1997 6.5L (L56) DIESEL C/K-truck Light Duty (< 8500 GVW) - ENGINE DIAGNOSTIC PARAMETERS

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SENSED PARAMETER	FAULT CODE	ACCEPTABLE OPERATING RANGE AND RATIONALITY	PRIMARY MALFUNCTION DETECTION PARAMETERS	SECONDARY MONITORING PARAMETERS AND CONDITIONS	MONITORING TIME LENGTH AND FREQUENCY OF CHECK	MONITORING METHOD	FAULT CODE STORAGE AND MIL ILLUMINATION
Mass Air Flow Circuit Range/ Performance	P0101		Must fail test 1 and at least one of the following tests: 4a, 4b, 4c or 4d of the EGR Diagnostic Tests	P0405, P0406, P0102 and P0103 must not be Set	Test performed continuously	EGR Control Pressure Sensor Mass Air Flow Sensor	B
Mass Air Flow Sensor Circuit Low Frequency	P0102	1280 hz to 10496 hz 1.5 g/s to 342 g/s Detects a sensor circuit low frequency	Mass Air Flow Input Frequency < 1280hz - same as - Mass Air Flow < 1.5 g/s	Engine Speed > 0 RPM Ignition Voltage > 8.5v	Diagnostic set conditions true for 2 seconds Test performed continuously	Mass Air Flow Sensor	B
Mass Air Flow Sensor Circuit High Frequency	P0103	1280 hz to 10496 hz 1.5 g/s to 342 g/s Detects a sensor circuit high frequency	Mass Air Flow Input Frequency > 10496hz - same as - Mass Air Flow > 342 g/s	Engine Speed > 0 RPM Ignition Voltage > 8.5v P0102 Clear or Disabled	Diagnostic set conditions true for 2 seconds Test performed continuously	Mass Air Flow Sensor	B
Intake Air Temperature Circuit Low Input	P0112	0.24 volt to 4.86 volts -40°C to 152°C Detects a sensor circuit short to ground	Air temperature sensor voltage < 0.24 volt - same as - Air temperature > 160°C	Coolant temperature < 42.5°C	Diagnostic set conditions true for 2 seconds Test performed continuously	Air temperature sensor	B
Intake Air Temperature Circuit High Input	P0113	0.24 volt to 4.86 volts -40°C to 152°C Detects a sensor circuit short to high voltage or a sensor circuit open	Air temperature sensor voltage > 4.86 volt - same as - Air temperature < -40°C	Engine has been running > 8 minutes	Diagnostic set conditions true for 2 seconds Test performed continuously	Air temperature sensor	B
Engine Coolant Temperature Circuit Low Input	P0117	0.24 volt to 4.76 volts -40°C to 152°C Detects a sensor circuit short to ground	Coolant temperature sensor voltage < 0.24 volt - same as - Coolant temperature > 160°C		Diagnostic set conditions true for 2 seconds Test performed continuously	Coolant temperature sensor	B
Engine Coolant Temperature Circuit High Input	P0118	0.24 volt to 4.76 volts -40°C to 152°C Detects a sensor circuit short to high high voltage or a sensor circuit open	Coolant temperature sensor voltage > 4.76 volt - same as - Coolant temperature < -40°C	Engine run timer > 8 minutes	Diagnostic set conditions true for 2 seconds Test performed continuously	Coolant temperature sensor	B
Insufficient Coolant Temp for Stable Operation	P0126	Engine Temperature > 56°C Detects engine not warm enough for stable operation	Engine run time >= 600s Engine temperature < 56°C Fuel burned since start >= 1,000,000cu.mm. Total idle time since start < 450s - OR -	*Ambient air temperature < f(eng. startup temp); Ambient air temp > -7°C; -7°C < Engine start-up temp < 56°C; Engine is running; P0126 not yet passed; P0112, P0113, P0117 and P0118 not set. * See Table DGTCMIT	Diagnostic set conditions true for 2 seconds	Engine coolant temperature sensor.	B
			Engine run time >= 300s Engine Temperature < 56°C Fuel burned since start >= 468,120cu.mm. Total idle time since start < 225s	*Ambient air temperature >= f(eng. startup temp); Ambient air temp > -7°C; -7°C < Engine start-up temp < 56°C; Engine is running; P0126 not yet passed; P0112, P0113, P0117 and P0118 not set. * See Table DGTCMIT	Test performed once from start-up until a pass/fail/disable condition exists.		

* Backup fueling mode occurs if any of the following codes are set: P0251, P0335, P0370

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Fuel Temperature Sensor Circuit Low Input	P0182	0.24 volts - 4.96 volts -28°C - 140°C Detects a sensor circuit short to ground	Fuel temperature < 0.24 volts - same as - Fuel temperature > 140°C	None	Diagnostic set conditions true for 2 seconds Test performed continuously	Fuel temperature sensor	B
Fuel Temperature Sensor Circuit High Input	P0183	0.24 volts - 4.96 volts -28°C - 140°C Detects a sensor short to high voltage or sensor circuit open	Fuel temperature > 4.96 volts - same as - Fuel temperature < -28°C	Engine running > 8 minutes	Diagnostic set conditions true for 2 seconds Test performed continuously	Fuel temperature sensor	B
Fuel Injection Timing Circuit Malfunction	P0216	| Desired timing - actual timing | =< 5 engine degrees Detects a failure of timing control under steady state conditions	| Desired timing - actual timing | > 5 pump degrees	Codes P0251, P0335 and P0370 clear Engine not stalled No change in engine speed > 56 RPM for a minimum of 5 seconds	Diagnostic set conditions true for 2 seconds Test performed continuously	Crank Sensor Optical Sensors (HRS, Cam)	B
Lift Pump Voltage Low	P0231	Lift pump voltage > Ignition voltage - 4 volts Detects a low voltage at the lift pump when the lift pump is commanded high	Lift pump voltage < Ignition voltage - 4 volts	Lift pump is commanded high	Lift pump commanded high > .5 second Diagnostic set conditions true for 2 seconds Test performed continuously	A/D voltage input of lift pump voltage	B
Wastegate Control Range/ Performance Failure	P0236	Detects a failure of wastegate control system under steady state boost conditions.	Final intake manifold pressure =< (Desired kPA - 20 kPa) - ((100kPa - Baro) /2) - OR - Final intake manifold pressure > (Desired kPa + 20 kPa)	Eng. speed > 2400 RPM; Fuel rate > 20 cu.mm. Final intake manifold pressure =< (Desired kPa + 20kPa) Condition 2 timer >= 10 seconds - OR - 1800 RPM < Eng. speed =< 2400 RPM; Fuel rate > 20 cu.mm Final intake manifold pressure =< (110kPa) - ((100kPa - Baro)/2) Condition 3 timer >= 12.8 seconds Eng. speed > 2400 RPM Condition 1 timer > 10 seconds	Test performed continuously	Boost Sensor	B
Intake Manifold Pressure Low Input	P0237	0.78 volt to 4.86 volts 40kPa to 202kPa Detects boost sensor circuit open	Boost Pressure < 0.78 volts - same as - Boost Pressure < 40kPa	None	Diagnostic set conditions true for 2 seconds Test performed continuously	Boost Sensor	B
Intake Manifold Pressure High Input	P0238	0.78 volt to 4.86 volts 40kPa to 202kPa Detects boost sensor circuit short to high voltage	Boost Pressure > 4.86 volts - same as - Boost Pressure > 202kPa	Engine Speed < 3506 RPM	Diagnostic set conditions true for 2 seconds Test performed continuously	Boost Sensor	B
Fuel Injection Pump cam Position	P0251	Number of consecutive missing CAM pulses < 8 Number of CAM pulses per #1 cylinder	Number of consecutive missing CAM pulses >= 8 Number of CAM pulses per #1 cylinder	Ratio of CAM to HRS = 1:64 +/- 4 RPM < 300		Optical Sensors (HRS, Cam) Crank Sensor	A

Sensor (CAM) Malfunction		event = 8. This must be true for 8 #1 cylinder events for RPM < 300 or 32 #1 cylinder events for RPM >= 300	event <> 8 for 8 #1 cylinder events Number of CAM pulses per #1 cylinder event <> 8 for 32 #1 cylinder events	RPM >= 300	Test performed continuously		

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Engine Crankshaft Position Sensor (CPS) Malfunction	P0335	Number of consecutive missing CPS pulses < 8	Number of consecutive missing CPS pulses >= 8	Ratio of CPS to HRS = 1:64 +/- 4	Test performed continuously	Optical Sensors (HRS, Cam) Crank Sensor	A
		Number of CPS pulses per #1 cylinder event = 8. This must be true for 8 #1 cylinder events for RPM < 300 or 32 #1 cylinder events for RPM >= 300	Number of CPS pulses per #1 cylinder event <> 8 for 8 #1 cylinder events Number of CPS pulses per #1 cylinder event <> 8 for 32 #1 cylinder events	RPM < 300 RPM >= 300			
Fuel Injection Pump High Resolution Angular Sensor (HRS) Malfunction	P0370	HRS pulses must be received by the PCM for every 8 CAM pulses	HRS free running pump counter = old count for > 8 consecutive CAM pulses	None	Test performed continuously	Optical Sensors (HRS, Cam)	A
Glow Plug Circuit Malfunction	P0380	| glowplug voltage - ignition voltage | =< 2.0 volts Detects a faulty glowplug relay circuit	Glowplugs commanded off & raw feedback > 4.0 v - OR - Glowplugs commanded on & raw feedback < 4.0 v - OR - Glowplugs commanded on and |glowplug voltage - ignition voltage| > 2 v	A/D inputs settled	Diagnostic set conditions true for 2 seconds Test performed continuously	A/D glowplug voltage input	B
EGR Flow Malfunction	P0400		Must fail test 01 and 03 and pass test 02. of the EGR Diagnostic Tests	P0405, P0406, P0102 and P0103 must not be Set	Test performed continuously	EGR Control Pressure Sensor Mass Air Flow Sensor	B
EGR Flow Insufficient	P0401		Must fail test 05 of the EGR Diagnostic Tests	P0405, P0406, P0102 and P0103 must not be Set	Test performed continuously	EGR Control Pressure Sensor Mass Air Flow Sensor	B
EGR Flow Excessive	P0402		Must fail test 06 of the EGR Diagnostic Tests	P0405, P0406, P0102 and P0103 must not be Set	Test performed continuously	EGR Control Pressure Sensor Mass Air Flow Sensor	B
EGR System Stuck EAP Sensor Mid-Range	P0404		Must Fail Test 09 and Pass Test 01 of the EGR Diagnostic Tests.	P0405, P0406, P0102 and P0103 must not be Set	Test performed continuously	EGR Control Pressure Sensor Mass Air Flow Sensor	B
EGR	P0405	0.24 volt to 3.96 volts	EGR control pressure signal < .24 v.		Diagnostic set conditions	EGR Control Pressure	

Control Pressure Low Input		15 kPa to 85 kPa Detects EGR control pressure feedback sensor short to ground	- same as - EGR control pressure < 15 kPa	None	true for 2 seconds Test performed continuously	Sensor	B
EGR Control Pressure High Input	P0406	0.24 volt to 3.96 volts 15 kPa to 85 kPa Detects EGR feedback sensor open circuit or a short to high voltage	EGR control pressure signal > 3.96 v. - same as - EGR control pressure > 85 kPa	Desired EGR control pressure < 60kPa EGR vent is closed Engine Speed > 0	Diagnostic set conditions true for 2 seconds Test performed continuously	EGR Control Pressure Sensor	B

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Flash Memory Malfunction	P0601	Detects a Malfunction in the Flash Memory	Calculated checksum <> flashed calibration checksum		Test performed at power-up reset and continuously.	Software	A
Control Module Programming Error	P0602	Detects a calibration that is not engine compatible.	Calibration is not engine run compatible		Test performed at power-up reset.	Software	A
PCM Processor Fault	P0606	Detects a TIO malfunction	Advance angle read from TIO > 1102 HRS Counts CAM pulse edge detect counter > 6 slow CAM edge counts	Engine Speed > 38 RPM Malf counter >= 6 TIO faults P0606 code set OR TIO malf (P0606) detected	Diagnostic set conditions true for 2 seconds Test performed continuously	Software	A
Intake Air Duct Leak	P1191		Must fail tests 4b, 4d and 11and Must pass tests 02, 4a and 4c of the EGR Diagnostic Tests	P0405, P0406, P0102 and P0103 must not be Set	Test performed continuously	EGR Control Pressure Sensor Mass Air Flow Sensor	B
Injection Pump Timing Reference Offset Error	P1214	-23 HRS Counts < Cal - Filtered Advance < 23 Hi Res Cnts	Cal - Filtered Advance > 23 HRS Counts - OR - Cal - Filtered Advance < -23 HRS Counts	None	Test performed continuously	Software	B
Fuel Pump Calibration Resistor Fault	P1218	0.27 volt to 4.29 volt Detects an invalid fuel pump calibration resistor learn	Fuel pump calibration resistor voltage < 0.27 volt - OR - Fuel pump calibration resistor voltage > 4.29 volts	Fuel pump calibration resistor invalid flag set - OR - Selected fuel pump calibration resistor address invalid	Test performed at power-up and running reset initialization	Fuel pump calibration resistor	B
EGR Valve Position Error	P1406		Must fail tests 01, 4b, and 4d and Must pass tests 02, 4a and 4c of the EGR Diagnostic Tests	P0405, P0406, P0102 and P0103 must not be Set	Test performed continuously	EGR Control Pressure Sensor Mass Air Flow Sensor	B
EGR Vacuum System	P1409		Must fail tests 01, 02, and 03 and Must pass tests 4a, 4b, 4c and 4d	P0405, P0406, P0102 and P0103 must not be Set		EGR Control Pressure Sensor	B

Leak/Supply Low			of the EGR Diagnostic Tests		Test performed continuously	Mass Air Flow Sensor	
PCM A/D Intermittent On	P1627	Less than 5 consecutive A/D read errors Detects when 5 consecutive A/D read errors occur	5 consecutive A/D read errors occur	None	Diagnostic set conditions true for 2 seconds Test performed continuously	PCM A/D Convertor	B
Glow Plug Light Output Circuit Failed	P1643	No ODM 'Open' Faults or 'Short' Fault Glowplug light output voltage at PCM follows S/W command	ODM 'Open' or 'Short' Fault Detected Glowplug light output voltage at PCM does not follow S/W command	None	Diagnostic set conditions true for 2 seconds Test performed continuously	ODM chip internal open/short detection circuit	B
EGR Vent Driver Circuit Failed	P1653	No ODM 'Open' Faults or 'Short' Fault EGR vent output voltage at PCM follows S/W command	ODM 'Open' or 'Short' Fault Detected EGR vent output voltage at PCM does not follow S/W command	Ignition > 8.0 volts	Diagnostic set conditions true for 2 seconds Test performed continuously	ODM chip internal open/short detection circuit	B

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EGR PWM Driver Circuit Failed	P1655	Number of ODM 'open' faults or 'short' faults < 2 EGR PWM output voltage at PCM follows S/W command	Number of ODM 'open' or 'short' faults detected >= 2 EGR PWM output voltage at PCM does not follow S/W command	Ignition > 8.0 volts	Diagnostic set conditions true for 2 seconds Test performed continuously	ODM chip internal open/short detection circuit	B
Wastegate PWM Solinoid Driver Circuit Failed	P1656	Number of ODM 'open' faults or 'short' faults < 2 Wastegate PWM output voltage at PCM follows S/W command	Number of ODM 'open' or 'short' faults detected >= 2 Wastegate PWM output voltage at PCM does not follow S/W command	Ignition > 8.0 volts	Diagnostic set conditions true for 2 seconds Test performed continuously	ODM chip internal open/short detection circuit	B

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*Tables

DGTCMIT	
Start-up Engine Temperature	Ambient Air Temperature
-40°C	149.75
-16°C	149.75
8°C	16.25
32°C	-1
56°C	-13
80°C	-13
104°C	-13
128°C	-13
152°C	-13

DGTLOEAP	
Ambient Air Pressure	Lowest Achieved EGR Absolute Pressure
64 kPa	51 kPa
80 kPa	51 kPa
96 kPa	61 kPa
112 kPa	71.5 kPa
128 kPa	127.5 kPa

DGTMFERE	
Ambient Air Pressure	Mass Air Flow Error Enable
64 kPa	0.4609 g/cyl
80 kPa	0.5078 g/cyl
96 kPa	0.5547 g/cyl
112 kPa	0.6016 g/cyl
128 kPa	0.6016 g/cyl

DGTNINEM	
Ambient Air Pressure	Nominal Idle No-EGR Mass Air Flow
64 kPa	0.4141 g/cyl
80 kPa	0.5781 g/cyl
96 kPa	0.7422 g/cyl
112 kPa	0.9063 g/cyl
128 kPa	1.0703 g/cyl

DGTNOIM	
Ambient Air Pressure	Nominal Off Idle No-EGR Mass Air Flow
64 kPa	0.5781 g/cyl
80 kPa	0.7148 g/cyl
96 kPa	0.8516 g/cyl
112 kPa	0.9883 g/cyl
128 kPa	1.1250 g/cyl

DGTNIFEM	
Ambient Air Pressure	Nominal Idle Full-EGR Mass Air Flow
48 kPa	0.2891 g/cyl
64 kPa	0.3008 g/cyl
80 kPa	0.3281 g/cyl
96 kPa	0.4844 g/cyl
112 kPa	0.6406 g/cyl
128 kPa	0.6406 g/cyl