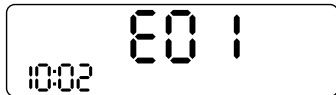




## AIR HEATER DIAGNOSTICS CODES



The Proheat Control Module (PCM) continually monitors the entire heater system.

If the self diagnostic system discover a problem, a Diagnostic Code number will be displayed on the Drivers Control Panel (DCP) and a Red light will flash continually at the top of the DCP until the diagnostic code is cleared.

Press the Timer/Enter Button  to clear the Diagnostic Code and the PCM will return to its normal state.

If the DCP reports a Diagnostic Code, check the possible causes noted in the list of Diagnostic Codes before clearing the DCP.

CODE	INDICATION	CONDITION	CHECK FOR
00	DCP Power Failure	System voltage has dropped below 9 Volts at the DCP.	<ul style="list-style-type: none"><li>• Code E00 is always displayed after the initial harness connection or reset of the DCP to the heater.</li><li>• If code continues Check the 4 pin communication harness between the DCP and the heater PCM</li><li>• Disconnected or dead battery.</li><li>• Blown fuse – there are two heater fuses to check, one located at the heater and one in the battery compartment.</li></ul>
01	Low Voltage	Low voltage (when heater is switched on) for more than 30 seconds. 12 Volt heaters: less than 10.5 volts. 24 Volt heaters: less than 21.0 volts.	<ul style="list-style-type: none"><li>• Check heater input voltage at battery.</li><li>• Check battery condition, loose or corroded connectors.</li></ul>
02	High Voltage	High voltage (when heater is switched on) for more than 30 seconds. 12 Volt heaters: Greater than 16 volts. 24 Volt heaters: Greater than 30 volts.	<ul style="list-style-type: none"><li>• Alternator or other charging device may be raising the voltage - check heater input voltage at battery.</li></ul>
03	Overheat Breaker/Fuel Pump Short Circuit	Resistance on the Overheat Breaker/Fuel pump circuit is less than 2 ohms. <b>NOTE:</b> The Overheat Breaker and the Fuel Pump are on the same wiring circuit.	<ul style="list-style-type: none"><li>• Disconnect wire harness at the fuel pump and restart heater:<ul style="list-style-type: none"><li>- Code 4 displayed – shorted fuel pump – replace.</li></ul><b>NOTE:</b> If fuel pump resistance is less than 9 ohms for 12VDC or 35 ohms for 24VDC – replace fuel pump.<ul style="list-style-type: none"><li>- Same code – Disconnect fuel pump wire harness at heater and restart heater.</li><li>- Code 4 displayed – short in wire harness – replace.</li><li>- Same code – Disconnect Brown wire at Overheat Breaker</li><li>- Code 4 displayed – short in Overheat Breaker – replace.</li><li>- Same code – PCM faulty – replace.</li></ul></li></ul>
04	Overheat Breaker/Fuel Pump Open Circuit	Temperature is above 250°F (120°C) (Overheat Breaker is open). Or Fuel Pump or wiring is open circuit. <b>NOTE:</b> The Overheat Breaker and the Fuel Pump are on the same wiring circuit. <b>NOTE:</b> The Overheat Breaker is Auto resetting once cooled down.	<ul style="list-style-type: none"><li>• Overheat – more likely if heater has been running for some time. (May be combined with code 14 and 60).<ul style="list-style-type: none"><li>- Check for air flow obstruction/restrictions or tight bends in the air ducts.</li><li>- Check for obstructed air vents.</li><li>- Check for air flow short circuit.</li></ul></li><li>• Fuel pump open circuit – more likely if heater is just starting.<ul style="list-style-type: none"><li>- Disconnect wire harness from fuel pump and measure the resistance of the fuel pump.</li><li>If DC resistance is above 10.5 ohms for 12V pumps or 37 ohms for 24V pumps, replace fuel pump.</li></ul></li></ul>

Continued on page 2.



# SERVICE BULLETIN

Copy Part# SB0053, Rev. D, 09/2014

Page 2 of 4

CODE	INDICATION	CONDITION	CHECK FOR
04 cont.			<ul style="list-style-type: none"><li>• If within tolerance check continuity of fuel pump wiring harness and check connectors for broken or frayed wires.</li><li>• If intact, check continuity of internal wiring harness from connector at PCM to external fuel pump connector.</li><li>• Check Overheat Sensor for open circuit (when it is cooled down)</li><li>• If intact replace PCM.</li></ul>
05	Glow Plug Open Circuit	Current draw on Glow plug circuit is less than 1 amp for more than 3 seconds.	<ul style="list-style-type: none"><li>• Check for loose or disconnected glow plug connector.</li><li>• Disconnect glow plug connector and measure glow plug resistance (between the center stud and connector base).</li><li>• If measured resistance is more than 0.5 ohms +/- 0.1 ohms, replace glow plug.</li><li>• If glow plug resistance is within tolerance, check continuity of wiring harness from PCM board to glow plug connector.</li><li>• If intact replace PCM.</li></ul>
06	Glow Plug Short Circuit	Current draw greater than 14 Amp for more than 20 seconds.	<ul style="list-style-type: none"><li>• Disconnect glow plug connector and restart heater.</li><li>• If code changes, replace glow plug.</li><li>• If code does not change disconnect glow plug cable from PCM and restart heater.</li><li>• If code changes, replace internal wire harness.</li><li>• If code does not change replace PCM.</li></ul>
07	Motor Open Circuit	Current draw less than 0.125 Amps.	<ul style="list-style-type: none"><li>• Check motor connector at PCM.</li><li>• Disconnect motor from PCM and check resistance of motor between the two pins of the connector. Rotate the motor one full turn</li><li>• If resistance is greater than 50 ohms, replace motor.</li></ul>
08	Motor Short Circuit	Current draw greater than 7 Amp.	<ul style="list-style-type: none"><li>• Disconnect motor and restart heater – if code changes replace motor.</li><li>• If code does not change replace PCM.</li></ul>
09	Motor RPM Not Detected	Motor rotation not detected (may be after Code 61).	<ul style="list-style-type: none"><li>• Check if motor rotates freely – if nothing is found to be jamming the motor but it still does not turn freely, replace motor.</li><li>• Check for missing magnet on back of fan – there should only be 1 – replace fan assembly if magnet is missing.</li><li>• If motor and fan test OK – Replace PCM.</li></ul>
12	Start Error	After 2 start attempts heater did not achieve proper combustion.	<ul style="list-style-type: none"><li>• Fuel problem (empty tank, fuel line leak, blocked fuel line).</li><li>• Combustion air inlet or exhaust restricted / plugged.</li><li>• Clear code and restart heater.</li><li>• If heater starts it is likely that there was air in the fuel line.</li><li>• If heater fails to start and code 12 is again displayed.</li><li>• Check for fuel at heater.</li><li>• Check for air bubbles or fuel leaks along fuel line.</li><li>• Check fuel pump for proper orientation – vertical +/- 45 degrees.</li><li>• Check for loops or low point that can trap air bubbles in the fuel line.</li><li>• Make sure the flame sensor connector is correctly installed at PCM.</li><li>• Pre Combustion Chamber Screen (around glow plug) fouled.</li></ul>
13	Flame Out	Temperature in combustion chamber dropped below 104°F (40°C) during full output.	<ul style="list-style-type: none"><li>• Fuel problem – empty tank, fuel line leak, blocked fuel line.</li><li>• Check that fuel is being supplied to heater and that fuel lines to heater are not damaged, blocked or kinked</li></ul>



# SERVICE BULLETIN

Copy Part# SB0053, Rev. D, 09/2014

Page 3 of 4

CODE	INDICATION	CONDITION	CHECK FOR
14	Purge/Cool Down	After the 6 minute cool down, the combustion chamber temperature is still greater than 140°F (60°C). <b>Note:</b> The heater will attempt a second cool down cycle.	<ul style="list-style-type: none"><li>Blocked air ducting – check incoming and outgoing air ducts for blockage or kinks.</li><li>Ensure heater shell casing is closed and secured.</li></ul>
15	Communication Error	Lost communication between DCP and PCM.	<ul style="list-style-type: none"><li>Reset Power to Heater. Same code displayed</li><li>- Check wires from PCM to DCP for continuity</li><li>- Check round white 4 pin connector for loose connections</li><li>- Defective DCP.</li><li>- Defective PCM.</li></ul>
16	High Intake Air Temperature	Detected ambient air temperature greater than 104°F (40°C) during heating or greater than 140°F (60°C) during ventilation mode.	<ul style="list-style-type: none"><li>Check for heater air short circuit.</li><li>Blocked air ducting – check incoming and outgoing air ducts for blockage or kinks.</li></ul>
22	Voltage Spike	Voltage spike above 37VDC	<ul style="list-style-type: none"><li>Check vehicle charging system.</li></ul>
23	Communication Error	Short on communication wires	<ul style="list-style-type: none"><li>Reset Power to Heater. Same code displayed</li><li>- Check wires from PCM to DCP for continuity</li><li>- Check round white 4 pin connector for loose/shorted connections</li><li>- Defective DCP.</li><li>- Defective PCM.</li></ul>
30	Fuel Pump Voltage	Wrong fuel pump installed 12V/24V.	<ul style="list-style-type: none"><li>Replace fuel pump with correct voltage for the heater</li></ul>
40	Communication Error	Communication error between PCM and DCP.	<ul style="list-style-type: none"><li>Check wires from PCM to DCP for continuity</li><li>Check round white 4 pin connector for loose connections</li><li>Defective DCP.</li><li>Defective PCM.</li></ul>
50	PCM	Control reset.	<ul style="list-style-type: none"><li>Reboot PCM and DCP by removing Main Power Fuse.</li></ul>
51	T2 DCP Internal Temp Sensor Error	The internal temperature sensor is no longer detected in the DCP.	<ul style="list-style-type: none"><li>Reset power to DCP.</li><li>If E51 error remains. Replace DCP or select T1 (PCM sensor) or T3 (external sensor – if connected).</li></ul>
52	T3 External Temp Sensor Error	The external temperature sensor is no longer detected.	<ul style="list-style-type: none"><li>Temperature sensor disconnected or shorted, replace or use sensor T2 (DCP) or T1 PCM.</li></ul>
53	Manual Controller Error	Communication error between PCM and Manual Controller.	<ul style="list-style-type: none"><li>Check wires from PCM to Manual Controller for continuity</li><li>Check round white 4 pin connector for loose connections</li><li>Replace manual control panel.</li></ul>
54	T3 External Temp Sensor	External temperature sensor T3 Connected.	<ul style="list-style-type: none"><li>This is an information code.</li></ul>
55	T3 External Temp Sensor	External temperature sensor T3 Disconnected.	<ul style="list-style-type: none"><li>This is an information code.</li></ul>
60	Motor Over Current	Motor overload, current draw greater than 9A.	<ul style="list-style-type: none"><li>Check for object jamming the motor or fan blades.</li><li>Check for objects on or around the heater causing pressure on the fan or heater enclosure.</li><li>Check incoming air ducts.</li><li>Replace Motor</li></ul>



# SERVICE BULLETIN

Copy Part# SB0053, Rev. D, 09/2014

Page 4 of 4

CODE	INDICATION	CONDITION	CHECK FOR
61	Motor Frozen	Motor frozen on start up (Max. current draw on motor reached).	<ul style="list-style-type: none"><li>• Motor attempts to break free, check for any obstructions on blower intake.</li></ul>
64	Motor RPM	Motor RPM out of range for longer than 60 seconds.	<ul style="list-style-type: none"><li>• Check for lost magnet on back side of fan – there should only be one.</li><li>• If missing, replace fan assembly.</li></ul>
70	Flame Sensor Short	Flame sensor shorted to ground.	<ul style="list-style-type: none"><li>• Check Flame Sensor Harness for Short</li><li>• Disconnect Flame Sensor at PCM and start heater<ul style="list-style-type: none"><li>- If code changes replace Flame Sensor</li><li>- Same code, replace PCM.</li></ul></li></ul>
72	Flame Sensor Open	Flame sensor disconnected.	<ul style="list-style-type: none"><li>• Check connector at PCM board.</li><li>• Measure DC resistance of flame sensor – replace if it measures open.</li><li>• If flame sensor measures any resistance, replace PCM.</li></ul>
74	Flame Sensor Max. Range Exceeded	Combustion Chamber temperature greater than 932°F (500°C).	<ul style="list-style-type: none"><li>• Check for restrictions in combustion air intake and exhaust.</li><li>• Replace flame sensor.</li></ul>
75	Flame Fault	Temperature in combustion chamber greater than 338°F (170°C) when heater is in standby.	<ul style="list-style-type: none"><li>• Power supply interrupted during full heat output – check battery connections.</li></ul>
79	Flame Sensor Low Range Exceeded	Combustion chamber temperature less than -67°F (-55°C).	<ul style="list-style-type: none"><li>• Check if Flame sensor connection at PCM is upside down</li><li>• Replace flame sensor.</li></ul>
81	PCM Motor Control	Motor control is lost.	<ul style="list-style-type: none"><li>• Motor will not stop, reset power to PCM</li><li>• If code remains, replace PCM.</li></ul>
82	PCM Glow Plug Control	Glow plug control lost.	<ul style="list-style-type: none"><li>• Constant power to glow plug, reset power to PCM.</li><li>• If code remains, replace PCM.</li></ul>