2001 6.6L Duramax Diesel (LB7)) C/K-truck
Heavy Duty (GVW >8500) ENGINE DIAGNOSTIC PARAMETERS

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FAULT CODE	MONITORING METHOD	SENSED PARAMETER	ACCEPTABLE OPERATING RANGE AND RATIONALITY	PRIMARY MALFUNCTION DETECTION PARAMETERS	SECONDARY MONITORING PARAMETERS AND CONDITIONS	MONITORING TIME LENGTH AND FREQUENCY OF CHECK	FAULT CODE STORAGE AND MIL ILLUMINATION
P0087	Rail Pressure Sensor	Fuel Rail Pressure [FRP] Too Low	Rail pressure should be higher than minimum commanded rail pressure minus possible transitional undershoot	rp < 0.0MPa :0-400rpm 22.5MPa:600-4000RPM 30.0MPa :over 4000RPM	No related malfunction (RPS_LO, RPS_HI, 5VB_A) Rail Pressure Feedback Mode Key_on_time>0.125 Sec. Fuel_Mode Rail Pressure>0MPa	49 Failure out of 50 sample	A
P0088	Rail Pressure Sensor	Fuel Rail Pressure [FRP] Too High	Rail pressure should be lower than maximum commanded railpressure plus possible transitional overshoot	Case.1 rp > 167MPa Case.2 rp > 175MPa	No related malfunction (RPS_LO, RPS_HI, 5VB_A) not in Power_Down_Mode Rail Pressure Feedback Mode Key_on_time>0.125 Sec.	Case.1 49 Failure out of 50 sample Case.2 49 Failure out of 50 sample	A
P0089	Rail Pressure Sensor and Commanded Pump Fuel Flow	Fuel Pressure Regulator Performance	Positive rail pressure error should be within 20MPa, Commande pump fuel flow > 100mm3/sec	rp -Drp < 20MPa and cmdpumpflow <= 100mm3/sec	No related malfunction (RPS_LO, RPS_HI, 5VB_A) Rail Pressure Feedback Mode Key_on_time>0.125 Sec. Fuel_Mode Not in Bankshutoff Mode	110 Failure out of 120 sample	A
P0090	RPCV current	Fuel Pressure Regulator Control Circuit	50mA < RPCV_Current < 1600mA	|rpcv_current_error| > 500 AD Counts or rpcv_current > 480 AD Counts or rpcv_current < 13 AD Counts Rev.	IGNITION ON EDU/RPCV Relay on Not in Powerdown_Mode Key_on_time>0.125 Sec. Cmd_RPCV_Current <= 1500mA Cmd_RPCV_Current >= 400mA	49 Failure out of 50 sample	A
P0093	Rail Pressure Sensor and commanded fuel flow to pump	Fuel System Large Leak Detected	Negative rail pressure error shoul be within 20MPa, Commanded pump flow should be lower than pump capability	Drp - rp > 20MPa:0-2200rpm 17MPa:2400rpm 13MPa:2600rpm 10MPa:2800rpm and cmdpumpflow >= 10000:0-400rpm 11030:600rpm 14706:800rpm 18382:1000rpm 22058:1200rpm 25736:1400rpm 29412:1600rpm 33088:1800rpm 36764:2000rpm	No related malfunction (RPS_LO, RPS_HI, 5VB_A) Rail Pressure Feedback Mode Key_on_time>0.125 Sec. Fuel_Mode	49 Failure out of 50 sample	A

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P0094	**1.** Delta RP @ DFCO **2.** fuel flow range check @ DFCO **3.** fuel flow range check @ idle	Fuel System Small Leak Detected	1. Delta rail pressure <= 30MPa 2.Commanded pump flow is less than 6000mm3/sec @ 40 MPa, 5740mm3/sec @ 60 MPa, 6280mm3/sec @ 80MPa 3. Commanded pump flow at idle is less than 6000mm3/sec @ 600rpm, 7000mm3/sec @ 800rpm, 8000mm3/sec @ 1000rpm	1. RP(n-1) - RP(n) > 30MPa @ cmdpumpflow=0 2. cmdpumpflow> 50000mm3/sec:0MPa 11930mm3/sec:20MPa 6000mm3/sec:40MPa 5740mm3/sec:60MPa 6280mm3/sec:80MPa @ cmdpumpflow>0 3. cmdpumpflow > 50000mm3/sec:0-400rpm 6000mm3/sec:600rpm 7000mm3/sec:800rpm 8000mm3/sec:1000rpm 50000mm3/sec:Over 1200rpm	No related malfunction (RPS_LO, RPS_HI, 5VB_A, RPCV) DFCO_Mode Rail Pressure Feedback Mode Blankshot_disable_status is True Key_on_time>0.125 Sec. No related malfunction (RPS_LO, RPS_HI, 5VB_A, RPCV, CLTHI, CLTLO, VSS) Rail Pressure Feedback Mode |desrpm -rpm|< 50rpm Coolant Temp. >39.75 degC engine_runtime > 0.125sec Key_on_time>0.125 Sec. idle_feedback_mode Vehicle Speed < 100MPH TPS < 2%	49 Failure out of 50 sample 49 Failure out of 50 sample	A
P0101	Mass Air Flow Sensor	Mass Air Flow (MAF) Sensor Performance	1.014 v to 4.670 v 102 kg/hr to 1620 kg/hr Detects an in range sensor fault	The delta between expected MAF and measured MAF > 2d look-up see chart 1.	P0102,P0103,P0112,P0113,P0234,P0236 P0237,P0238,P0335,P0336,P1345 are not set. 9v < IGN volts >16 RPM < 2500, RPM Delta < 50RPM %Pedal < 100%. Above met for > 2 sec	Diagnostic set conditions true for 2 seconds Test performed continuously	B
P0102	Mass Air Flow Sensor	Mass Air Flow (MAF) Sensor Circuit Low Voltage	1.014 v to 4.670 v 102 kg/hr to 1620 kg/hr Detects a sensor circuit low voltage	Mass Air Flow Input Voltage < 0.5 volts - same as - Mass Air Flow < 102 kg/hr	Engine Run Time > 2 sec Engine Speed > 500 RPM Ignition Voltage > 9v Above conditions have been met for >2 secs	Diagnostic set conditions true for 2 seconds Test performed continuously	B
P0103	Mass Air Flow Sensor	Mass Air Flow (MAF) Sensor Circuit High Voltage	1.014 v to 4.670 v 102 kg/hr to 1620 kg/hr Detects a sensor circuit high voltage	Mass Air Flow Input Voltage > 4.5 volts - same as - Mass Air Flow > 1600 kg/hr	Engine Run Time > 2 sec Engine Speed > 500 RPM Ignition Voltage > 9v Above conditions have been met for >2 secs	Diagnostic set conditions true for 2 seconds Test performed continuously	B
P0106	Baro Pressure Sensor	Barometric Pressure Sensor Performance	0.78 volt to 4.86 volts 40kPa to 202kPa Detects in range fault of Baro sensor Baro diff = Barometric Pressure - (Manifold Absolute Pressure - 2 kpa) Baro diff < 8kpa	Baro diff = Barometric Pressure - (Manifold Absolute Pressure - 2 kpa) Baro diff > 8kpa	P0101,P0102,P0103,P0107,P0108,P0116 P0116,P0117,P0118,P0236,P0237,P0238, P0335,P0336, P0500 are not set. Engine runtime >20sec , %Pedal < 20%. vehicle speed < 15mph, Mass airflow < 500 kg/hr Engine coolant > -10 C vehicle speed < 15mph, PTO = off 500 RPM < Engine RPM < 1000 RPM Above conditions true for 5 sec	Diagnostic set conditions true for 2 seconds	B
P0107	Baro Pressure Sensor	Barometric Pressure Circuit Low Input	0.78 volt to 4.86 volts 40kPa to 202kPa Detects baro sensor circuit open	Baro Pressure < 0.114 volts - same as - Baro Pressure < 40kPa	None	Diagnostic set conditions true for 2 seconds Test performed continuously	B

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P0108	Baro Pressure Sensor	Barometric Pressure Circuit High Input	0.78 volt to 4.86 volts 40kPa to 202kPa Detects baro sensor circuit short to high voltage	Baro Pressure > 4.65 volts - same as - Baro Pressure > 202kPa	None	Diagnostic set conditions true for 2 seconds Test performed continuously	B
P0112	Air temperature sensor	Intake Air Temperature Circuit Low Input	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 < 50.25°C	Diagnostic set conditions true for 2 seconds Test performed continuously	B
P0113	Air temperature sensor	Intake Air Temperature Circuit High Input	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	B
P0116	coolant temperature sensor Intake Air temperature sensor.	Engine Coolant Temperature Performance	Coolant temp delta = (Start-up coolant temperature - Start-up Intake Air temperature) coolant temp delta < 40 °C	Coolant temp delta = (Start-up coolant temperature - Start-up Intake Air temperature) coolant temp delta > 40 °C	P0112, P0113, P0117, P0118, P1683 not set. Start-up IAT > -7 °C Engine off timer > 36000 sec Ignition off time value is valid	Performed once just after engine start	B
P0117	Coolant temperature sensor	Engine Coolant Temperature Circuit Low Input	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	none	Diagnostic set conditions true for 2 seconds Test performed continuously	B
P0118	Coolant temperature sensor	Engine Coolant Temperature Circuit High Input	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	B
P0128	Engine coolant temperature sensor.	Engine Coolant Temperature (ECT) Below Thermostat Regulating Temperature	Engine Temperature > 72°C Detects engine not warm enough for stable operation	Engine run time >= 1320secs Engine temperature < 72°C Fuel burned since start >= 9 millon cu.mm. Total idle time since start < 450 s - OR - Engine run time >= 600s Engine Temperature <72°C Fuel burned since start >= 3.75 million cu.mm. Total idle time since start < 300s	*Ambient air temperature < f(eng. startup temp); Ambient air temp > -7°C; -7°C < Engine start-up temp < 51°C; Engine is running; P0128 not yet passed; P0112, P0113, P0117 and P0118 not set. * See Chart 2 *Ambient air temperature >= f(eng. startup temp); Ambient air temp > -7°C; 51°C < Engine start-up temp < 70°C; Engine is running; P0126 not yet passed; P0112, P0113, P0117 and P0118 not set. * See Chart 2	Diagnostic set conditions true for 2 seconds Test performed once from start-up until a pass/fail/disable condition exists.	B
P0181	Fuel temperature sensor Intake Air temperature sensor.	Fuel Circuit Sensor Performance	Fuel temp delta = (Start-up fuel temperature - Start-up Intake Air temperature) fuel temp delta < 15 °C Detects an in range sensor fault.	Fuel temp delta = (Start-up fuel temperature - Start-up Intake Air temperature) fuel temp delta > 15 °C	P0112, P0113, P0182, P0183, P1683 not set. Start-up IAT > -7 °C Engine off timer > 36000 sec	Performed once just after engine start	B
P0182	Fuel temperature	Fuel Temperature	0.24 volts - 4.96 volts -30°C to 120°C	Fuel temperature < 0.24 volts - same as -	None	Diagnostic set conditions true for 2 seconds	B

	sensor	Sensor Circuit Low Input	Detects a sensor circuit short to ground	Fuel temperature > 120°C		Test performed continuously	
P0183	Fuel temperature sensor	Fuel Temperature Sensor Circuit High Input	0.24 volts - 4.96 volts -30°C to 120°C Detects a sensor short to high voltage or sensor circuit open	Fuel temperature > 4.96 volts - same as - Fuel temperature < -30°C	Engine running > 8 minutes	Diagnostic set conditions true for 2 seconds Test performed continuously	B
P0192	Piezo Pressure Sensor	Fuel Rail Pressure [FRP] Sensor Circuit Low Voltage	0.1 Volt to 4.9 Volt	rp_ad <= 42 AD Counts	No related malfunction (5VB_A) IGNITION is ON not in Power_Down_Mode Key_on_time>0.125 Sec.	19 Failure out of 20 sample	A
P0193	Piezo Pressure Sensor	Fuel Rail Pressure [FRP] Sensor Circuit High Voltage	0.1 Volt to 4.9 Volt	rp_ad >= 963 AD Counts	No related malfunction (5VB_A) IGNITION is ON not in Power_Down_Mode Key_on_time>0.125 Sec.	19 Failure out of 20 sample	A
P0201	Mornitoring in EDU and message transferred via CAN	Injector 1 Control Circuit	No Error Message from EDU	"#1 Load Drop" or "#1 HSD Over current" or "#1 LSD Overcurrent" or "Bank1 Booster Low"	IGN on Poweruptime>0.5sec CAN MSG from EDU is valid Not in Poweroff Mode	20 out of 40 (32ms)	A
P0202	Mornitoring in EDU and message transferred via CAN	Injector 2 Control Circuit	No Error Message from EDU	"#2 Load Drop" or "#2 HSD Over current" or "#2 LSD Overcurrent" or "Bank2 Booster Low"	IGN on Poweruptime>0.5sec CAN MSG from EDU is valid Not in Poweroff Mode	20 out of 40 (32ms)	A
P0203	Mornitoring in EDU and message transferred via CAN	Injector 3 Control Circuit	No Error Message from EDU	"#3 Load Drop" or "#3 HSD Over current" or "#3 LSD Overcurrent" or "Bank2 Booster Low"	IGN on Poweruptime>0.5sec CAN MSG from EDU is valid Not in Poweroff Mode	20 out of 40 (32ms)	A
P0204	Mornitoring in EDU and message transferred via CAN	Injector 4 Control Circuit	No Error Message from EDU	"#4 Load Drop" or "#4 HSD Over current" or "#4 LSD Overcurrent" or Bank1 Booster Low"	IGN on Poweruptime>0.5sec CAN MSG from EDU is valid Not in Poweroff Mode	20 out of 40 (32ms)	A
P0205	Mornitoring in EDU and message transferred via CAN	Injector 5 Control Circuit	No Error Message from EDU	"#5 Load Drop" or "#5 HSD Over current" or "#5 LSD Overcurrent" or "Bank2 Booster Low"	IGN on Poweruptime>0.5sec CAN MSG from EDU is valid Not in Poweroff Mode	20 out of 40 (32ms)	A
P0206	Mornitoring in EDU and message transferred via CAN	Injector 6 Control Circuit	No Error Message from EDU	"#6 Load Drop" or "#6 HSD Over current" or "#6 LSD Overcurrent" or "Bank1 Booster Low"	IGN on Poweruptime>0.5sec CAN MSG from EDU is valid Not in Poweroff Mode	20 out of 40 (32ms)	A
P0207	Mornitoring in EDU and message transferred via CAN	Injector 7 Control Circuit	No Error Message from EDU	"#7 Load Drop" or "#7 HSD Over current" or "#7 LSD Overcurrent" or "Bank1 Booster Low"	IGN on Poweruptime>0.5sec CAN MSG from EDU is valid Not in Poweroff Mode	20 out of 40 (32ms)	A
P0208	Mornitoring in EDU and message transferred via CAN	Injector 8 Control Circuit	No Error Message from EDU	"#8 Load Drop" or "#8 HSD over current" or "#8 LSD Overcurrent" or "Bank2 Booster Low"	IGN on Poweruptime>0.5sec CAN MSG from EDU is valid Not in Poweroff Mode	20 out of 40 (32ms)	A
P0234	Boost Sensor	Turbocharger Engine	The delta between 3d lookup expected Boost and measured	The delta between 3d lookup expected Boost and measured	P0238 not set Engine running	Diagnostic set conditions true for 30 seconds	B

		Overboost	Boost < 20kPa. Detects an overboost condition	Boost > 20kPa.	Fuel quantity < 75mm	Test performed continuously	
P0236	Boost Sensor	Turbocharger Boost System Performance	Final intake manifold pressure >= (Expected kPA - 20 kPa) -(Baro adjust) if Baro < 98 kPa Baro adjust = (98 - baro) if (Baro > 98 kPa) then Baro adjust = 0 Detects an Underboost Condition	Final intake manifold pressure <= (Expected kPA - 20 kPa) -(Baro adjust) if Baro < 98 kPa Baro adjust = (98 - baro) if (Baro > 98 kPa) then Baro adjust = 0	P0237 not set Engine running at RPM > 1500 RPM Total Fuel Quantity Burned > 1,000,000mm3	Diagnostic set conditions true for 30 seconds Test performed continuously	B
P0237	Boost Sensor	Turbocharger Boost Sensor Circuit Low Input	1 volt to 4.75 volts 67kPa to 313kPa Detects boost sensor circuit open	Boost Pressure < 1.0 volts - same as - Boost Pressure < 67kPa	None	Diagnostic set conditions true for 2 seconds Test performed continuously	B
P0238	Boost Sensor	Turbocharger Boost Sensor Circuit High Input	1 volt to 4.75 volts 67kPa to 313kPa Detects boost sensor circuit short to high voltage	Boost Pressure > 4.75 volts - same as - Boost Pressure > 313kPa	None	Diagnostic set conditions true for 2 seconds Test performed continuously	B
P0300	Cylinder engine speed and cylinder fuel rate	Engine Misfire Detected	# of detected misfire cylinders =< 1	Number of detected misfire cylinders > 1	Coolant temperature >= 56°C Engine Speed = Idle	Test performed for 90 seconds once per ignition cycle	B
P0301	Cylinder engine speed and cylinder fuel rate	Cylinder 1 Misfire Detected	Cylinder #1 fuel rate adjustment < 10 mm3/stroke	Cylinder #1 fuel rate greater than desired fuel rate by >= 10 mm3/stroke	Coolant temperature >= 56°C Engine Speed = Idle	Test performed for 90 seconds once per ignition cycle	B
P0302	Cylinder engine speed and cylinder fuel rate	Cylinder 2 Misfire Detected	Cylinder #2 fuel rate adjustment < 10 mm3/stroke	Cylinder 2 fuel rate greater than desired fuel rate by >= 10 mm3/stroke	Coolant temperature >= 56°C Engine Speed = Idle	Test performed for 90 seconds once per ignition cycle	B
P0303	Cylinder engine speed and cylinder fuel rate	Cylinder 3 Misfire Detected	Cylinder #3 fuel rate adjustment < 10 mm3/stroke	Cylinder #3 fuel rate greater than desired fuel rate by >= 10 mm3/stroke	Coolant temperature >= 56°C Engine Speed = Idle	Test performed for 90 seconds once per ignition cycle	B
P0304	Cylinder engine speed and cylinder fuel rate	Cylinder 4 Misfire Detected	Cylinder #4 fuel rate adjustment < 10 mm3/stroke	Cylinder #4 fuel rate greater than desired fuel rate by >= 10 mm3/stroke	Coolant temperature >= 56°C Engine Speed = Idle	Test performed for 90 seconds once per ignition cycle	B
P0305	Cylinder engine speed and cylinder fuel rate	Cylinder 5 Misfire Detected	Cylinder #5 fuel rate adjustment < 10 mm3/stroke	Cylinder #5 fuel rate greater than desired fuel rate by >= 10 mm3/stroke	Coolant temperature >= **56**°C Engine Speed = Idle	Test performed for 90 seconds once per ignition cycle	B
P0306	Cylinder engine speed and cylinder fuel rate	Cylinder 6 Misfire Detected	Cylinder #6 fuel rate adjustment < 10 mm3/stroke	Cylinder #6 fuel rate greater than desired fuel rate by >= 10 mm3/stroke	Coolant temperature >= **56**°C Engine Speed = Idle	Test performed for 90 seconds once per ignition cycle	B
P0307	Cylinder engine speed and cylinder fuel rate	Cylinder 7 Misfire Detected	Cylinder #7 fuel rate adjustment < 10 mm3/stroke	Cylinder #7 fuel rate greater than desired fuel rate by >= 10 mm3/stroke	Coolant temperature >= **56**°C Engine Speed = Idle	Test performed for 90 seconds once per ignition cycle	B
P0308	Cylinder engine speed and cylinder fuel rate	Cylinder 8 Misfire Detected	Cylinder #8 fuel rate adjustment < 10 mm3/stroke	Cylinder #8 fuel rate greater than desired fuel rate by >= 10 mm3/stroke	Coolant temperature >= 56°C Engine Speed = Idle	Test performed for 90 seconds once per ignition cycle	B
P0335	Checks the number of Crank pulses every 7.8 ms	Crankshaft Position [CKP] Sensor Circuit	Hall Effect Sensor	No Crank signal counter >=5	CAM is rotating Ignition On key_on_time>0.5sec Not in powerdown mode	60 failures out of 80 samples. Samples are taken every 31.6 ms.	B
P0336	Checks the number of Crank pulses between the last synch event and the current	Crankshaft Position [CKP] Sensor Performance	Hall Effect Sensor 57 pulses and gap per 1 crank revolution	Number of teeth between gap and gap is not equal to 57 but not equal to 0	Ignition On key_on-time>0.5sec Not in Powerdown mode As soon as a synch tooth is detected	15 failures out of 20 samples Samples are taken every reference event	B

P0340	Checks CAM interrupts every 7.8 ms	Camshaft Position [CMP] Sensor Circuit	Hall Effect Sensor	No CAM interrupts received in 2 seconds.	Engine speed > 50rpm Ignition On Not in Powerdown_mode key_on_time > 0.5sec	60 failures out of 80 samples. Samples are taken every 31.6 ms.	B
P0370	Monitored by EDU and message transferred via CAN	High Resolution System Circuit	Buffered Signal of Hall Effect Sensor	Message has the 'No crank signal' bit on.	Engine speed >= 60rpm Ignition on Key_on_time>0.5sec Not in Powerdown mode	100 failures out of 120 samples. Samples are taken every 31.6 ms.	B
P0374	Monitored by EDU and message transferred via CAN	High Resolution System Performance	Buffered Signal of Hall Effect Sensor	Message has the '57X Signal Implausible' bit on.	Engine speed >= 60rpm Ignition on Key_on_time>0.5sec Not in Powerdown mode	100 failures out of 120 samples. Samples are taken every 31.6 ms.	B
P0380	A/D glowplug voltage input	Glow Plug Circuit Malfunction **(FEDERAL)**	glowplug feedback voltage follows the commanded state Detects a faulty glowplug relay circuit	Glowplugs commanded off & raw feedback > 4.0 v - OR - Glowplugs commanded on & raw feedback < 4.0 v		Diagnostic set conditions true for 2 seconds Test performed continuously	B
P0380	A/D glowplug voltage input	Glow Plug Circuit Malfunction **(CALIFORNIA)**	Glowplugs commanded off & raw feedback < 2.0 v Glowplugs commanded on & 5.0 v < raw feedback < 6.2 v Detects a faulty glowplug relay circuit	Glowplugs commanded off & raw feedback > 2.0 v -OR- Glowplugs commanded on & raw feedback > 6.2 v - OR - raw feedback < 5.0 v Battery voltage = 0	Ignition Voltage > 9v Glow plug feedback stable for 1.25 sec.	Diagnostic set conditions true for 2 seconds Test performed continuously	B
P0500	Monitor vehicle speed input signal.	Vehicle Output Speed Sensor Circuit	**Manual Transmission:** Vehicle Speed < 5 mph Coolant Temperature > 20 degrees C. **Automatic Transmission:** Engine Running	**Manual Transmission**: No detected vehicle speed pulses **Automatic Transmission:** Delta between ECM Vehicle Speed value and CAN Vehicle Speed value > 10 mph	Manual Trans: Engine speed > 1500 rpm and Engine Torque > 200 N-m	30 failures out of 40 (Every 125ms)	B
P0541	Checks the voltage of heater line	Intake Heater Open	Heater line voltage<3.8V @ relay off and Reference line voltage is low @ relay off and Heater line voltage >=1.0V @ relay on and Reference line voltage is High @ relay on	3.8V<=Heater line voltage<8.1V @relay off and Battery voltage - **0.5**V <Heater line voltage @relay on	10V<=Battery voltage<=18V	Diagnostic condition true for 1 second relay off mode and on mode for 3 seconds (once per key cycle)	B
P0542	Checks the voltage of heater line	Intake Heater System	Heater line voltage<3.8V @ relay off and Reference line voltage is low @ relay off and Heater line voltage >=1.0V @ relay on and Reference line voltage is High @ relay on	**Case A:** Heater line voltage>=8.1V @relay off **Case B:** 3.8V<=Heater line voltage<8.1V @ relay off and Battery voltage - 0.5V >=Heater line voltage @relay on	10V<=Battery voltage<=18V	Diagnostic condition true for 1 second relay off mode and on mode for 3 seconds (once per key cycle)	B

				Case C: Heater line voltage<3.8V @ relay off and Reference line voltage=low @ relay off and <C-1> Heater line voltage<1.0V @ relay on or <C-2> Heater line voltage>=1.0V @ relay on and Referrence line voltage is Low @ relay on **Case D:** Heater line voltage<3.8V @ relay off and Referrence line voltage is High @ relay off		
P0601		Control Module Read Only Memory		Calculated Checksum(s) not equal to imbedded Checksum(s)		Run one (1) time at powerup.	A
P0602		Control Module Not Programmed		K_Check_Service_Calibration = TRUE.		Run every 125 ms	A
P0604		Control Module Random Access Memory		Data read from RAM location not equal to data written to RAM location.		Run during ECM initialization.	A
P0611	Mornitoring in EDU and message transferred via CAN	Fuel Injector Control Module Performance	No Error Message from EDU	Micro.C or MM defective" or "A/D conversion SRC violation" if 10 <= battery voltage <= 18 or "A/D conversion Timeout Error"	Ignition on J1939 Initialization is done Key_on_time > 0.5sec Not in Powerdown Mode CAN MSG is Valid Engine Speed >= 0rpm	30 out of 50 (Every 125ms)	B
P0612	Discrete flag from hardware I/O	Fuel Injector Control Module Relay Control Circuit	No ODM faulure flag from hardware I/O	OUTD state and F/B voltage does not match	IGNITION ON J1939 Initialization is done Not in Powerdown_Mode Key_on_time>0.5sec	30 out of 50 (Every 125ms)	B
P0650		Malfunction Indicator Lamp (MIL) Control Circuit	Ignition voltage between 6 and 18 volts	MIL Output MIL fail counter incremented if MIL output driver indicates a fault condition (open/short ckt)	Ignition on Ignition voltage between 6 and 18 volts	Greater than or equal to 10 fail counts MIL Output monitored at least every 500 msec	A
P0700	Monitor MIL Request input	Transmission Control Module (TCM) Requested MIL Illumination		MIL Request line active	Ignition 0 on time > 7 seconds P1781 Fault not set	Active for 20 samples (Every 125 ms)	A
P1223	OUTD Mornitoring in ECM	Injector 1 Output Circuit	No Error Message from EDU	Short to High Signal from TFD	IGN on Poweruptime>0.5sec rpm > 300 rpm Fuel Mode	100 out of 120 (Every 32ms)	B

	Mornitoring in EDU and message transferred via CAN		1 <= Number of injection pulses <= 2 when ECM request inejction to EDU	"Illegal Req.(too long/short/close)" or "wrong segment Req. " or "simultaneous Req. " or "number of pulse > 2 or < 1 if qd > 5mm3/st and bpw>60us and blankshot not active	IGN on Poweruptime>0.5sec CAN MSG from EDU is valid Not in Poweroff Mode rpm > 300 rpm	100 out of 120 (Every 32ms)	
P1226	OUTD Mornitoring in ECM	Injector 2 Output Circuit	No Error Message from EDU	Short to High Signal from TFD	IGN on Poweruptime>0.5sec rpm > 300 rpm Fuel Mode	100 out of 120 (Every 32ms)	B
	Mornitoring in EDU and message transferred via CAN		1 <= Number of injection pulses <= 2 when ECM request inejction to EDU	"Illegal Req.(too long/short/close)" or "wrong segment Req. " or "simultaneous Req. " or "number of pulse > 2 or < 1 if qd > 5mm3/st and bpw>60us and blankshot not active	IGN on Poweruptime>0.5sec CAN MSG from EDU is valid Not in Poweroff Mode rpm > 300 rpm	100 out of 120 (Every 32ms)	
P1229	OUTD Mornitoring in ECM	Injector 3 Output Circuit	No Error Message from EDU	Short to High Signal from TFD	IGN on Poweruptime>0.5sec rpm > 300 rpm Fuel Mode	100 out of 120 (Every 32ms)	B
	Mornitoring in EDU and message transferred via CAN		1 <= Number of injection pulses <= 2 when ECM request inejction to EDU	"Illegal Req.(too long/short/close)" or "wrong segment Req. " or "simultaneous Req. " or "number of pulse > 2 or < 1 if qd > 5mm3/st and bpw>60us and blankshot not active	IGN on Poweruptime>0.5sec CAN MSG from EDU is valid Not in Poweroff Mode rpm > 300 rpm	100 out of 120 (Every 32ms)	
P1232	OUTD Mornitoring in ECM	Injector 4 Output Circuit	No Error Message from EDU	Short to High Signal from TFD	IGN on Poweruptime>0.5sec rpm > 300 rpm Fuel Mode	100 out of 120 (Every 32ms)	B
	Mornitoring in EDU and message transferred via CAN		1 <= Number of injection pulses <= 2 when ECM request inejction to EDU	"Illegal Req.(too long/short/close)" or "wrong segment Req. " or "simultaneous Req. " or "number of pulse > 2 or < 1 if qd > 5mm3/st and bpw>60us and blankshot not active	IGN on Poweruptime>0.5sec CAN MSG from EDU is valid Not in Poweroff Mode rpm > 300 rpm	100 out of 120 (Every 32ms)	
P1235	OUTD Mornitoring in ECM	Injector 5 Output Circuit	No Error Message from EDU	Short to High Signal from TFD	IGN on Poweruptime>0 rpm > 300 rpm Fuel Mode	100 out of 120 (Every 32ms)	B
	Mornitoring in EDU and message transferred via CAN		1 <= Number of injection pulses <= 2 when ECM request inejction to EDU	"Illegal Req.(too long/short/close)" or "wrong segment Req. " or "simultaneous Req. " or "number of pulse > 2 or < 1 if qd > 5mm3/st and bpw>60us and blankshot not active	IGN on Poweruptime>0 CAN MSG from EDU is valid Not in Poweroff Mode rpm > 300 rpm	100 out of 120 (Every 32ms)	
P1238	OUTD Mornitoring in ECM	Injector 6 Output Circuit	No Error Message from EDU	Short to High Signal from TFD	IGN on Poweruptime>0.5sec rpm > 300 rpm Fuel Mode	100 out of 120 (Every 32ms)	B
	Mornitoring in EDU and message transferred via CAN		1 <= Number of injection pulses <= 2 when ECM request inejction to EDU	"Illegal Req.(too long/short/close)" or "wrong segment Req. " or "simultaneous Req. " or "number of pulse > 2 or < 1 if qd > 5mm3/st and bpw>60us and blankshot not active	IGN on Poweruptime>0.5sec CAN MSG from EDU is valid Not in Poweroff Mode rpm > 300 rpm	100 out of 120 (Every 32ms)	

P1241	OUTD Mornitoring in ECM Mornitoring in EDU and message transferred via CAN	Injector 7 Output Circuit	No Error Message from EDU 1 <= Number of injection pulses <= 2 when ECM request inejction to EDU	Short to High Signal from TFD "Illegal Req.(too long/short/close)" or "wrong segment Req. " or "simultaneous Req. " or "number of pulse > 2 or < 1 if qd > 5mm3/st and bpw>60us and blankshot not active	IGN on Poweruptime>0.5sec rpm > 300 rpm Fuel Mode IGN on Poweruptime>0.5sec CAN MSG from EDU is valid Not in Poweroff Mode rpm > 300 rpm	100 out of 120 (Every 32ms) 100 out of 120 (Every 32ms)	B
P1244	OUTD Mornitoring in ECM Mornitoring in EDU and message transferred via CAN	Injector 8 Output Circuit	No Error Message from EDU 1 <= Number of injection pulses <= 2 when ECM request inejction to EDU	Short to High Signal from TFD "Illegal Req.(too long/short/close)" or "wrong segment Req. " or "simultaneous Req. " or "number of pulse > 2 or < 1 if qd > 5mm3/st and bpw>60us and blankshot not active	IGN on Poweruptime>0.5sec rpm > 300 rpm Fuel Mode IGN on Poweruptime>0.5sec CAN MSG from EDU is valid Not in Poweroff Mode rpm > 300 rpm	100 out of 120 (Every 32ms) 100 out of 120 (Every 32ms)	B
P1261	Mornitoring in EDU and message transferred via CAN	Injector Positive Voltage Control Circuit Group 1	No Error Message from EDU	"HSOC #1 or #4 or #6 or #7" or "LSOC #1 or #4 or #6 or #7" or "Boost low EDU Bank 1" or "load drop #1 or #4 or #6 or #7"	CAN MSG from EDU is valid IGN on Poweruptime>0.5sec Not in Poweroff Mode	20 out of 40 (32ms)	A
P1262	Mornitoring in EDU and message transferred via CAN	Injector Positive Voltage Control Circuit Group 2	No Error Message from EDU	"HSOC #2 or #3 or #5 or #8" or "LSOC #2 or #3 or #5 or #8" or "Boost low EDU Bank 2" or "load drop #2 or #3 or #5 or #8"	CAN MSG from EDU is valid IGN on Poweruptime>0.5sec Not in Poweroff Mode	20 out of 40 (32ms)	A
P1345	Checks the number of CAM edges at crankshaft synch(gap) event	Crankshaft Position [CKP] - Camshaft Position [CMP] Correlation	Hall Effect Sensor 3 pulses (encoded) per 2 crank revolution	Number of CAM edges in 1 crank revolution is not equal to 3 but not equal to 0.	Ignition On Key_on_time>0.5sec Not in Powerdown mode As soon as a synch tooth is detected	15 failures out of 35 samples. Samples are taken every reference event	B
P1550	CAN Message from EDU	Fuel Injector Control Module System Voltage		"'EDU battery voltage out of range"	Ignition on Initialization complete Poweruptime > 0 Not in Poweroff Mode CAN MSG is Valid Engine Speed > 60rpm 11 <= Battery voltage <= 16	30 out of 50 (Every 125ms)	C
P1635	Checks the 5 Volt Reference 0utput (V5B1) of the A/D converter	5 Volt Reference 1 Circuit	5 Volt Reference V5B1 does not exceed 5v and does not fall below 4.4V	5 Volt Reference V5B1 > 5V 5 Volt Reference V5B1 < 4.4V	Ign ON	Failure detected for 2 seconds	A
P1639	Checks the 5 Volt Reference 0utput (V5B2) of the A/D converter	5 Volt Reference 2 Circuit	5 Volt Reference V5B2 does not exceed 5v and does not fall below 4.4V	5 Volt Reference V5B2 > 5V 5 Volt Reference V5B2 < 4.4V	Ign ON	Failure detected for 2 seconds	B

2001 6.6L Duramax Diesel (LB7)) C/K-truck
Heavy Duty (GVW >8500) ENGINE DIAGNOSTIC PARAMETERS

2001file9.doc

P1643		Wait To Start Lamp Control Circuit	Ignition voltage between 6 and 18 volts	Wait To Start Telltale Output WTS fail counter incremented if WTS output driver indicates a fault condition (open/short ckt)	Ignition on Ignition voltage between 6 and 18 volts	Greater than or equal to 10 fail counts Wait To Start Telltale Output monitored at least every 500 msec	B
P1658	Mornitoring in EDU and message transferred via CAN	Fuel Injector Control Module Driver Performance	No Error Message from EDU	Any cylinder of "Fast Current Decrease Errorr" (Injection Current is grater than 3A at 100usec from EOC)	Ignition on J1939 Initialization is done Key_on_time > 0.5sec Not in Powerdown Mode CAN MSG is Valid	30 out of 50 (Every 125ms)	A
P1683	Ignition off timer	Control Module Ignition Off Timer Performance	((ignition off time delta >= min 0 sec) and (Ignition off time delta<= max 5 sec)) AND timer is incrementing AND timer increment < 2 delta sec Detects a faulty Ignition off Timer circuit.	Delta between Ignition off timer reads <= 0 sec OR Delta between Ignition off timer reads <= 5 sec OR timer unchanged for 25 sec OR timer increment > 2 delta sec	Ignition off timer is running diagnostic has not yet run to completion	Test performed continuously	B
P1781	Monitor MIL Request input	Transmission Control Module (TCM) MIL Request Circuit	Ignition 0 on time > 1 second but < 7 seconds	MIL Request line inactive		Monitored for 6 seconds after Ignition 0 transitions from off to on (Every 125 ms)	B
U1800	Message from EDU via CAN (Monitor the status of Message B7, toggring bit)	Lost Communication with Fuel Injector Control Module	Toggring bit should be inverted every 20msec	CAN Message is not updated for 3 count (By refering Toggling bit every 15.6ms)	Ignition on J1939 Initialization is done Key_on_time > 0.5sec Not in Powerdown_Mode	30 out of 50 (Every 125ms)	B
U2104	Monitor CAN status register of CAN controller chip	CAN bus reset counter overrun		A CAN bus hardware error shall present for a calibrated amount of time.	Ignition on Ignition voltage <= 18 volts Ignition voltage >= 6 volts	Monitor time is 200msec. Frequency is every 8msec.	B
U2106	CAN Message from the TCM	Lost communications with Transmission Control System		The ECM fails to receive PGN 0 or PGN 61,445 from the TCM	Ignition on Ignition voltage <= 18 volts Ignition voltage >= 6 volts	Monitor time is 1000msec. Frequency is every 8msec.	B

2001 6.6L Duramax Diesel (LB7)) C/K-truck
Heavy Duty (GVW >8500) ENGINE DIAGNOSTIC PARAMETERS

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CHART 1	
Value	**RPM**
10	0
10	200
10	400
10	600
10	800
10	1000
10	1200
10	1400
10	1600
10	1800
10	2000
11	2200
12	2400
13	2600
14	2800
15	3000
16	3200
20	3400
20	3600
20	3800
20	4000
20	4200
20	4400
20	4600
20	4800
20	5000

*Tables	
CHART 2	
Start-up Engine Temperature	Ambient Air Temperature
-40°C	150
-16°C	150
8°C	16
32°C	-1
56°C	-13
80°C	-13
104°C	-13
128°C	-13
152°C	-13