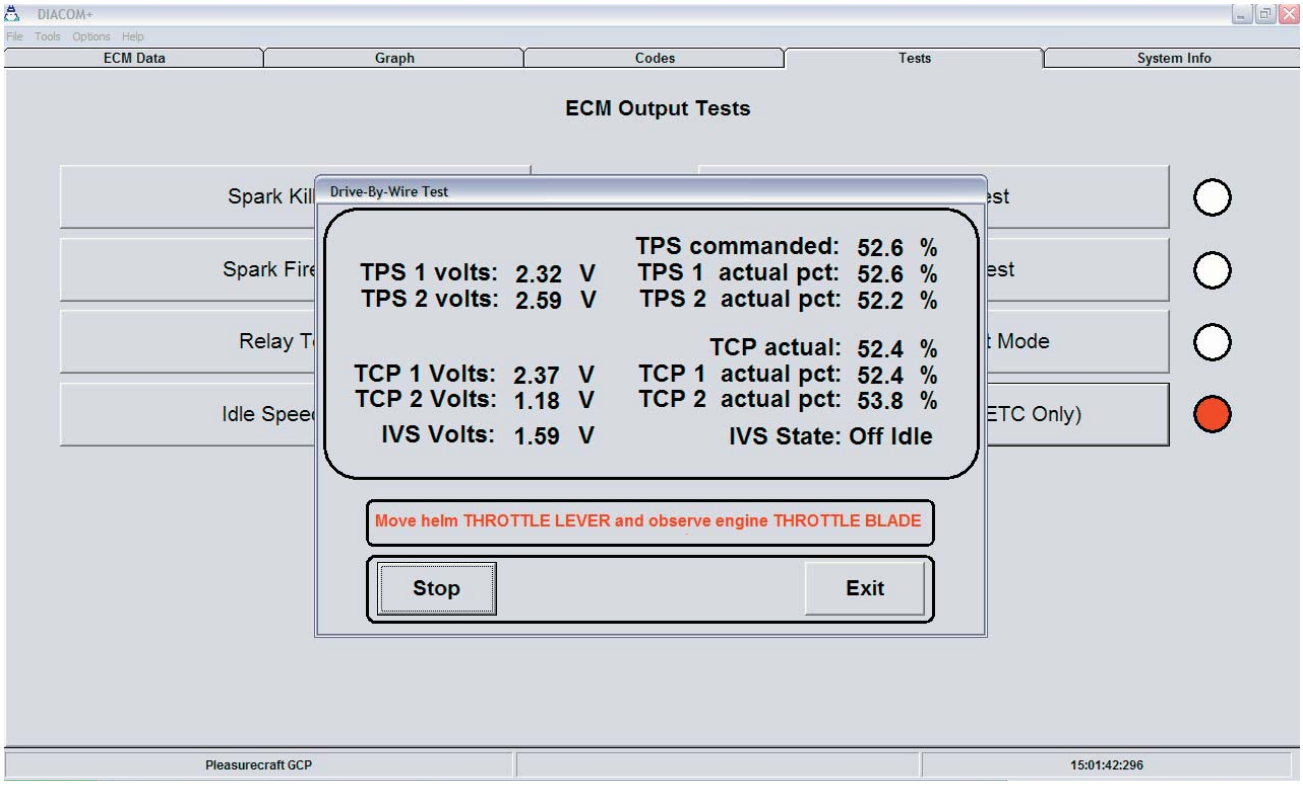


DRIVE-BY-WIRE TEST (ETC ONLY)

This test allows you to verify throttle body operation in the Key ON Engine OFF mode. Under normal operating conditions, the throttle plate will not move with throttle handle movement in the Key On Engine OFF mode, throttle plate movement is restricted to Engine Running mode only.

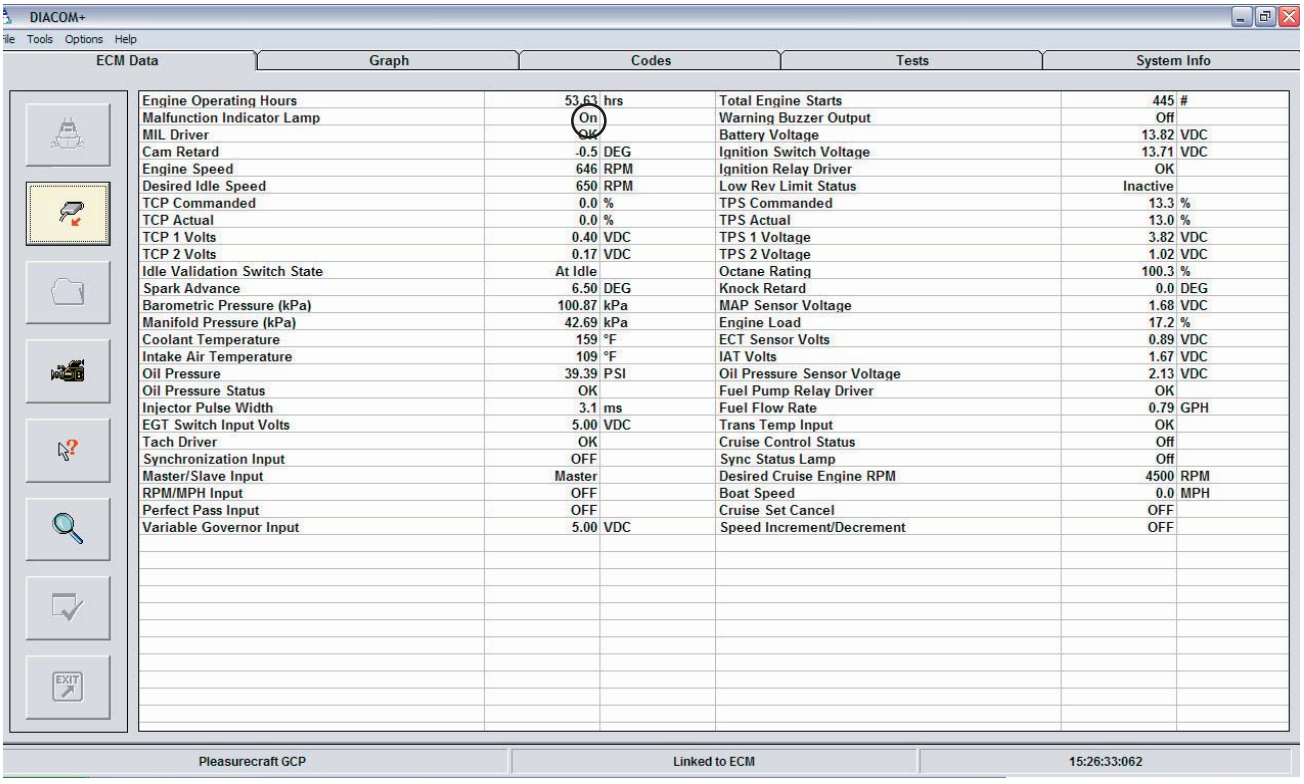


DRIVE-BY-WIRE TEST (ETC ONLY) SCREEN



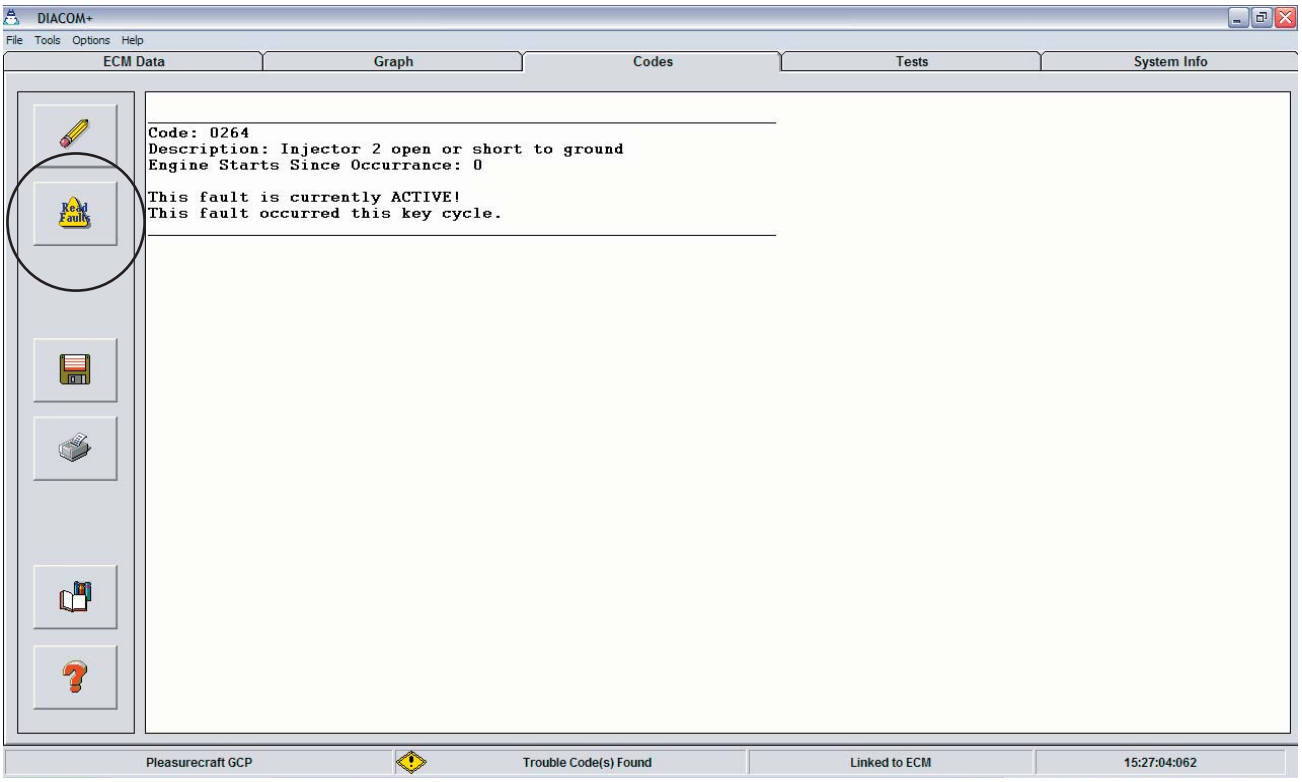
ACTIVE FAULT ECM DATA SCREEN

A fault has occurred and the ECM-07 has stored a DTC and lit the MIL.



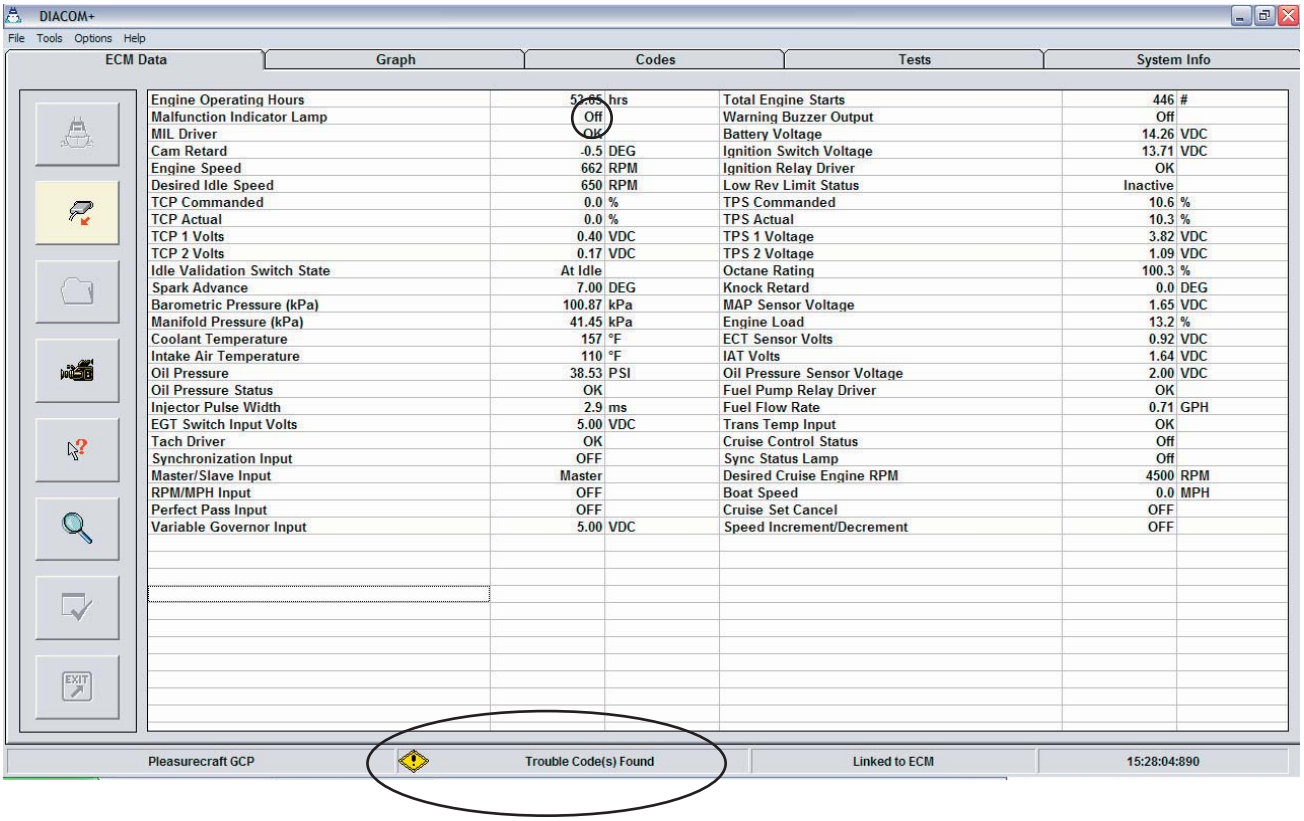
ACTIVE FAULT CODES SCREEN

When a fault occurs, you must open the Codes screen to see what the fault is. Upon entering the Codes screen you must left click the Read Faults icon to view the diagnostic message..



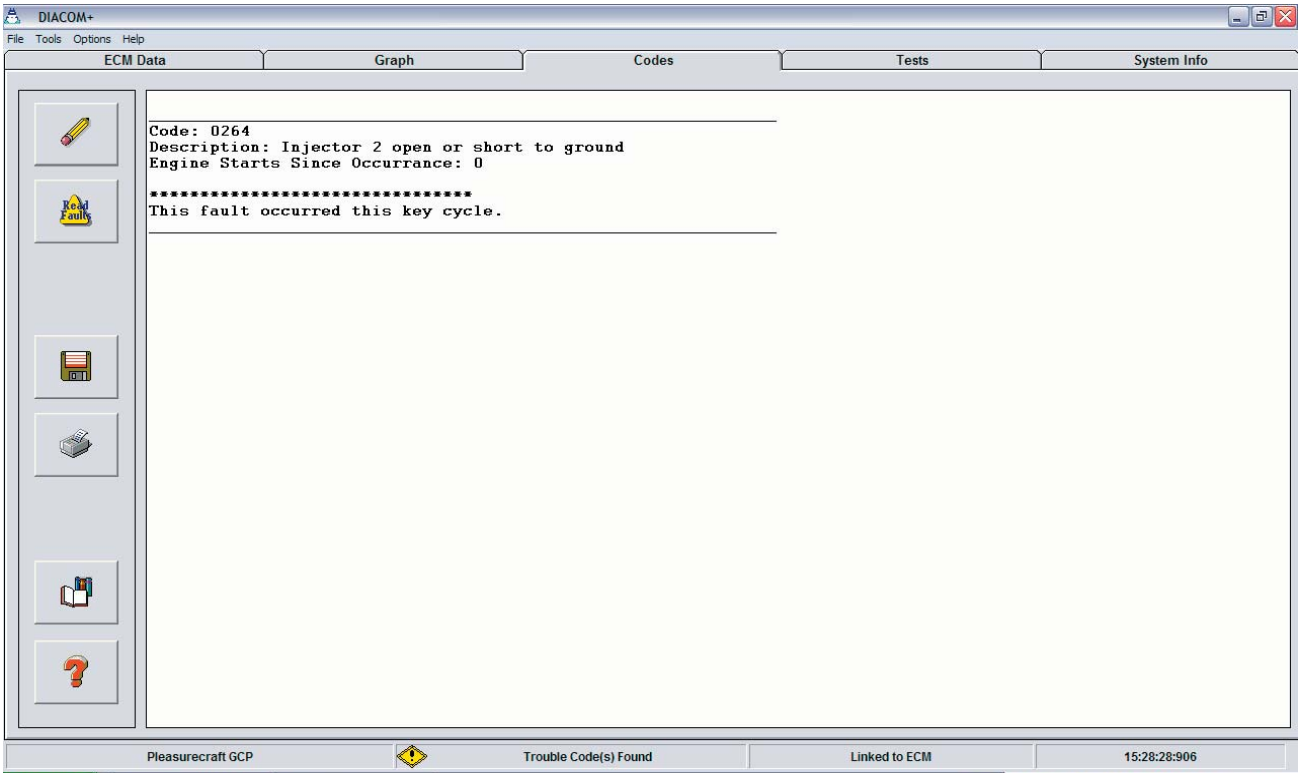
IN-ACTIVE FAULT ECM DATA SCREEN

A fault occurred and the ECM-07 has stored a DTC. Note that if the fault is not active the MIL will not be lit. Diacom does display the Trouble Codes Found flag indicating a fault is stored in the ECM memory.



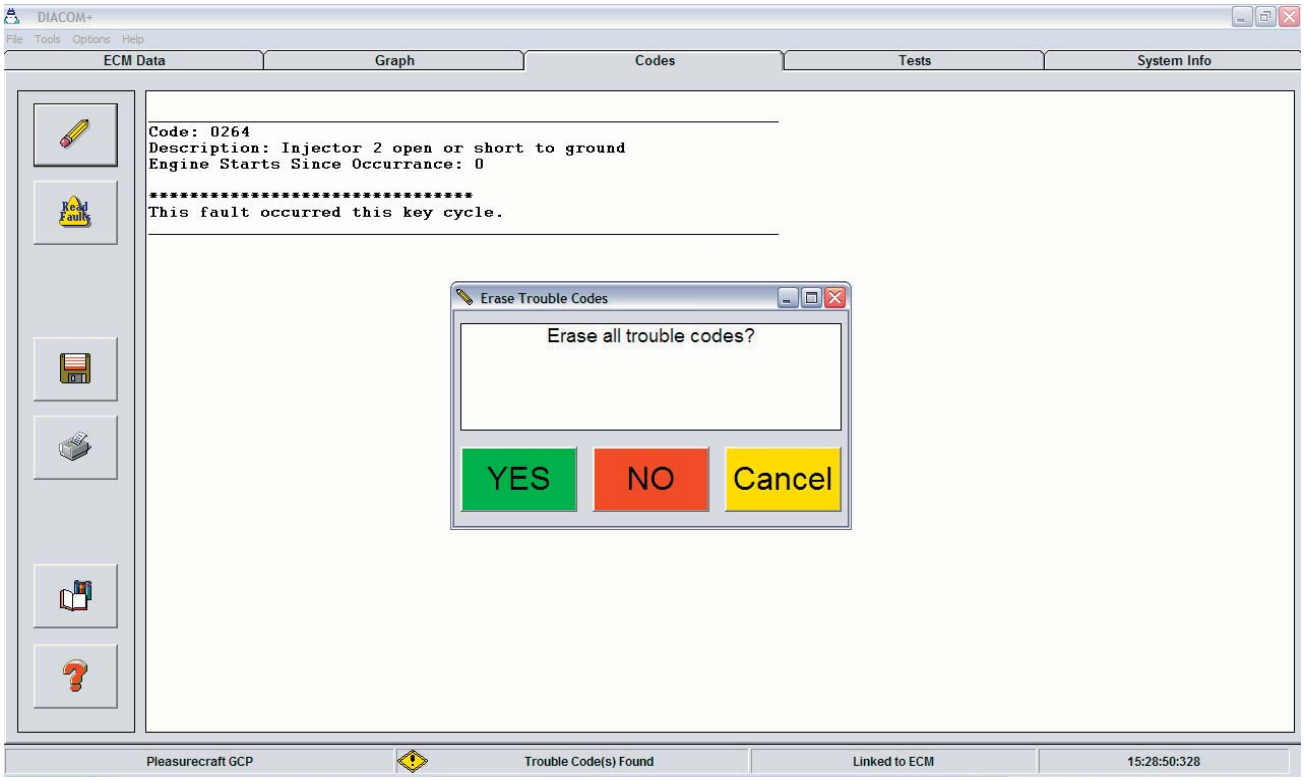
IN-ACTIVE FAULT CODES SCREEN

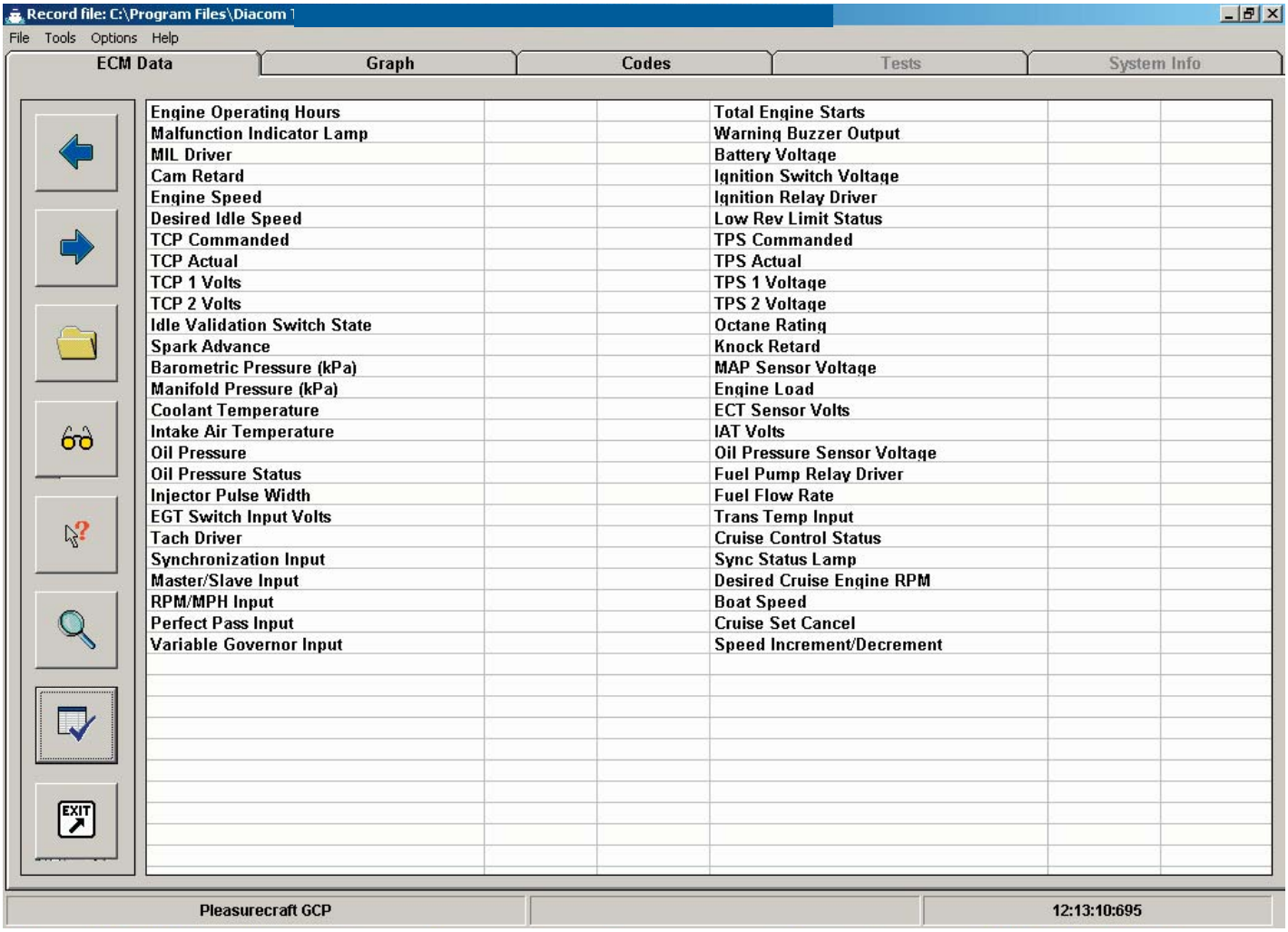
When a fault occurs, you must open the Codes screen to see what the fault is. Upon entering the Codes screen you must left click the Read Faults icon to view the diagnostic message.



CLEAR FAULT CODES SCREEN

To clear DTC(s) you must left click on the Pencil icon then select YES to clear the codes. Inactive codes may be cleared, if a fault is currently active the code will return even after clearing. You must turn the Ignition OFF to complete the clear codes cycle.





PEG ECM-07 - PREFERRED SCREEN

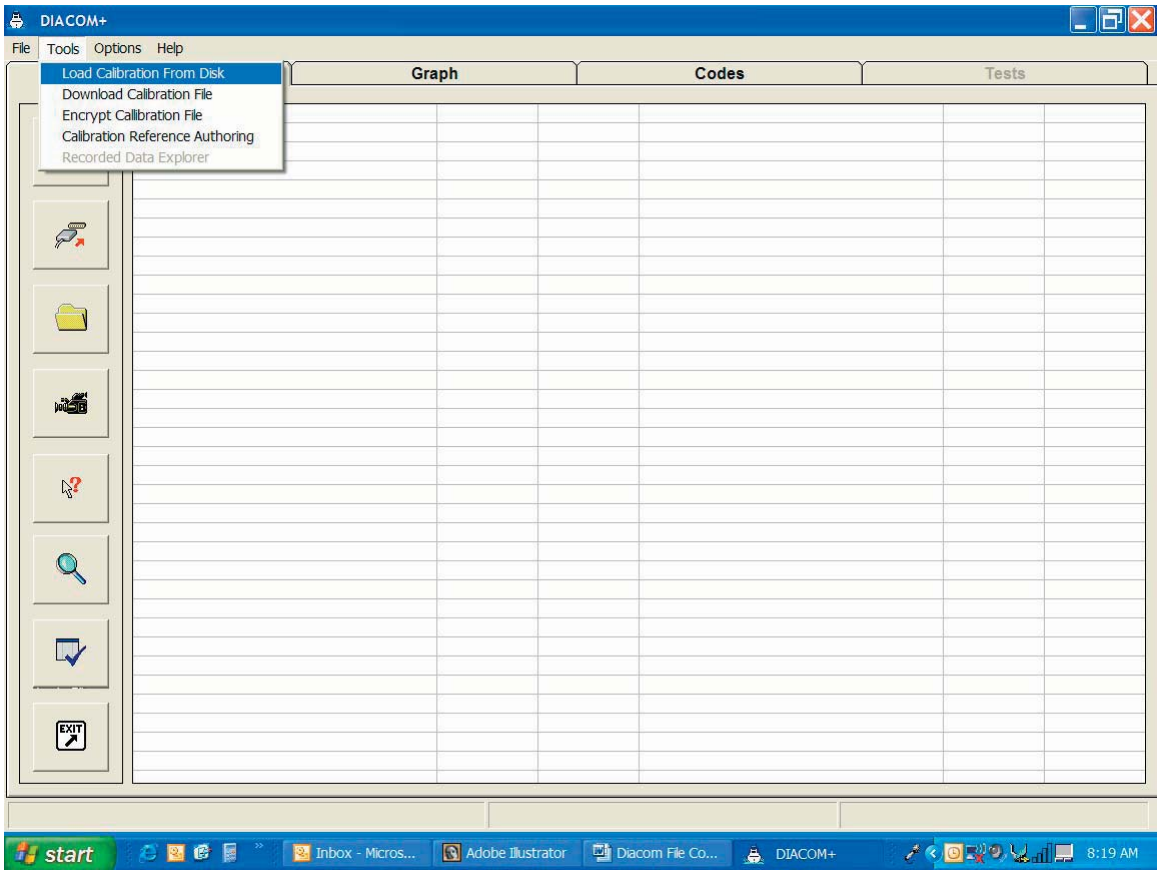
The following pages provide a sample of using the calibration download feature in the Diacom program. The sample shown is for a MEFI 4B calibration download. An ECM-07 download would follow a similar process. As you can see in the sample provided, Diacom will prompt you each step of the way. When performing an ECM-07 download, you will connect Diacom through the Diacom CAN Network Adapter to the CAN Network adapter on the engine harness (located next to the DLC connector). It is important to note that you should always ensure that the battery is charged on your laptop prior to beginning a calibration download. An ECM-07 download can take as long as 6-12 minutes to execute properly.

Copying Database and Calibration Files to Hard Drive

This form facilitates the copying of files from a disk to a selected calibration folder on your hard drive. The new algorithm in this form will open the selected database file prior to being transferred and retrieve all the references to the calibration files. Once that information is obtained, it will search the entire location for those calibration files and transfer them together with the database file into the newly selected folder. If a referenced file is not found, a message box will be displayed informing you of the missing file name.

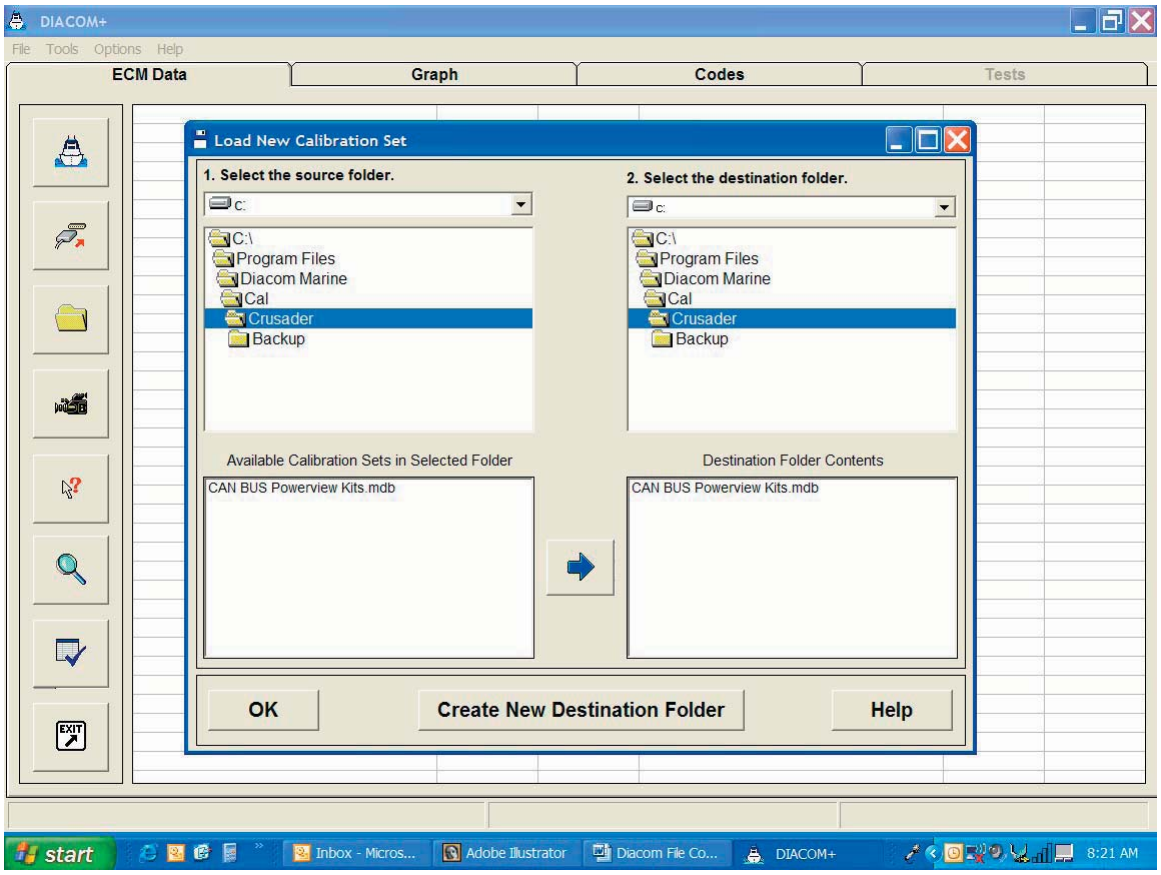
To copy a new calibration set from one location to another, perform the following steps:

1. Open the Diacom Program.
2. Insert CD into your CD drive.
3. Select **Tools**, and then select **Load Calibration From Disk.**



4. Select the **Drive** of the disk where the source calibration set resides (this can be the CD drive on your computer).
5. Select the source **Folder** where the calibration set resides, if there is one.
6. In the **Available Calibration Sets** box, select the **CAN BUS Powerview Kits.mdb** database file. Please notice that this box will only display the database files (the files with the extension MDB) however, it will be your responsibility to copy all the related calibration files (with the CAL extension) in the same folder in order for the algorithm in the form to be able to find and copy those files together with the database file into the new destination folder.
7. Select the Destination drive.
8. Select the Destination folder. This can be any folder on your computer, but it is recommended that you select a drive where the Diacom program is located

(preferably under the default Cal\Crusader directory created by default by Diacom installation program).

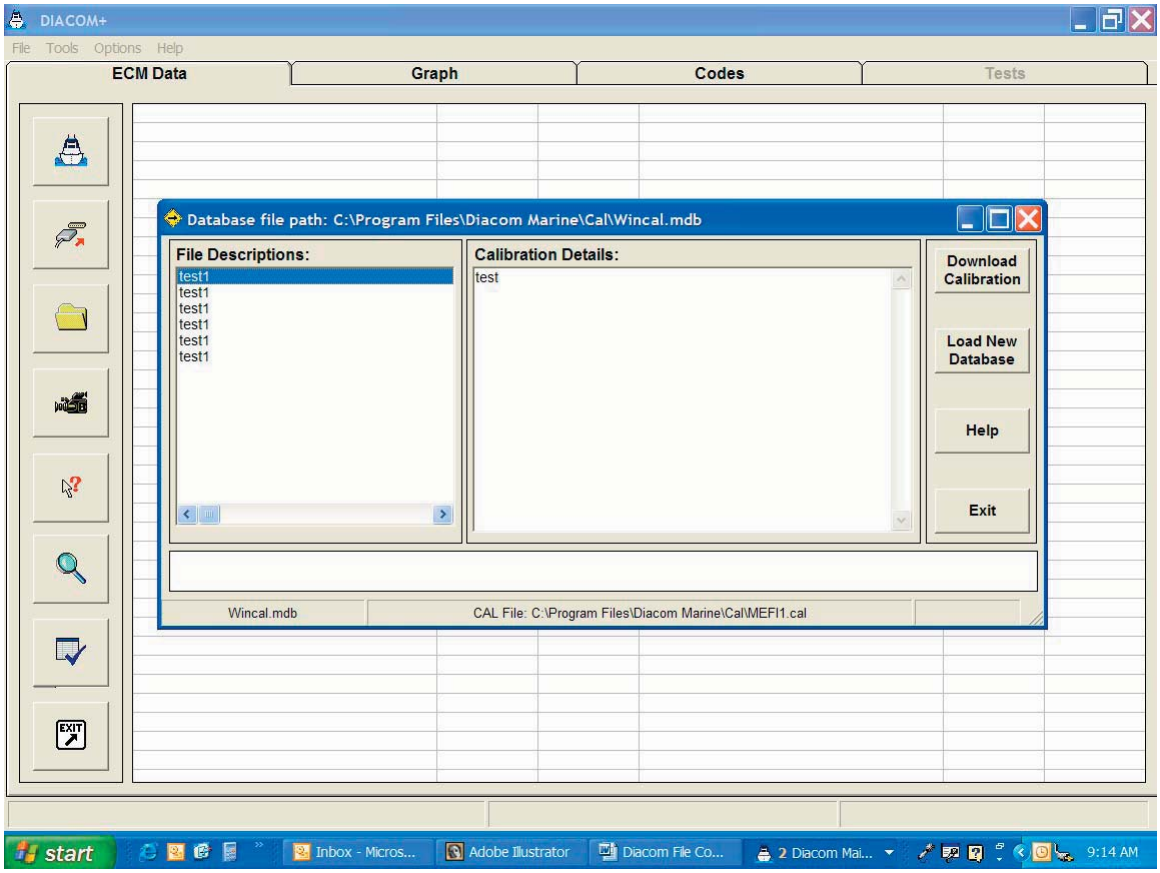


9. Click and hold the left mouse button on the Source Database File and drag the mouse cursor over to the destination file box on the right. If no messages appear, then the copy process ended successfully, otherwise the popup messages will display which calibration files could not be found in the folder where the calibration database files resides. To remedy this situation, please make sure that all calibration files (CAL extension) referenced in the calibration database file (MDB extension) can be found in the same folder. You can also select a source file and press the left mouse button to copy the new database to the destination folder.

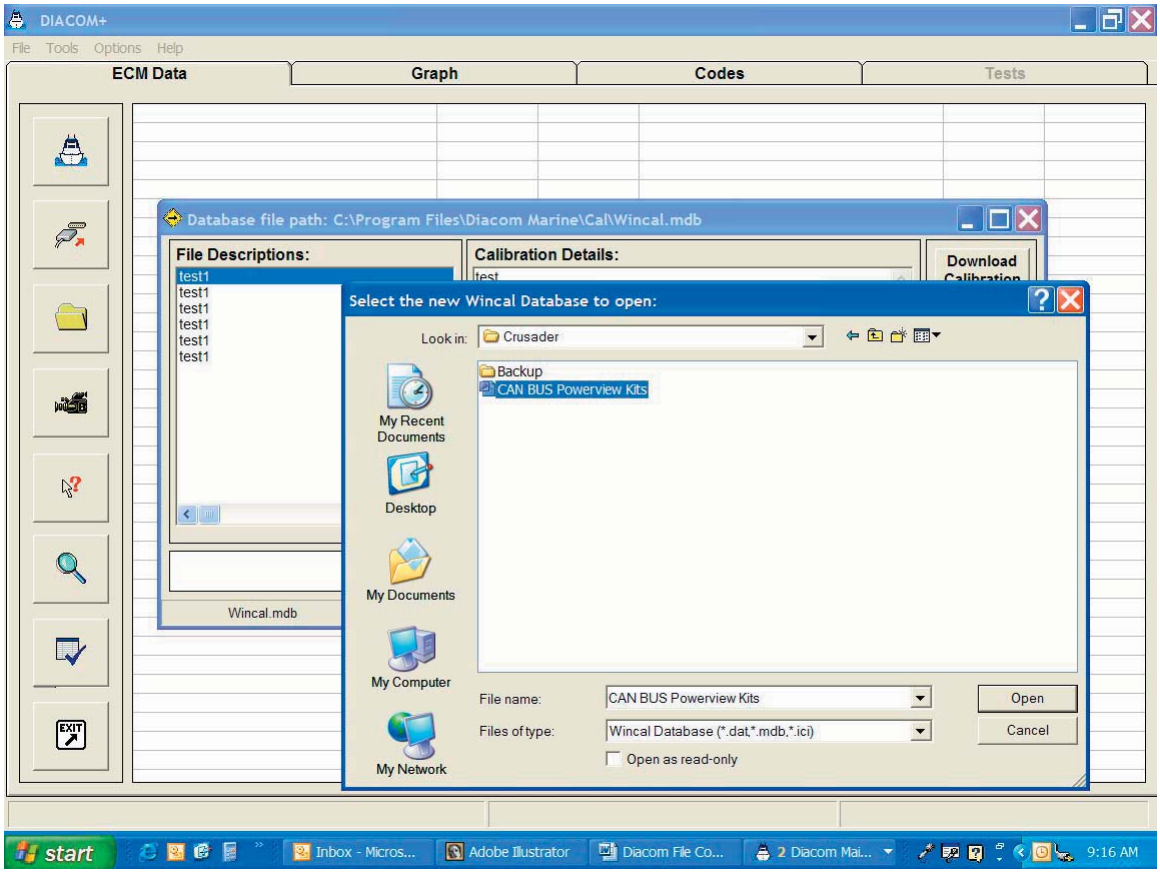
Downloading a New Calibration

To download a new calibration into an ECM, follow the steps below:

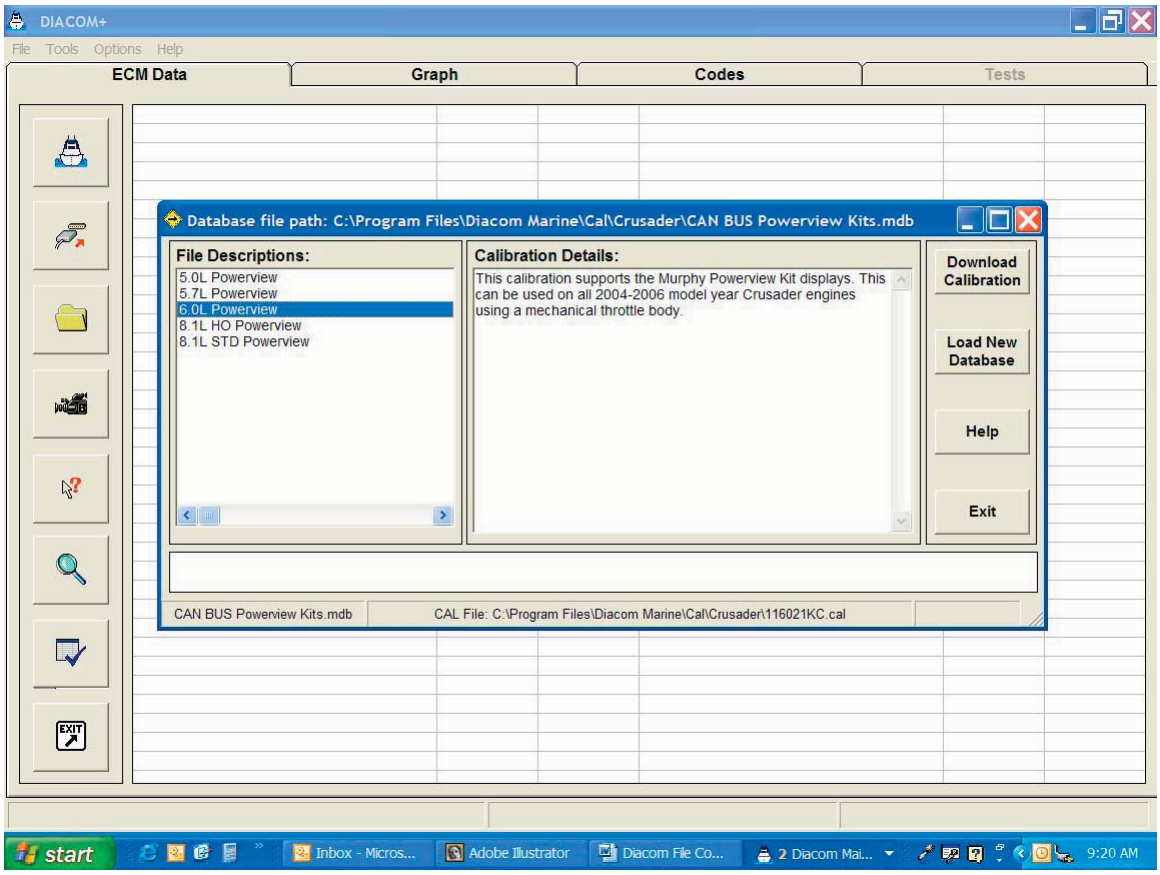
1. In the Diacom Tools menu, select **Download Calibration** menu to activate the dialog box below.



2. Select **Load New Database.**



3. Select the database file **CAN BUS Powerview Kits.**



4. From the displayed list of File Descriptions, select the appropriate calibration to download.
5. Press the **Download Calibration** button to start the download process.
6. After the completion of the download, you are instructed to turn the ignition OFF for 5 seconds in order for the new calibration to be written to the ECM's internal memory.

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