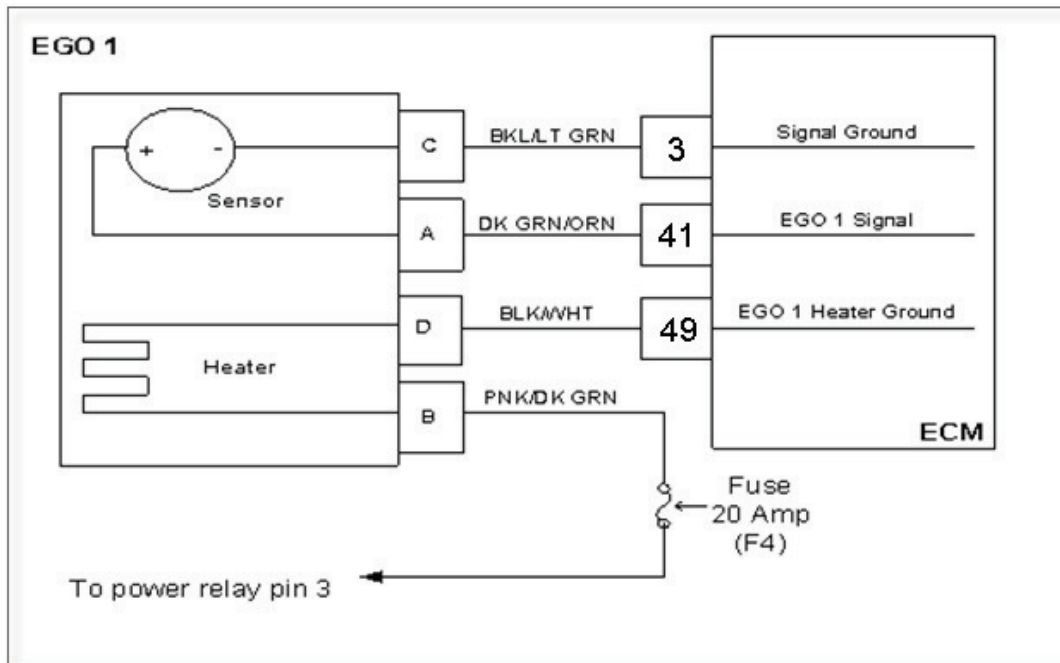


## DIAGNOSTIC TROUBLE CODE (DTC) – CROSS REFERENCE CHART

PSI- GCP Diagnostic Cross Reference		DTC Set 2		PSI- GCP Diagnostic Cross Reference		DTC Set 2	
Fault Index	Description	SPN-2	FMI-2	Fault Index	Description	SPN-2	FMI-2
0	DTC 108: MAP pressure high	106	16	45	DTC 1164: Adaptive-learn NG low	520203	1
1	DTC 107: MAP voltage low	106	4	46	DTC 261: Injector 1 open or short to ground	651	5
2	DTC 118: ECT voltage high	110	3	47	DTC 264: Injector 2 open or short to ground	652	5
3	DTC 117: ECT voltage low	110	4	48	DTC 267: Injector 3 open or short to ground	653	5
4	DTC 116: ECT higher than expected stage 1	110	15	49	DTC 270: Injector 4 open or short to ground	654	5
5	DTC 113: IAT voltage high	105	3	50	DTC 273: Injector 5 open or short to ground	655	5
6	DTC 112: IAT voltage low	105	4	51	DTC 276: Injector 6 open or short to ground	656	5
7	DTC 2229: BP pressure high	108	0	52	DTC 279: Injector 7 open or short to ground	657	5
8	DTC 129: BP pressure low	108	1	53	DTC 282: Injector 8 open or short to ground	658	5
9	DTC 563: Vbat voltage high	168	15	54	DTC 285: Injector 9 open or short to ground	659	5
10	DTC 562: Vbat voltage low	168	17	55	DTC 288: Injector 10 open or short to ground	660	5
11	DTC 643: Sensor supply voltage 1 high	1079	3	56	DTC 262: Injector 1 coil shorted	651	6
12	DTC 642: Sensor supply voltage 1 low	1079	4	57	DTC 265: Injector 2 coil shorted	652	6
13	DTC 123: TPS1 voltage high	51	3	58	DTC 268: Injector 3 coil shorted	653	6
14	DTC 122: TPS1 voltage low	51	4	59	DTC 271: Injector 4 coil shorted	654	6
15	DTC 223: TPS2 voltage high	520251	3	60	DTC 274: Injector 5 coil shorted	655	6
16	DTC 222: TPS2 voltage low	520251	4	61	DTC 277: Injector 6 coil shorted	656	6
17	DTC 221: TPS1-2 higher than expected	51	0	62	DTC 280: Injector 7 coil shorted	657	6
18	DTC 121: TPS1-2 lower than expected	51	1	63	DTC 283: Injector 8 coil shorted	658	6
19	DTC 2122: FPP1 voltage high	91	3	64	DTC 286: Injector 9 coil shorted	659	6
20	DTC 2123: FPP1 voltage low	91	4	65	DTC 289: Injector 10 coil shorted	660	6
21	DTC 2128: FPP2 voltage high	29	3	66	DTC 2300: Spark coil 1 primary open or short to ground	1268	5
22	DTC 2127: FPP2 voltage low	29	4	67	DTC 2303: Spark coil 2 primary open or short to ground	1269	5
23	DTC 2115: FPP1 higher than IVS	91	0	68	DTC 2306: Spark coil 3 primary open or short to ground	1270	5
24	DTC 2139: FPP1 lower than IVS	91	1	69	DTC 2309: Spark coil 4 primary open or short to ground	1271	5
25	DTC 2116: FPP2 higher than IVS	29	0	70	DTC 2312: Spark coil 5 primary open or short to ground	1272	5
26	DTC 2140: FPP2 lower than IVS	29	1	71	DTC 2315: Spark coil 6 primary open or short to ground	1273	5
27	DTC 2126: FPP1-2 higher than expected	91	16	72	DTC 2318: Spark coil 7 primary open or short to ground	1274	5
28	DTC 2121: FPP1-2 lower than expected	91	18	73	DTC 2321: Spark coil 8 primary open or short to ground	1275	5
29	DTC 524: Oil pressure low	100	1	74	DTC 2324: Spark coil 9 primary open or short to ground	1276	5
30	DTC 171: Adaptive-learn gasoline bank1 high	520200	0	75	DTC 2327: Spark coil 10 primary open or short to ground	1277	5
31	DTC 172: Adaptive-learn gasoline bank1 low	520200	1	76	DTC 2301: Spark coil 1 primary shorted	1268	6
32	DTC 1155: Closed-loop gasoline bank1 high	520204	0	77	DTC 2304: Spark coil 2 primary shorted	1269	6
33	DTC 1156: Closed-loop gasoline bank1 low	520204	1	78	DTC 2307: Spark coil 3 primary shorted	1270	6
34	DTC 1157: Closed-loop gasoline bank2 high	520205	0	79	DTC 2310: Spark coil 4 primary shorted	1271	6
35	DTC 1158: Closed-loop gasoline bank2 low	520205	1	80	DTC 2313: Spark coil 5 primary shorted	1272	6
36	DTC 1151: Closed-loop LPG high	520206	0	81	DTC 2316: Spark coil 6 primary shorted	1273	6
37	DTC 1152: Closed-loop LPG low	520206	1	82	DTC 2319: Spark coil 7 primary shorted	1274	6
38	DTC 1153: Closed-loop NG high	520207	0	83	DTC 2322: Spark coil 8 primary shorted	1275	6
39	DTC 1154: Closed-loop NG low	520207	1	84	DTC 2325: Spark coil 9 primary shorted	1276	6
40	DTC 174: Adaptive-learn gasoline bank2 high	520201	0	85	DTC 2328: Spark coil 10 primary shorted	1277	6
41	DTC 175: Adaptive-learn gasoline bank2 low	520201	1	86	DTC 217: ECT higher than expected stage 2	110	0
42	DTC 1161: Adaptive-learn LPG high	520202	0	87	DTC 111: IAT higher than expected stage 1	105	15
43	DTC 1162: Adaptive-learn LPG low	520202	1	88	DTC 127: IAT higher than expected stage 2	105	0
44	DTC 1163: Adaptive-learn NG high	520203	0	89	DTC 327: Knock1 sensor open or not present	731	4

## DTC 1163-Adaptive Learn High NG



### Conditions for Setting the DTC

- Heated Oxygen Sensor
- Check Condition-Engine Running
- Fault Condition-Adaptive multiplier out of range greater than 30%
- MIL-ON

### Circuit Description

The EGO 1 sensor is used to determine if the fuel flow to the engine is correct by measuring the oxygen content in the exhaust gas. The ECM uses this information to correct the fuel flow with the Closed Loop multiplier and Adaptive multiplier. This fault will set if the adaptive multiplier exceeds the limits of normal operation. Always run the fuel system diagnostic checks before using the following diagnostic chat.

### Diagnostic Aid

**Oxygen Sensor Wire** Heated Oxygen sensor wires may be mis-routed and contacting the exhaust manifold.

**Vacuum Leaks** Large vacuum leaks and crankcase leaks can cause a lean exhaust condition at especially at light load.

**Fuel Mixer** System can be lean due to faulty EPR (Electronic Pressure Regulator) or faulty fuel mixer.

**Fuel Pressure** Low fuel pressure, faulty fuel regulator or contaminated fuel filter can cause fuel the system to run lean

**Exhaust Leaks** If there is an exhaust leak, outside air can be pulled into the exhaust and past the O2 sensor causing a false lean condition.

**Fuel Quality** Contaminated or spoiled fuel can cause the fuel system to be lean.

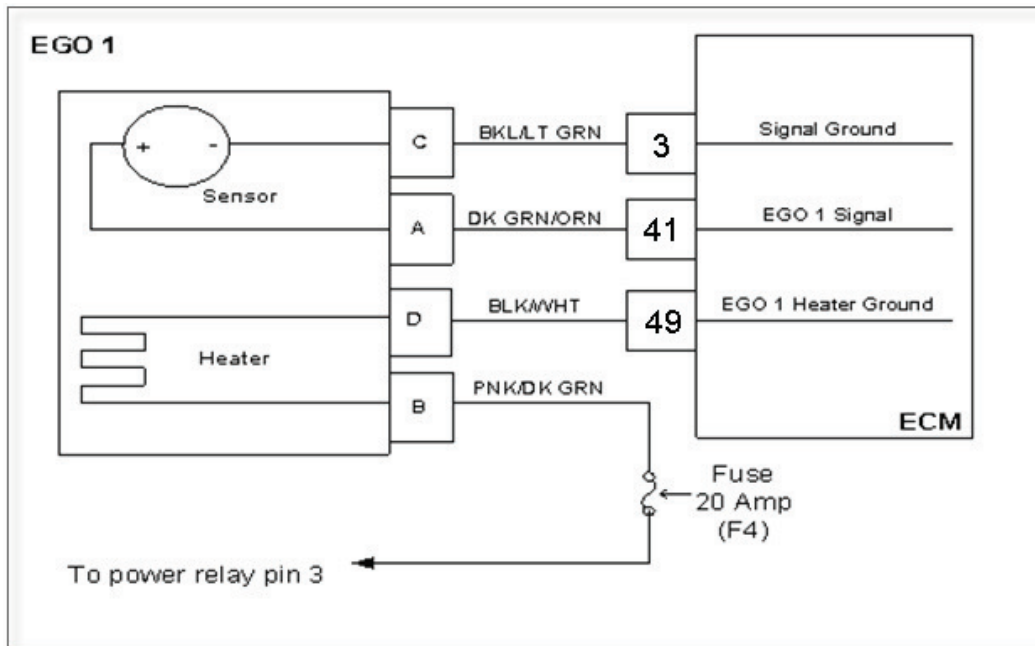
**Ground Problem** ECM grounds must be clean, tight and in the proper location.

## DTC 1161 Adaptive Learn High LPG

Step	Action	Value(s)	Yes	No
1	<ul style="list-style-type: none"> <li>• Perform the On-Board (OBD) System Check?</li> </ul> Are any other DTCs present?		Go to Step (3)	Go to Step (2)
2	Visually and physically check the following items: <ul style="list-style-type: none"> <li>• The air intake duct for being collapsed or restricted</li> <li>• The air filter for being plugged</li> <li>• System power fuses are good and in the proper location</li> <li>• The EGO 1 sensor installed securely and the wire leads not contacting the exhaust manifold or ignition wires</li> <li>• ECM grounds must be clean and tight. Refer to Engine Electrical Power and Ground Distribution</li> <li>• Fuel System Diagnostics. Refer to Fuel System Diagnostics</li> </ul> Was a repair made?		Go to Step (9)	Go to Step (4)
3	<ul style="list-style-type: none"> <li>• Diagnose any other DTC codes before proceeding with this chart. Always repair existing codes starting with the lowest numerical code set first.</li> </ul> Have any other DTC codes been detected, diagnosed and repaired?		Go to Step (9)	Go to Step (4)
4	<ul style="list-style-type: none"> <li>• Disconnect EGO1 connector C005</li> <li>• Using a DVOM check for voltage between EGO 1 connector pin B and engine ground</li> <li>• Key ON</li> </ul> (CHECK MUST BE MADE WITHIN 30 SECONDS OR BEFORE POWER RELAY SHUTS DOWN) Do you have voltage?	System voltage	Go to Step (5)	Repair the open EGO power circuit as necessary. Refer to Wiring Repairs in Engine Electrical.
5	<ul style="list-style-type: none"> <li>• Key OFF</li> <li>• Disconnect EGO 1 sensor wire harness connector C005</li> <li>• Disconnect ECM wire harness connector C001</li> <li>• Key ON</li> <li>• Using a high impedance DVOM check for continuity between EGO 1 connector signal pin A and engine ground</li> </ul> Do you have continuity?		Repair the shorted circuit as necessary. Refer to Wiring Repairs in Engine Electrical.	Go to Step (6)

Step	Action	Value(s)	Yes	No
6	<ul style="list-style-type: none"> <li>Using a high impedance DVOM check for continuity between EGO 1 connector signal ground pin C and EGO 1 signal pin A</li> </ul> Do you have continuity?		Repair the shorted circuit as necessary. Refer to Wiring Repairs in Engine Electrical.	Go to Step (7)
7	<ul style="list-style-type: none"> <li>Using a high impedance DVOM check for continuity between EGO 1 heater ground pin D and ECM pin 49</li> </ul> Do you have continuity?		Go to Step (8)	Repair the open EGO heater ground
8	<ul style="list-style-type: none"> <li>Replace EGO 1 sensor</li> </ul> Is the replacement complete?		Go to Step (9)	-
9	<ul style="list-style-type: none"> <li>Remove all test equipment except the DST.</li> <li>Connect any disconnected components, fuses, etc.</li> <li>Using the DST clear DTC information from the ECM.</li> <li>Turn the ignition OFF and wait 30 seconds.</li> <li>Start the engine and operate the vehicle to full operating temperature</li> <li>Observe the MIL</li> <li>Observe engine performance and driveability</li> <li>After operating the engine within the test parameters of DTC-1161 check for any stored codes.</li> </ul> Does the engine operate normally with no stored codes?		System OK	Go to OBD System Check

## DTC 1164-Adaptive Learn Low NG



### Conditions for Setting the DTC

- Heated Oxygen Sensor
- Check Condition-Engine running
- Fault Condition-Adaptive multiplier out of range greater than -30%
- MIL-ON

### Circuit Description

The EGO1 sensor is used to determine if the fuel flow to the engine is correct by measuring the oxygen content in the exhaust gas. The ECM uses this information to correct the fuel flow with the Closed Loop multiplier and Adaptive multiplier. This fault will set if the adaptive multiplier exceeds the limits of normal operation. Always run the fuel system diagnostics before using the following diagnostic chart.

### Diagnostic Aid

**Fuel System** High secondary fuel pressure will cause the system to run rich. A worn fuel mixer, faulty EPR (Electronic Pressure Regulator) may also cause the system to run rich.

**Fuel Quality** A drastic variation in fuel quality (very high butane content) may cause the fuel system to run rich. Be sure that the specified HD-5 or HD-10 motor fuel grade propane is used.

**Air Filter** A plugged, damaged or modified air filter may cause the system to run rich.

## DTC 1164-Adaptive Learn Low NG

Step	Action	Value(s)	Yes	No
1	<ul style="list-style-type: none"> <li>• Perform the On-Board (OBD) System Check?</li> </ul> Are any other DTCs present?		Go to Step (3)	Go to Step (2)
2	Visually and physically check the following items: <ul style="list-style-type: none"> <li>• The air intake duct for being collapsed or restricted</li> <li>• The air filter for being plugged</li> <li>• The EGO sensor is installed securely and the wire leads not damaged or contacting the secondary ignition wires</li> <li>• ECM grounds for being clean and tight.</li> <li>• Fuel system diagnostic checks</li> </ul> Was a repair made?		Go to Step (6)	Go to Step (4)
3	<ul style="list-style-type: none"> <li>• Diagnose any other DTC codes before proceeding with this chart.</li> </ul> Have any other DTC codes been detected, diagnosed and repaired?		Go to Step (6)	Go to Step (4)
4	<ul style="list-style-type: none"> <li>• Key OFF</li> <li>• Disconnect EGO sensor wire harness connector C005</li> <li>• Disconnect ECM wire harness connector C001</li> <li>• Key ON</li> <li>• Using a DVOM check for voltage at EGO 1 connector signal pin A and engine ground</li> </ul> Do you have voltage?		Repair the circuit as necessary. Refer to Wiring Repairs in Engine Electrical.	Go to Step (5)
5	<ul style="list-style-type: none"> <li>• Replace EGO sensor</li> </ul> Is the replacement complete?		Go to Step (6)	-
6	<ul style="list-style-type: none"> <li>• Remove all test equipment except the DST.</li> <li>• Connect any disconnected components, fuses, etc.</li> <li>• Using the DST clear DTC information from the ECM.</li> <li>• Turn the ignition OFF and wait 30 seconds.</li> <li>• Start the engine and operate the vehicle to full operating temperature</li> <li>• Observe the MIL</li> <li>• Observe engine performance and driveability</li> <li>• After operating the engine within the test parameters of DTC-1162 check for any stored codes.</li> </ul> Does the engine operate normally with no stored codes?		System OK	Go to OBD System Check