2006 6.6L (LLY) *when used in:* Silverado, Sierra, Express, Savana, G30 Cutaway, P30 Chassis
ENGINE DIAGNOSTIC PARAMETERS

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	Note
P00XX Fuel and Air Metering and Auxiliary Emission Controls								
Crankshaft Position (CKP)-Camshaft Position (CMP) Correlation	P0016	Calculation of crank position by CKP sensor and CMP sensor disagree by < 6deg crank angle. Detects implausible camshaft/crankshaft sensor correlation by comparing the differences between calculated camshaft and crankshaft positions.	PATH 1) Difference between CKP position as calculated by CKP sensor and CMP sensor is >= 6 degrees crank angle. OR PATH 2) Difference between CKP position as calculated by CKP sensor and CMP sensor is < 6 degrees crank angle, but the CMP position tolerance is > 12 degrees (cam). CMP position tolerance is the error between TDC and first edge of cam detection. Prevents false	P0335, P0336 DTCs not set Ignition ON Engine Speed ≥ 50 rpm	PATH 1) 255 crankshaft increments (60 increments/revolution) PATH 2) 5 cam phases (4 phases/cam revolution)	Cam sensor (CMP sensor) and Crank sensor (CKP sensor)	A	
Turbocharger Boost Control Position Not Learned	P003A	Position of the vanes opened during a learn : vane position > 5.54%, OR vane position < 36.94% Position of the vanes closed during a learn : vane position >69.92%, OR vane position < 95.60%. Detects in range vane position errors during a vane sweep to learn min and max vane positions.	Position of the vanes opened during a learn : vane position < 5.54%, OR vane position > 36.94% Position of the vanes closed during a learn : vane position <69.92%, OR vane position > 95.60%	P117,P118,P2563, P2564,P2565,P2228,P2229 DTCs are not set. ECM is commanding vanes open or closed during a position learn process Injected Fuel <30 mm^3/S 600 rpm< engine speed <750 rpm 0 mph< vehicle speed< 200 kph 71C< Engine Coolant Temp <96C 60 kpa <=Baro <=110 kpa	Diagnostic fail conditions true for for 30 seconds. Performed once per ignition cycle	Turbocharger Vane Position Sensor.	B	
Turbocharger Boost Control Solenoid Control Circuit.	P0045	Electronic out-put driver circuitry determines the faults (open/short/no load) do not exist on the Turbo Boost Solenoid Cntrl Circuit.	Electronic out-put driver circuitry determines the faults (open/short/no load) do exist on the Turbo Boost Solenoid Cntrl Circuit.	Ignition On	Diagnostic fail conditions true for 4 seconds. Test performed continuously	ECM Electronic out put driver circuitry	B	
Fuel Rail Pressure [FRP] Too Low	P0087	22.5 Mpa to 198 Mpa Measured Rail Pressure sensor < 15 MPa below Desired rail Pressure. AND Measured Rail Pressure sensor > = 22.5 MPa Detects a Low Rail Pressure condition.	Measured Rail Pressure sensor > 15 MPa below Desired rail Pressure. OR Measured Rail Pressure < = 22.5 MPa	P0090,P0192,P0193, DTCs are not set Rail Pressure control in closed loop control. (closed loop RP control occurs when engine traniations from crank to Run mode)	Diagnostic fail conditions true for 12.5 seconds . Test performed continuously	Rail Pressure Sensor	A	
Fuel Rail Pressure [FRP] Too High	P0088	22.5 Mpa to 198 Mpa Measured Rail Pressure sensor < 20 MPa above Desired rail Pressure. AND Measured Rail Pressure sensor < = 189 MPa Detects a High Rail Pressure condition.	PATH 1) Measured Rail Pressure sensor > 20 MPa above Desired rail Pressure AND Rail Pressure Desired Fuel Flow <= 100 mm3/sec. AND fuel injection qty > 1 mm3/stroke. OR PATH 2) Measured Rail Pressure sensor > =	P0087,P0192,P0193 DTCs are not set Rail Pressure control in closed loop control. (closed loop RP control occurs when engine transitions from crank to Run mode) "Rail Pressure Desired Fuel Flow is calculated based on RPM and FR	PATH 1) 10 seconds continuous PATH 2) 6 seconds continuous	Rail Pressure Sensor	A	
Fuel Pressure Regulator Control Circuit	P0090	Electronic out-put driver circuitry determines the faults (open/short/no load) do not exist on the Fuel Pressure Regulator Cntrl Circuit.	Electronic out-put driver circuitry determines the faults do exist on the Fuel Pressure Regulator Cntrl Circuit. PATH 1) open / short to GND / no load) PATH 2) Short to Battery	Ignition On	Diagnostic fail conditions true for: PATH1) 220 m seconds PATH 2) 500 m seconds Test	ECM Electronic out put driver circuitry	A	
Intake Air Temperature (IAT) Sensor 2 Circuit Low Voltage	P0097	0.10 volt to 4.8 volts -40degC to 200 degC Detects a sensor circuit short to ground	Air temperature sensor voltage <= 0.10 volt -same as- Air temperature>200degC	Ignition On	Diagnostic fail conditions true for 1 seconds Test performed continuously 100msec rate	Air temperature sensor	B	
Intake Air Temperature (IAT) Sensor 2 Circuit High Voltage	P0098	0.10 volt to 4.8 volts -40degC to 200 degC Detects a sensor circuit short high voltage or a sensor circuit open	Air temperature sensor voltage>=4.8 volt -same as- Air temperature<-40degC	Ignition On	Diagnostic fail conditions true for 1 seconds Test performed continuously	Air temperature sensor	B	

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ENGINE DIAGNOSTIC PARAMETERS

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P01XX Fuel and Air Metering								
Mass Air Flow (MAF) Sensor Performance	P0101	5.5 kg/hr to 1650 kg/hr. 0 .9 < Normalized air flow ratio < 1.5 The normalized air flow ratio is derived by dividing the reference air flow by the actual air flow.	Normalized air flow ratio < 0.9 OR Normalized air flow ratio > 1.5	P0102,P0103,P0107,P0108,P0106,P2228, P2229,P0117,P0118,P0112,P0113,P0652, P0653,P0642,P0643,P0652,P0653,P0698, P0699 DTCs are not set. Baro >= 72kPa -20C <= Coolant temp <=99 C	Diagnostic fail conditions true for 16 seconds Test performed continuously .	Mass Air Flow Sensor	B	
Mass Air Flow (MAF) Sensor Circuit Low Voltage	P0102	5.5 kg/hr to 1650 kg/hr. Uses a low mass air flow reading to indicate a MAF sensor circuit open or short to ground.	Raw Mass Air Flow < 5.5 kg/hr	500 < RPM < 3100.	Diagnostic fail conditions true for 3 seconds Test performed	Mass Air Flow Sensor	B	
Mass Air Flow (MAF) Sensor Circuit High Voltage	P0103	5.5 kg/hr to 1650 kg/hr. Uses a high mass air flow reading to indicate a MAF sensor circuit short to voltage.	Mass Air Flow > 2000 kg/hr	Ignition On	Diagnostic fail conditions true for 3 seconds Test performed	Mass Air Flow Sensor	B	
Manifold Absolute Pressure (MAP) Sensor Performance	P0106	0.144 v - 4.149 v (18 kPA - 307kPa) Compares MAP and Baro for in range rationality diag.	Baro and MAP disagree at key-up by 15kPa	P0107,P0108,P2228,P2229 DTCs are not set. ECM powered On, RPM < 900.	Diagnostic fail conditions true for 10 sec. Test performed continuously	Manifold Absolute Pressure (MAP) Sensor and Baro Sensor	A	
Manifold Absolute Pressure (MAP) Sensor Circuit Low Voltage	P0107	0.144 v - 4.149 v (18 kPA - 307kPa) Detects MAP sensor circuit open or short to ground	MAP Sensor Signal <0.144 v same as 18kpa	Ignition voltage >11 volts Engine Run time >1sec	Diagnostic fail condition true for 2 seconds Test performed continuously	Manifold Absolute Pressure (MAP) Sensor	A	
Manifold Absolute Pressure (MAP) Sensor Circuit High Voltage	P0108	0.144 v - 4.149 v (18 kPA - 307kPa) Detects MAP sensor circuit short to high voltage	MAP Sensor Signal >4.149 v same as 307kpa	Engine Run time >1sec	Diagnostic fail condition true for 2 seconds Test performed continuously	Manifold Absolute Pressure (MAP) Sensor	A	
Intake Air Temperature (IAT) Sensor Circuit Low Voltage	P0112	0.10 volt to 4.8 volts -40degC to 150 degC Detects a sensor circuit short to ground	Intake Air temperature sensor voltage <= 0.10 volt -same as- Air temperature>150degC	Ignition On	Diagnostic set conditions true for 1 second Test performed continuously 100msec rate	Intake Air temperature sensor	B	
Intake Air Temperature (IAT) Sensor Circuit High Voltage	P0113	0.10 volt to 4.8 volts -40degC to 150 degC Detects a sensor circuit short high voltage or a sensor circuit open	Intake Air temperature sensor voltage>=4.8 volt -same as- Air temperature<-40degC	Ignition On	Diagnostic set conditions true for 1 second Test performed continuously 100msec rate	Intake Air temperature sensor	B	
Engine Coolant Temperature (ECT) Sensor Performance	P0116	absolute value of (Startup Coolant Temperature Sensor - Startup Air Temperature Sensor 1) < 5.3degC. Detects biased Coolant Temperature Sensor	PATH 1) absolute value of (Startup Coolant Temperature Sensor - Startup Air Temperature Sensor 1) > 5.3degC AND block heater influenced determined to be not true. Block heater influence is true if after 6mins at VSS > 24kph the IAT drops 5.3degC from start-up IAT. OR PATH 2) absolute value of (Startup Coolant	P0117,P0118, DTCs are not set. Engine Off Timer > 10hrs, IAT > 10deg C, Engine running > 2 seconds	Diagnostic sets on first fail Test performed once per key cycle	Coolant Temperature Sensor and Intake Air Temperature Sensor	B	
Engine Coolant Temperature (ECT) Sensor Circuit Low Voltage	P0117	0.065 V to 4.75 V -40degC to 150 degC Detects a sensor circuit short to ground	Coolant Temperature Sensor voltage <= 0.065 volt -same as- Coolant Temperature>150degC	Ignition On	Diagnostic set conditions true for 15 second Test performed continuously	Coolant Temperature Sensor	B	
Engine Coolant Temperature (ECT) Sensor Circuit High Voltage	P0118	0.065 V to 4.75 V -40degC to 150 degC Detects a sensor circuit short high voltage or a sensor circuit open	Coolant Temperature Sensor voltage >= 4.8 V -same as- Coolant Temperature >-40 degC	Ignition On	Diagnostic set conditions true for 60 second Test performed continuously	Coolant Temperature Sensor	B	

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Engine Coolant Temperature (ECT) Below Thermostat Regulating Temperature	P0128	Engine Temperature > 72degC AND ambient air temperature > 10 degC OR Engine Temperature >50 degC AND ambient air temperature <= 10 degC. Detects thermostat failures causing engine to run cooler than expected.	PATH 1 High Region) Modeled coolant temp predicts coolant temp should be > 80 deg C AND Actual coolant temp is < 72 degC PATH 2 Low Region) Modeled coolant temp > 55 and Actual coolant temp < 50 degC	P0128 not yet passed; AND P0112, P0113,P0116,P0117,P0118 DTCs are not set PATH 1 High Region) Ambient air temp >10 deg C PATH 2 Low Region) Ambient air temp <=10 deg C '-7 degC<Ambient air temp < 100 degC; -40degC < Engine start-up temp < 65degC; Engine is running;	Test performed once from start-up until a pass/fail/disable condition exists.	Engine coolant temperature sensor. IAT 1 sensor	B	
Fuel Tempertaure Sensor Performance	P0181	absolute value of (Startup Coolant Temperature Sensor - Startup Fuel Temperature Sensor) < 10 degC. Detects bias Fuel Temperature Sensor	PATH 1) absolute value of (Startup Coolant Temperature Sensor - Startup Fuel Temperature Sensor) > 10degC AND block heater influenced determined to be not true. Block heater influence is true if after 6mins at VSS > 24kph the IAT drops 5.3degC from start-up IAT. OR PATH 2) absolute value of (Startup Coolant	P0182,P0183,P0117,P0118 DTCs are not set. Engine Off Timer > 10hrs, IAT 1> 10deg C, Engine running > 2 seconds	Diagnostic sets on first fail Test performed once per key cycle	Coolant Temperature Sensor and Fuel Temperature Sensor	B	
Fuel Temperature Sensor Circuit Low Voltage	P0182	0.12V -4.57V -30degC to 120degC Detects a sensor circuit short to ground	Fuel temperature<0.07 V - same as - Fuel temperature > 120degC	Ignition On	Diagnostic set conditions true for 1 seconds Test performed continuously at	Fuel temperature sensor	B	
Fuel Temperature Sensor Circuit High Voltage	P0183	0.12V -4.57V -30degC to 120 degC Detects a sensor short to high voltage or sensor circuit open	Fuel temperature > 4.72 V - same as - Fuel temperature < -30degC	Ignition On	Diagnostic set conditions true for 1 seconds Test performed continuously100msec	Fuel temperature sensor	B	
Fuel Rail Pressure [FRP] Sensor Performance	P0191	0.352V (-7.5 bar) < FRP at engine off < 0.65 V (7.7bar) Detects a biased sensor by determining the FRP sensor voltage to be in the correct range for atmospheric pressure at engine off and with sufficient pressure bleed-off time.	PATH 1) FRP voltage < 0.352V (-7.5 bar) OR FRP voltage > 0.65V (7.7bar) at ECM initialization PATH 2) FRP voltage < 0.352V (-7.5 bar) OR FRP voltage >0.65V (7.7 bar) after engine shutoff with bleed off time.	PATH 1) P0016, P062F, P0116, P0117, P0118, P0192, P0193, P0652, P0653 DTCs are not set, ECM in INITIALIZATION status, coolant temperature drop > 5degC since last driving cycle, 0 degC <= Coolant temperature <= 120 degC, Engine Speed = 0 rpm PATH 2) P0652, P0653, P0191, P0192, P0193 DTCs are not set, Test did not complete at ECM initialization (PATH1), ECM status = AFTERRUN (engine off, ECM still active), fuel temperature ≥ 60 degC, wait timer has elapsed (30-70 seconds after engine shutoff, depending on	Failure exists for one sample cycle (cycle location either at ECM initialization (PATH1) or during afterrun (PATH2), depending on entry conditions)	Fuel Rail Pressure Sensor (FRP)	A	
			Chart 2a					
			Rail Pressure at engine shut down (MPa	Engine Off Time (seconds)				
			200	30				
			250	50				
			400	55				
			1000	60				
			1150	65				
			1300	70				
Fuel Rail Pressure [FRP] Sensor Circuit Low Voltage	P0192	0.254 V to 4.75 V Detects a Rail Pressure Sensor circuit short to ground	Rail Pressure Sensor voltage < 0.254 V	P0652, P0653 DTCs not set	Diagnostic set conditions true for 200 msec Test performed	Rail Pressure Sensor	A	

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Fuel Rail Pressure [FRP] Sensor Circuit High Voltage	P0193	0.254 V to 4.75 V Detects a Rail Pressure Sensor short to high voltage or sensor circuit open	Rail Pressure Sensor voltage > 4.75 V	P0652, P0653 DTCs not set	Diagnostic set conditions true for 200 msec Test performed	Rail Pressure Sensor	A	
P02XX Fuel and Air Metering								
Injector 1 Control Circuit	P0201	Electronic out-put driver circuitry determines that the faults (open/short/no load) do not exist.	Electronic out-put driver circuitry determines that the faults (open/short/no load) do exist	Engine running. Injection event is being attempted for Cly 1	Fault exists for 3 msec. Monitored continuosly	ECM Injector Electronic out-put driver circuitry	A	
Injector 2 Control Circuit	P0202	Electronic out-put driver circuitry determines that the faults (open/short/no load) do not exist.	Electronic out-put driver circuitry determines that the faults (open/short/no load) do exist	Engine running. Injection event is being attempted for Cly 2	Fault exists for 3 msec. Monitored continuosly	ECM Injector Electronic out-put driver circuitry	A	
Injector 3 Control Circuit	P0203	Electronic out-put driver circuitry determines that the faults (open/short/no load) do not exist.	Electronic out-put driver circuitry determines that the faults (open/short/no load) do exist	Engine running. Injection event is being attempted for Cly 3	Fault exists for 3 msec. Monitored continuosly	ECM Injector Electronic out-put driver circuitry	A	
Injector 4 Control Circuit	P0204	Electronic out-put driver circuitry determines that the faults (open/short/no load) do not exist.	Electronic out-put driver circuitry determines that the faults (open/short/no load) do exist	Engine running. Injection event is being attempted for Cly 4	Fault exists for 6 msec. Monitored continuosly	ECM Injector Electronic out-put driver circuitry	A	cly4 longer detection time required because of unique bank charging time
Injector 5 Control Circuit	P0205	Electronic out-put driver circuitry determines that the faults (open/short/no load) do not exist.	Electronic out-put driver circuitry determines that the faults (open/short/no load) do exist	Engine running. Injection event is being attempted for Cly 5	Fault exists for 3 msec. Monitored continuosly	ECM Injector Electronic out-put driver circuitry	A	
Injector 6 Control Circuit	P0206	Electronic out-put driver circuitry determines that the faults (open/short/no load) do not exist.	Electronic out-put driver circuitry determines that the faults (open/short/no load) do exist	Engine running. Injection event is being attempted for Cly 6	Fault exists for 3 msec. Monitored continuosly	ECM Injector Electronic out-put driver circuitry	A	
Injector 7 Control Circuit	P0207	Electronic out-put driver circuitry determines that the faults (open/short/no load) do not exist.	Electronic out-put driver circuitry determines that the faults (open/short/no load) do exist	Engine running. Injection event is being attempted for Cly 7	Fault exists for 3 msec. Monitored continuosly	ECM Injector Electronic out-put driver circuitry	A	
Injector 8 Control Circuit	P0208	Electronic out-put driver circuitry determines that the faults (open/short/no load) do not exist.	Electronic out-put driver circuitry determines that the faults (open/short/no load) do exist	Engine running. Injection event is being attempted for Cly 8	Fault exists for 3 msec. Monitored continuosly	ECM Injector Electronic out-put driver circuitry	A	
Turbocharger Engine Overboost	P0234	Measured Boost is < 40kPa above Desired Boost. Detects an Overboost condition or a biased high boost sensor.	Measured Boost is > 40kPa above Desired Boost	P2564,P2565 DTCs are not set 800 rpm <= Engine RPM <=3600 rpm	Diagnostic fail condition true for 10 second Test performed continuously	MAP Sensor (aka Boost Sensor)	A	
Turbochager Engine Underboost	P0299	Measured Boost is < 40kPa below Desired Boost Detects an underboost condition or a biased low sensor.	Measured Boost is > 40kPa below Desired Boost	P2564,P2565 DTCs are not set 800 rpm <= Engine RPM <=3600 rpm	Diagnostic fail condition true for 10 second Test performed continuously	MAP Sensor (aka Boost Sensor)	A	
P03XX Ignition System or Misfire								
Engine Misfire Detected	P0300	Misfires do not exist on more than one clyinder	Misfires do exist on more than one clyinder	Ignition On	Diagnostic sets on first fail Test performed once per key cycle	Cylinder to Cylinder engine speed. SW Poling of individual cly	B	

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ENGINE DIAGNOSTIC PARAMETERS

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	Note
Cylinder 1 Misfire Detected	P0301	Cylinder #1 RPM >= minimum average cylinder speed after an injection event. The minimum average cly speed is calculated every 2 rotations and represents the average speed that all cly are rotating at after a combustion event.	Cylinder #1 RPM < minimum average cylinder speed. after an injection event for at least 180 counts	1)P0335,P0336,P0117,P0118,P0201,P0202, P0203,P0204,P0205,P0206,P0207,P0208, P2146,P2149,P2152,P2155,P0502,P062C DTCs are not set. 2)Engine is running 3)Coolant temperature >= 40degC 4)500 rpm < Engine speed < 1500 rpm 5) 3 mm3/S < injected fuel < 25 mm3/S 6)vehicle speed<= 3 Kph 7)Engine run time > 10 seconds	Diagnostic fail condition true for 180 revolutions. Test performend once per key cycle in a total of 440 revolutions	Cylinder to Cylinder engine speed	B	
Cylinder 2 Misfire Detected	P0302	Cylinder #2 RPM >= minimum average cylinder speed after an injection event. The minimum average cly speed is calculated every 2 rotations and represents the average speed that all cly are rotating at after a combustion event.	Cylinder #2 RPM < minimum average cylinder speed after an injection event for at least 180 counts	1)P0335,P0336,P0117,P0118,P0201,P0202, P0203,P0204,P0205,P0206,P0207,P0208, P2146,P2149,P2152,P2155,P0502,P062C DTCs are not set. 2)Engine is running 3)Coolant temperature >= 40degC 4)500 rpm < Engine speed < 1500 rpm 5) 3 mm3/S < injected fuel < 25 mm3/S 6)vehicle speed<= 3 Kph 7)Engine run time > 10 seconds	Test performend once per key cycle in a total of 440 revolutions	Cylinder to Cylinder engine speed	B	
Cylinder 3 Misfire Detected	P0303	Cylinder #3 RPM >= minimum average cylinder speed after an injection event. The minimum average cly speed is calculated every 2 rotations and represents the average speed that all cly are rotating at after a combustion event.	Cylinder #3 RPM < minimum average cylinder speed after an injection event for at least 180 counts	1)P0335,P0336,P0117,P0118,P0201,P0202, P0203,P0204,P0205,P0206,P0207,P0208, P2146,P2149,P2152,P2155,P0502,P062C DTCs are not set. 2)Engine is running 3)Coolant temperature >= 40degC 4)500 rpm < Engine speed < 1500 rpm 5) 3 mm3/S < injected fuel < 25 mm3/S 6)vehicle speed<= 3 Kph 7)Engine run time > 10 seconds	Test performend once per key cycle in a total of 440 revolutions	Cylinder to Cylinder engine speed	B	
Cylinder 4 Misfire Detected	P0304	Cylinder #4 RPM >= minimum average cylinder speed after an injection event. The minimum average cly speed is calculated every 2 rotations and represents the average speed that all cly are rotating at after a combustion event.	Cylinder #4 RPM < minimum average cylinder speed after an injection event for at least 180 counts	1)P0335,P0336,P0117,P0118,P0201,P0202, P0203,P0204,P0205,P0206,P0207,P0208, P2146,P2149,P2152,P2155,P0502,P062C DTCs are not set. 2)Engine is running 3)Coolant temperature >= 40degC 4)500 rpm < Engine speed < 1500 rpm 5) 3 mm3/S < injected fuel < 25 mm3/S 6)vehicle speed<= 3 Kph 7)Engine run time > 10 seconds	Test performend once per key cycle in a total of 440 revolutions	Cylinder to Cylinder engine speed	B	
Cylinder 5 Misfire Detected	P0305	Cylinder #5 RPM >= minimum average cylinder speed after an injection event. The minimum average cly speed is calculated every 2 rotations and represents the average speed that all cly are rotating at after a combustion event.	Cylinder #5 RPM < minimum average cylinder speed after an injection event for at least 180 counts	1)P0335,P0336,P0117,P0118,P0201,P0202, P0203,P0204,P0205,P0206,P0207,P0208, P2146,P2149,P2152,P2155,P0502,P062C DTCs are not set. 2)Engine is running 3)Coolant temperature >= 40degC 4)500 rpm < Engine speed < 1500 rpm 5) 3 mm3/S < injected fuel < 25 mm3/S 6)vehicle speed<= 3 Kph 7)Engine run time > 10 seconds	Test performend once per key cycle in a total of 440 revolutions	Cylinder to Cylinder engine speed	B	

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Cylinder 6 Misfire Detected	P0306	Cylinder #6 RPM >= minimum average cylinder speed after an injection event. The minimum average cly speed is calculated every 2 rotations and represents the average speed that all cly are rotating at after a combustion event.	Cylinder #6 RPM < minimum average cylinder speed after an injection event for at least 180 counts	1)P0335,P0336,P0117,P0118,P0201,P0202, P0203,P0204,P0205,P0206,P0207,P0208, P2146,P2149,P2152,P2155,P0502,P062C DTCs are not set. 2)Engine is running 3)Coolant temperature >= 40degC 4)500 rpm < Engine speed < 1500 rpm 5) 3 mm3/S < injected fuel < 25 mm3/S 6)vehicle speed<= 3 Kph 7)Engine run time > 10 seconds	Test performend once per key cycle in a total of 440 revolutions	Cylinder to Cylinder engine speed	B	
Cylinder 7 Misfire Detected	P0307	Cylinder #7 RPM >= minimum average cylinder speed after an injection event. The minimum average cly speed is calculated every 2 rotations and represents the average speed that all cly are rotating at after a combustion event.	Cylinder #7 RPM < minimum average cylinder speed after an injection event for at least 180 counts	1)P0335,P0336,P0117,P0118,P0201,P0202, P0203,P0204,P0205,P0206,P0207,P0208, P2146,P2149,P2152,P2155,P0502,P062C DTCs are not set. 2)Engine is running 3)Coolant temperature >= 40degC 4)500 rpm < Engine speed < 1500 rpm 5) 3 mm3/S < injected fuel < 25 mm3/S 6)vehicle speed<= 3 Kph 7)Engine run time > 10 seconds	Test performend once per key cycle in a total of 440 revolutions	Cylinder to Cylinder engine speed	B	
Cylinder 8 Misfire Detected	P0308	Cylinder #8 RPM >= minimum average cylinder speed after an injection event. The minimum average cly speed is calculated every 2 rotations and represents the average speed that all cly are rotating at after a combustion event.	Cylinder #8 RPM < minimum average cylinder speed after an injection event for at least 180 counts	1)P0335,P0336,P0117,P0118,P0201,P0202, P0203,P0204,P0205,P0206,P0207,P0208, P2146,P2149,P2152,P2155,P0502,P062C DTCs are not set. 2)Engine is running 3)Coolant temperature >= 40degC 4)500 rpm < Engine speed < 1500 rpm 5) 3 mm3/S < injected fuel < 25 mm3/S 6)vehicle speed<= 3 Kph 7)Engine run time > 10 seconds	Test performend once per key cycle in a total of 440 revolutions	Cylinder to Cylinder engine speed	B	
Crankshaft Position [CKP] Sensor Circuit	P0335	Receiving valid signals from CKP sensor while CMP sensor is also sending valid signals. Detects crankshaft sensor circuit failure.	CKP edge detection status = FALSE (no digital edge transitions measured in CKP signal.) CKP signal does not match calibrated pattern	P0652, P0653 not set Ignition is ON Engine is running	Failure exists for 20 camshaft phases (4 phases per cam revolution)	Crankshaft Position Sensor (CKP)	A	
Crankshaft Position [CKP] Sensor Performance	P0336	Receiving valid signals from CKP. Detects implausible crankshaft sensor operation (correct pattern not detected).	A.) CKP pattern not yet recognized AND no transitions in CKP signal are seen. OR B.) No CKP signal transitions detected	P0652, P0653 not set Ignition is ON, Engine running Engine Speed < 0 rpm for one sample (implies engine CKP speed is being calculated but signals being dropped.)	A.) Failure exists for 312 crankshaft increments B.) Failure exists for 312 increments (elapsed from A.) AND	Crankshaft Position Sensor (CKP)	A	
Camshaft Position [CMP] Sensor Circuit	P0340	Receiving valid signals from CMP sensor while CKP sensor is also sending valid signals. Detects camshaft sensor circuit failure.	CMP edge detection status = FALSE (no digital edge transitions measured in CMP signal.) CMP signal does not match calibrated pattern	P0642, P0643, P0335, P0336 not set Ignition is ON Engine Speed ≥ 50 rpm (implies engine crankshaft speed recognized)	Failure exists for 132 crankshaft increments	Camshaft Position Sensor (CMP)	A	
Camshaft Position [CMP] Sensor Performance	P0341	Receiving valid signals from CMP. Detects implausible camshaft sensor operation (correct pattern not detected).	CKP signal pattern detected as calibrated AND CMP pattern NOT detected as calibrated.	P0335, P0336 not set Ignition is ON Engine Speed ≥ 50 rpm (implies engine crankshaft speed recognized)	Failure exists for 240 crankshaft (CKP) increments.	Camshaft Position Sensor (CMP)	A	
Wait to Start Lamp (WTS) Control Circuit	P0381	Electronic out-put driver circutry determines that faults (open/short and no load)do not exist on the WTS circuit.	Electronic out-put driver circutry determines faults (open/short and no load)do exist on the WTS circuit.	Lamp must be commanded on for short to battery/open faults. Lamp must be commanded off for shot to ground/no load	Failure exists for 3 sec. Monitoring is continuos	Sensing circuity in the out put drver electronics.	B	
	P04XX EGR System							

2006 6.6L (LLY) *when used in:* Silverado, Sierra, Express, Savana, G30 Cutaway, P30 Chassis
ENGINE DIAGNOSTIC PARAMETERS

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	Note
Exhaust Gas Recirculation(EGR) Flow Insufficient	P0401	Measured Mass Air Flow values < 60 mg/hub above Desired MAF values. Measured MAF verses Desired MAF indicates EGR flow. When Measured MAF is above Desired MAF, EGR flow has been reduced. Detects a low EGR flow condition.	Measured Mass Air Flow values > 60 mg/hub above Desired MAF values	P0101,P0102,P0103,P0403,P0405,P0406 DTCs are not set. EGR Actively being controlled	Diagnostic fail condition true for 15 seconds Test performed continuously	Mass Airflow sensor	B	
Exhaust Gas Recirculation(EGR) Flow Excessive	P0402	Measured Mass Air Flow values < 50 mg/hub below Desired MAF values. Measured MAF verses Desired MAF indicates EGR flow. When Measured MAF is below Desired MAF, EGR flow has been increased. Detects a high EGR flow condition.	Measured Mass Air Flow values > 50 mg/hub below Desired MAF values.	P0101,P0102,P0103,P0403,P0405,P0406 DTCs are not set EGR Actively being controlled	Diagnostic fail condition true for 15 seconds Test performed continuously	Mass Airflow sensor	B	
Exhaust Gas Recirculation (EGR) Solenoid Control Circuit	P0403	At a 10% or greater EGR duty cycle signal, circuit current > 25 mA	At a 10% or greater EGR duty cycle signal, circuit current < 25 mA	Engine Power Up Time > 0.5sec Engine running 10% < EGR Duty Cycle	Diagnostic fail condition true for 30 seconds Test performed continuously	ECM Electronic out put driver circuitry	B	
Exhaust Gas Recirculation(EGR) Position Sensor Circuit Low Voltage	P0405	0.254 v to 4.75 v (0% to 100% position) Detects a sensor circuit Low voltage.	EGR Position sensor <= 254 mv (0% position)	P0698,P0699 DTCs are not set Ignition on	Diagnostic fail condition true for 3 seconds Test performed continuously	EGR Position Sensor	B	
Exhaust Gas Recirculation(EGR) Position Sensor Circuit High Voltage	P0406	0.254 v to 4.75 v (0% to 100% position) Detects a sensor circuit High voltage.	EGR Position sensor >= 4745 mv (100% position)	P0698,P0699 DTCs are not set Ignition on	Diagnostic fail condition true for 3 seconds Test performed continuously	EGR Position Sensor	B	
Exhaust Gas Recirculation(EGR) Position Sensor Performance	P046C	Delta from target position < = +/- 3% Delta is the difference between desired EGR position and actual EGR position. Detects in range EGR valve position errors.	Delta from target position > = +/- 3%	P0401,P0402,P0403,P0642,P0643 DTCs are not set EGR Actively being controlled	Diagnostic set conditions true for 5 sec. Test performed continously during EGR operation	EGR Position Sensor	B	
	P05XX Vehicle Speed, Idle Control and Auxiliary Inputs							
Vehicle Speed Sensor (VSS) Absence of Signal	P0502	VSS inputs received during a monitoring time period < 9.5 sec	No VSS input for a monitoring time period > 9.5 sec	P0117,P0118,DTCs are not set. Must be a Manual Transmission. Coolant Temperature > 10deg C , Engine Speed > 800,rpm Engine Torque >200 Nm, PTO not active,	Diagnostic set conditions true for 45 seconds Test performed continuously	VSS sensor	B	
Idle Speed Too Low	P0506	Actual Engine Speed < 100 rpm below TargetTarget Idle Speed	Actual Engine Speed > 100 rpm below TargetTarget Idle Speed	No Related fault code set(P0016,P0117,P0118,P0335,P0336) Engine is running Engine RPM > 300 Idle governor is enabled and requesting torque Engine Coolant Temp > 40 degC	Diagnostic set for 20 seconds. Samples taken every 100msec	Monitoring Engine Speed	B	

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ENGINE DIAGNOSTIC PARAMETERS

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	Note
Idle Speed Too High	P0507	Actual Engine Speed < 200 rpm above TargetTarget Idle Speed	Actual Engine Speed > 200 rpm above TargetTarget Idle Speed	No Related fault code set(P0016,P0117,P0118,P0335,P0336,) Engine is running Engine RPM > 300 Idle governor is enabled and requesting torque Engine Coolant Temp > 40 degC	Diagnostic set for 20 seconds. Samples taken every 100msec	Monitoring Engine Speed	B	
Intake Air (IA) Heater Feedback Circuit	P0540	P0540 Error Message not received from the Glow Plug Control Module via GMLAN	P0540 Error Message received from the Glow Plug Control Module via GMLAN indicating one or more of the conditions below 1)No current detected through the heater grid 2)Low current detected through the heater grid 3)IAH is overtemp 4)IAH is overvoltage or undervoltage 5)Ground line is detected open 6)IAH switch is defective 7)temperature line is open or shorted 8)IAH resistance is too high	Ignition on	Monitor time is 10msec. Frequency is every 10msec.	GPCM detects the faults and sends serial data message via GMLAN to the ECM	B	SEE ATTACHED REFERENCE DOCUMENT (Pcode P0540)--Page 830-833
	P06XX Computer and Auxiliary Outputs							
Control Module Not Programmed	P0602	ECM is programmed.	ECM is not programmed (K_Check_Service_Calibration = TRUE.)	Ignition on	Run every key cycle		A	
Control Module Internal Performance	P0606	ECM is operating correctly at proper voltage. All internal hardware modules are communicating correctly. Injector power stages can be properly shut off by ECM during start-up test. Internal watchdog module reports that microprocessor responds to queries with correct answers within the correct latency time. Injector energizing time is less that 220 microseconds. No ECM recoveries have been triggered by hardware faults.	PATH1: Microprocessor overvoltage is detected by hardware-based diagnositcs. PATH2: Microprocessor undervoltage is detected by hardware-based diagnostics. PATH3: Internal SPI bus communication error detected in hardware. PATH4: Redunudant injector shut-off path tests faulted during engine startup (test to confirm that ECM can disable injection successfully). PATH5: Internal watchdog module (seperate HW) reports calculation and/or timing error with microprocessor. PATH6: Injector on-time > 220 microseconds (i.e. still torque-producing) is still being commanded after the driver has released the accelerator pedal and all applicable debounce timers that account for torque interventions	PATH1: None. PATH2: None. PATH3: None. PATH4: ECM in "INITIALIZATION" state. PATH5: None. PATH6: Accelerator pedal position = 0, Debounce time for accessory compentation (==200 ms) elapsed, engine speed governor inactive, low-idle speed governor inactive, PTO off, gearbox torque requests = 0, starter inactive, cruise control inactive. Active surge damper debounce time (==700ms) elapsed. PATH7: None.	PATH1: Continuous PATH2: Continuous PATH3: Continuous PATH4: Continuous PATH5: Failure counter exceeds 5 times. PATH6: Failure exists for 280 ms. PATH7: Continuous	ALL: Internal ECM Hardware Fault Detection	A	
Control Module Analog to Digital Performance	P060B	ADC is correctly converting signals within the correct time periods.	Converted ADC voltage from special channel connected to 3.5V microprocessor supply >= 3.87V OR <= 3.37V OR Engine-speed sychronous ADC queues have not updated within a 60 ms timeout OR Time synchronous queues have not updated since the last ADC cycle OR The APP2 voltage (which is periodically set to	ECM powered up Engine speed >= 400rpm for engine -speed sync ADC queue test APP2 test impulse carried out for APP2 voltage check test	Continuous	Analog to Digital Converter	A	
Internal Control Module Engine RPM Performance	P061C	Main and redundant engine speed calculations agree. Detects failure in engine speed calculation through redundant calculation	Difference between CKP engine speed and redundantly-calculated engine speed > 320 rpm	Engine speed < 1300 rpm.	Failure exists for 880 ms.	Crankshaft Position Sensor (CKP)	A	
TPU error on VSS signal	P062C	Electronic ECM circuitry determines that faults related to the TPU chip used to calculate Vehicle speed do not exist.	Electronic ECM circuitry determines that faults related to the TPU chip used to calculate Vehicle speed do exist.	Ignition on	Failure exists for 1 sec. Monitoring is continuos	ECM electronic circuitry	A	

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ENGINE DIAGNOSTIC PARAMETERS

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	Note
Control Module Long Term Memory Performance	P062F	Each data block of memory is read for a check sum error and flags a fault is found.		Ignition on	once at key-up	ECM Hardware Fault Detection	A	
5 Volt Reference 1 Circuit Low Voltage	P0642	4.86V to 5.1V Detects circuit faults which lower the 5V reference 1 supply voltage out of regulation	5 Volt Reference 1 < 4.86V	Ignition on	Monitor time is 160msec. Continuous	ECM Hardware Fault Detection	A	
5 Volt Reference 1 Circuit High Voltage	P0643	4.86V to 5.1V Detects circuit faults which raise the 5V reference 1 supply voltage out of regulation	5 Volt Reference 1 > 5.1V	Ignition on	Monitor time is 160msec. Continuous	ECM Hardware Fault Detection	A	
Glow Plug Control Module Performance	P064C	P064C Error Message not received from the Glow Plug Control Module via GMLAN	P064C Error Message received from the Glow Plug Control Module via GMLAN indicating one or more of the conditions below; 1) Any of the 8 glow plug switches is defective 2)No IGN1 voltage 3)GPCM is overtemp 4)GPCM is overvoltage or undervoltage 5)Internal voltage supply to the Intake Air heater is too low 6)Difference between IGN1 and KI 30 (Battery) voltage is too high 7)Difference between battery voltage measured by ECM and battery voltage measured by the GPCM is too high	Ignition on	Monitor time is 3000msec. Frequency is every 250msec.	GPCM detects the faults and sends serial data message via GMLAN to the ECM	B	SEE ATTACHED REFERENCE DOCUMENT (P-code P064C)---Page 830-833
Malfunction Indicator Lamp (MIL) Control Circuit	P0650	Electronic out-put driver circutry determines that faults (open/short and no load)do not exist on the MIL circuit.	Electronic out-put driver circutry determines faults (open/short and no load)do exist on the MIL circuit.	Lamp must be commanded on for short to battery/open faults. Lamp must be commanded off for shot to ground/no load	Fault exists for 3 sec monitored continuosly	ECM electronic circuitry	A	
5 Volt Reference 2 Circuit Low Voltage	P0652	4.86V to 5.1V Detects circuit faults which lower the 5V reference 2 supply voltage out of regulation	5 Volt Reference 2 < 4.86V	Ignition on	Monitor time is 160msec. Continuous	ECM Hardware Fault Detection	A	
5 Volt Reference 2 Circuit High Voltage	P0653	4.86V to 5.1V Detects circuit faults which raise the 5V reference 2 supply voltage out of regulation	5 Volt Reference 2 > 5.1V	Ignition on	Monitor time is 160msec. Continuous	ECM Hardware Fault Detection	A	
Cylinder #1 Glow Plug Control Circuit	P0671	P0671 Error Message not received from the Glow Plug Control Module via GMLAN indicating an error on Cyl #1 Glow Plug	1)Glow Plug line is open 2)Glow Plug line is shorted 3)Glow Plug line high resistance 4)Glow Plug line low resistance SEE "GPCM Cert Doc" worksheet	Ignition on Glow plugs commanded on	Monitor time is 1 sec. Frequency is every 250msec.	GPCM detects the faults and sends serial data message via GMLAN to the	B	SEE ATTACHED REFERENCE DOCUMENT (P-code P0671-P0678)--Page 830-833
Cylinder #2 Glow Plug Control Circuit	P0672	P0672 Error Message not received from the Glow Plug Control Module via GMLAN indicating an error on Cyl #2 Glow Plug	1)Glow Plug line is open 2)Glow Plug line is shorted 3)Glow Plug line high resistance 4)Glow Plug line low resistance SEE "GPCM Cert Doc" worksheet	Ignition on Glow plugs commanded on	Monitor time is 1 sec. Frequency is every 250msec.	GPCM detects the faults and sends serial data message via GMLAN to the ECM	B	SEE ATTACHED REFERENCE DOCUMENT (P-code P0671-P0678)--Page 830-833
Cylinder #3 Glow Plug Control Circuit	P0673	P0673 Error Message not received from the Glow Plug Control Module via GMLAN indicating an error on Cyl #3 Glow Plug	1)Glow Plug line is open 2)Glow Plug line is shorted 3)Glow Plug line high resistance 4)Glow Plug line low resistance SEE "GPCM Cert Doc" worksheet	Ignition on Glow plugs commanded on	Monitor time is 1 sec. Frequency is every 250msec.	GPCM detects the faults and sends serial data message via GMLAN to the	B	SEE ATTACHED REFERENCE DOCUMENT (P-code P0671-P0678)--Page 830-833

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ENGINE DIAGNOSTIC PARAMETERS

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	Note
Cylinder #4 Glow Plug Control Circuit	P0674	P0674 Error Message not received from the Glow Plug Control Module via GMLAN indicating an error on Cyl #4 Glow Plug	1)Glow Plug line is open 2)Glow Plug line is shorted 3)Glow Plug line high resistance 4)Glow Plug line low resistance SEE "GPCM Cert Doc" worksheet	Ignition on Glow plugs commanded on	Monitor time is 1 sec. Frequency is every 250msec.	GPCM detects the faults and sends serial data message via GMLAN to the	B	SEE ATTACHED REFERENCE DOCUMENT (P-code P0671-P0678)--Page 830-833
Cylinder #5 Glow Plug Control Circuit	P0675	P0675 Error Message not received from the Glow Plug Control Module via GMLAN indicating an error on Cyl #5 Glow Plug	1)Glow Plug line is open 2)Glow Plug line is shorted 3)Glow Plug line high resistance 4)Glow Plug line low resistance SEE "GPCM Cert Doc" worksheet	Ignition on Glow plugs commanded on	Monitor time is 1 sec. Frequency is every 250msec.	GPCM detects the faults and sends serial data message via GMLAN to the	B	SEE ATTACHED REFERENCE DOCUMENT (P-code P0671-P0678)--Page 830-833
Cylinder #6 Glow Plug Control Circuit	P0676	P0676 Error Message not received from the Glow Plug Control Module via GMLAN indicating an error on Cyl #6 Glow Plug	1)Glow Plug line is open 2)Glow Plug line is shorted 3)Glow Plug line high resistance 4)Glow Plug line low resistance SEE "GPCM Cert Doc" worksheet	Ignition on Glow plugs commanded on	Monitor time is 1 sec. Frequency is every 250msec.	GPCM detects the faults and sends serial data message via GMLAN to the	B	SEE ATTACHED REFERENCE DOCUMENT (P-code P0671-P0678)--Page 830-833
Cylinder #7 Glow Plug Control Circuit	P0677	P0677 Error Message not received from the Glow Plug Control Module via GMLAN indicating an error on Cyl #7 Glow Plug	1)Glow Plug line is open 2)Glow Plug line is shorted 3)Glow Plug line high resistance 4)Glow Plug line low resistance SEE "GPCM Cert Doc" worksheet	Ignition on Glow plugs commanded on	Monitor time is 1 sec. Frequency is every 250msec.	GPCM detects the faults and sends serial data message via GMLAN to the	B	SEE ATTACHED REFERENCE DOCUMENT (P-code P0671-P0678)--Page 830-833
Cylinder #8 Glow Plug Control Circuit	P0678	P0678 Error Message not received from the Glow Plug Control Module via GMLAN indicating an error on Cyl #8 Glow Plug	1)Glow Plug line is open 2)Glow Plug line is shorted 3)Glow Plug line high resistance 4)Glow Plug line low resistance SEE "GPCM Cert Doc" worksheet	Ignition on Glow plugs commanded on	Monitor time is 1 sec. Frequency is every 250msec.	GPCM detects the faults and sends serial data message via GMLAN to the	B	SEE ATTACHED REFERENCE DOCUMENT (P-code P0671-P0678)--Page 830-833
5 Volt Reference 3 Circuit Low Voltage	P0698	4.86V to 5.1V Detects circuit faults which lower the 5V reference 3 supply voltage out of regulation	5 Volt Reference 3 < 4.86V	Ignition on	Monitor time is 160msec. Continuous	ECM Hardware Fault Detection	A	
5 Volt Reference 3 Circuit High Voltage	P0699	4.86V to 5.1V Detects circuit faults which raise the 5V reference 3 supply voltage out of regulation	5 Volt Reference 3 > 5.1V	Ignition on	Monitor time is 160msec. Continuous	ECM Hardware Fault Detection	A	
	P07XX-P08XX Transmission							
Transmission Control Module (TCM) Requested MIL Illumination	P0700	Serial Data communication from the TCM indicates a fault exists with the transmission.	Serial Data communication from the TCM indicates no faults exists with the transmission.	Ignition on	active on first message received. Monitored continuosly	GMLAN Bus	A	
Park/Neutral Position (PNP) Switch Circuit Low Voltage	P0851	GMLAN Message for PNP position indicates park nuetral position and agrees with ECM sensed position based on PNP switch inputs to	GMLAN Message for PNP position indicates park nuetral and dis-agrees with ECM sensed position based on PNP switch inputs to ECM	11v < Battery voltage < 18v , No GMLAN error messages, P0852 not active Ignition on	Failure being transmitted for 5 sec. Checked continuosly	GMLAN, PNP switch inputs to ECM	B	
Park/Neutral Position (PNP) Switch Circuit High Voltage	P0852	ECM sensed position based on PNP switch inputs to ECM indacates not park or nuetral.	ECM sensed position based on PNP switch inputs to ECM indacates park or nuetral.	Engine speed > 650rpm, Vehicle speed > 24kPH, Actual Engine Torque > 120 newtor meters, 11v < Battery voltage < 18v, No GMLAN error messages, P0851 not active, APPS < 6%	Failure being transmitted for 5 sec. Checked continuosly	GMLAN, PNP switch inputs to ECM	B	
	P12XX-P22XX Fuel and Air Metering and Auxiliary Emission Controls							

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ENGINE DIAGNOSTIC PARAMETERS

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	Note
Engine Calibration Information Not Programmed – GPCM	P160C	P160C Error Message not received from the Glow Plug Control Module via GMLAN	P160C Error Message received from the Glow Plug Control Module via GMLAN indicating IQA data has not been programmed	Ignition ON	Monitor time is 1 second. Frequency is every 160msec.	GPCM detects the fault and sends serial data message via GMLAN to the	A	
Accelerator Pedal Position (APP) Sensor 1 Circuit Low Voltage	P2122	0.806 volt to 4.75 volts Detects a sensor circuit short to ground	Accelerator pedal supply voltage <= 0.806 volts	P2122, P2123 are not currently set No sensor supply errors. No A-to-D pulse test Ignition ON	Diagnostic fail conditions true for 0.24 seconds Test performed continuously 100msec	Accelerator pedal sensor 1	C	
Accelerator Pedal Position (APP) Sensor 1 Circuit High Voltage	P2123	0.806 volt to 4.75 volts Detects a sensor circuit short high voltage or a sensor circuit open	Accelerator pedal supply voltage >= 4.75 volts	P2122, P2123 are not currently set No sensor supply errors. No A-to-D pulse test Ignition ON	Diagnostic fail conditions true for 0.24 seconds Test performed continuously 100msec	Accelerator pedal sensor 1	C	
Accelerator Pedal Position (APP) Sensor 2 Circuit Low Voltage	P2127	0.308 volt to 2.5 volts Detects a sensor circuit short to ground	Accelerator pedal supply voltage <= 0.308 volts	P2127, P2128 are not currently set No sensor supply errors. No A-to-D pulse test Ignition ON	Diagnostic fail conditions true for 0.24 seconds Test performed continuously 100msec	Accelerator pedal sensor 2	C	
Accelerator Pedal Position (APP) Sensor 2 Circuit High Voltage	P2128	0.308 volt to 2.5 volts Detects a sensor circuit short high voltage or a sensor circuit open	Accelerator pedal supply voltage >= 2.5 volts	P2127, P2128 are not currently set No sensor supply errors. No A-to-D pulse test Ignition ON	Diagnostic fail conditions true for 0.24 seconds Test performed continuously 100msec	Accelerator pedal sensor 2	C	
Accelerator Pedal Position (APP) Sensor 1-2 Correlation	P2138	0.806 volt to 4.75 volts Detects a sensor 1 to sensor 2 correlation error	Accelerator pedal sensor 1 & 2 differ by more than 2%.	P2122, P2123, P2127, P2128 are not currently set. No sensor supply errors. Ignition ON	Diagnostic fail conditions true for 0.3 seconds Test performed continuously 100msec	Accelerator pedal sensor 1 & 2	C	
Injector Positive Voltage Control Circuit Group 1	P2146	Electronic out-put driver circuitry determines the faults (open/short/no load) do not exist	Electronic out-put driver circuitry determines the faults (open/short/no load) do exist	Engine running. Injection event is being attempted for injectors 1&4 connected to bank 1	Fault exists for 3 msec. Monitored continuosly	ECM Injector Electronic out-put driver circuitry	A	cly4 longer detection time required because of bank charging time.
Injector Positive Voltage Control Circuit Group 2	P2149	Electronic out-put driver circuitry determines the faults (open/short/no load) do not exist	Electronic out-put driver circuitry determines the faults (open/short/no load) do exist	Engine running. Injection event is being attempted for injectors 7&6 connected to bank 1	Fault exists for 3 msec. Monitored continuosly	ECM Injector Electronic out-put driver circuitry	A	
Injector Positive Voltage Control Circuit Group 3	P2152	Electronic out-put driver circuitry determines the faults (open/short/no load) do not exist	Electronic out-put driver circuitry determines the faults (open/short/no load) do exist	Engine running. Injection event is being attempted for injectors 2&5 connected to bank 1	Fault exists for 3 msec. Monitored continuosly	ECM Injector Electronic out-put driver circuitry	A	
Injector Positive Voltage Control Circuit Group 4	P2155	Electronic out-put driver circuitry determines the faults (open/short/no load) do not exist	Electronic out-put driver circuitry determines the faults (open/short/no load) do exist	Engine running. Injection event is being attempted for injectors 8&3 connected to bank 1	Fault exists for 5 msec. Monitored continuosly	ECM Injector Electronic out-put driver circuitry	A	
Intake Air Temperature (IAT) Sensor 1-2 Correlation	P2199	absolute value of (Startup Air Temperature Sensor 2 - Startup Air Temperature Sensor 1) < 5.3degC. Detects bias Coolant Temperature Sensor	absolute value of (Startup Air Temperature Sensor 2 - Startup Air Temperature Sensor 1) > 5.3degC. Once block heater influenced determined to be not true. OR absolute value of (Startup Air Temperature Sensor 2 - Startup Air Temperature Sensor 1) > 100degC	P0112,P0113,P0097,P0098,P0117,P0118 DTCs are not set. P2199 not currently active this key cycle. Engine Off Timer > 10hrs, IAT 1 > 10deg C Engine running	Diagnostic set conditions true on first failure Test performed once per key cycle	Intake air temperature sensors 1 and 2	B	

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	Note
Barometric Pressure (BARO) Circuit Low Input	P2228	1.5 v - 4.8 v (60kPA - 120kPa) Detects Baro sensor circuit open or grounded	Baro Sensor Signal <1.5 v	P0652,P0653 DTCs not set Ignition On	Diagnostic fail condition true for 800msec Test performed continuously	Barometric Pressure (Baro) Sensor	B	
Barometric Pressure (BARO) Circuit High Input	P2229	1.5 v - 4.8 v (60kPA - 120kPa) Detects Baro sensor circuit shorted to high voltage	Baro Sensor Signal >4.8v	P0652,P0653 DTCs not set Ignition On	Diagnostic fail condition true for 800msec Test performed continuously	Barometric Pressure (Baro) Sensor	B	
P25XX Auxiliary Inputs								
ECM Power Relay Circuit	P2510	Relay is responding corectly to ECM command to turn off.	Relay is responding incorrectly to ECM command to turn off.	Engine has tranistioned from start to run or After run (Power down) has occurred	Diagnostic set conditions !st failure Test performed twice a drive cycle	Updates to the EEPROM Variables.	A	
Turbocharger Boost Control Position Sensor Performance	P2563	Delta from target turbo vane position < +/- 15%. Delta is the difference between desired turbo vane position and the actual turbo vane position. Detects turbo vane position error.	Delta from target turbo vane position > +/- 15%.	P0045, P2564 Engine Run time>30 sec	Diagnostic set conditions true for for 5 seconds Test performed continuously	Turbocharger Vane Position Sensor.	B	
Turbocharger Boost Control Position Sensor Circuit Low Voltage	P2564	0.277 v to 4.780 v (0% to 100% position) Detects Turbocharger Vane Position sensor circuit open and shorted to ground	Turbocharger Vane Position Sensor Signal < 0.277v	Engine Run time>3sec	Diagnostic set condition true for 1Seconds Test performed continuously	Turbocharger Vane Position Sensor.	B	
Turbocharger Boost Control Position Sensor Circuit High Voltage	P2565	0.277 v to 4.780 v (0% to 100% position) DetectsTurbocharger Vane Position sensor circuit shorted to high voltage voltage	Turbocharger Vane Position Sensor Signal > 4.78v	Engine Run time>3sec	Diagnostic set condition true for 1 seconds Test performed continuously	Turbocharger Vane Position Sensor.	B	
P26XX Computer and Auxiliary Outputs								
Control Module Ignition Off Timer Performance	P2610	ignition off time delta = 1sec AND ignition off timer >= 0 sec AND ignition off timer <= 10 sec AND timer is incrementing Detects a faulty Ignition off Timer circuit.	Ignition off timer reads < 0 sec OR Ignition off timer reads <=5 sec >10 sec OR timer unchanged for 60 sec OR	ECM powered up	Diagnostic set conditions 1st failure Test performed once during drive cycle and once at after run	SW calculation	B	
Fuel Injector Calibration Not Programmed	P268A	Injector Calibration Data (IQA) is programmed in the ECM	Injector Calibration Data (IQA) is not programmed in the ECM	Ignition on	Diagnostic set conditions 1st failure Test performed once at key-up	SW calculation	A	
UXXXX Communications								
Lost communications with Transmission Control System	U0101	ECM reports no loss of communication with the TCM	PATH 1)The ECM fails to receive messages $19D, $0F9, $1F5, $4C9 or $199 PATH 2) Rolling counts for messages $199 or $19D are not increasing by one.	Ignition on	Monitor time is 1000msec. Frequency is every 160msec.	CAN Message from the TCM	A	
Lost Communications with Glow Plug Control Module	U0106	ECM reports no loss of communication with the GPCM	PATH 1)The ECM fails to receive message $3BD. PATH 2)GPCM reports message $3B9 from ECM is missing	Ignition on	Monitor time is 1000msec. Frequency is every 160msec.	Message from GPCM and ECM signal indicating loss of GPCM	B	

2006 6.6L (LLY) *when used in:* **Silverado, Sierra, Express, Savana, G30 Cutaway, P30 Chassis**

ENGINE DIAGNOSTIC PARAMETERS

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	Note

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	Note
Reference document for OBD codes P0540, P064C and P0671-P0678								
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	Note
P00XX Fuel and Air Metering and Auxiliary Emission Controls								
IAH open	P0540	IIAH > 20 A	IIAH < 20 A and "digital response" == high	USigTemp <= 4.96 Volt (no loss of ground condition)Voltage KL30 at IAH > 6,9 VoltVoltage IGN >= 6.9 Voltsignal line "digital response" is not open signal line "digital response" is not shorted to ground IAH commanded on and proper working – this means:- no failure "current out of limit" IAH- no over voltage condition- no over temperature condition - signal line "current" is not shorted to battery- signal line "temperature" is not open- signal line	Monitor time is 10msec. Frequency is every 10msec.	Monitored by GPCM and message transferred by CAN	B	
IAH current out of limit	P0540	IIAH > 20 A	IAH < 20 A and "digital response" == low	USigTemp <= 4.96 Volt (no loss of ground condition)Voltage KL30 at IAH > 6,9 VoltVoltage IGN >= 6.9 VoltIAH commanded on and proper working – this means:- No over voltage condition - No over temperature condition - signal line "temperature" is not shorted to ground- no failure "current out of limit" IAH- signal line "current" is not shorted to battery- signal	Monitor time is 10msec. Frequency is every 10msec.	Monitored by GPCM and message transferred by CAN	B	
IAH over temperature	P0540	TIAH <80 °C and	TIAH > 80 °C	- Voltage KL30 at IAH > 6,9 Volt- USigTemp <= 4.96 Volt (no loss of ground condition)IAH commanded on and proper working – this means:- no over voltage condition - no failure "current out of limit" IAH- GPCM internal supply for the IAH electronic is ok - signal line "temperature" is not shorted to ground- signal line "current" is not shorted to battery- signal line	Monitor time is 10msec. Frequency is every 10msec.	Monitored by GPCM and message transferred by CAN	B	
Glow Plug switch defect and open	P064C	Glow Plug current > = 4.25 Amps,	IGP < 4.25 A and "digital response" glow plug == low	1)glow plugs are commanded on 2)no over temperature condition 3)no over voltage condition 4)no voltage difference between KL30 and IGN 5)voltage KL30 > 7.0 Volts 6)not all 8 glow pugs are in low resistance condition 7)glow plug not disabled because of short	5 out of 10 counts. Frequency is 500 msec	Monitored by Glow plug switch		
IGN 1 voltage	P064C	IGN 1 HIGH	IGN 1 LOW Any of the 8 glow plug switches is defective 2)No IGN1 voltage 3)GPCM is overtemp 4)GPCM is overvoltage or undervoltage 5)Internal voltage supply to the Intake Air heater is too low 6)Difference between IGN1 and KI 30 (Battery) voltage is too high	1)glow plugs are commanded on	5 out of 10 counts. Frequency is 1000 msec	Ignition 1 line		

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ENGINE DIAGNOSTIC PARAMETERS

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GPCM Temperature	P064C	GPCM Temperature<=123 °C	GPCM Temperature >123 °C	IGNITION ON 1)glow plugs are commanded on 2)no over temperature condition 3)no over voltage condition 4)no voltage difference between KL30 and IGN 5)voltage KL30 > 7.0 Volts 6)not all 8 glow pugs are in low resistance condition 7)glow plug not disabled because of short	5 out of 10 counts. Frequency is 650 msec	Monitored by Glow plug switch		
GPCM Battery Voltage(Over)	P064C	Voltage GPCMKL30 <= 16.5 Volt	Voltage GPCMKL30 > 16.5 Volt	IGNITION ON 1)Voltage GPCMIGN < 14.0 Volt and Voltage GPCMIGN > 8.0 Volt glow plugs are commanded on 2)no over temperature condition 3)no over voltage condition 4)no voltage difference between KL30 and IGN 5)voltage KL30 > 7.0 Volts 6)not all 8 glow pugs are in low resistance condition	5 out of 10 counts. Frequency is 130 msec	Monitored by Glow plug switch		
GPCM Battery Voltage(Under)	P064C	Voltage GPCMKL30 >= 6.0 Volt	Voltage GPCMKL30 < 6.0 Volt	IGNITION ON 1)Voltage GPCMIGN < 14.0 Volt and Voltage GPCMIGN > ~~8.0 Volt~~ 9.0 Volt glow plugs are commanded on 2)no over temperature condition 3)no over voltage condition 4)no voltage difference between KL30 and IGN 5)voltage KL30 > 7.0 Volts 6)not all 8 glow pugs are in low resistance condition	5 out of 10 counts. Frequency is 520 msec	Monitored by Glow plug switch		
voltage difference KL30 and Ignition too high	P064C	absolute value of voltage difference: VGPCM_KL30 - VGPCM_IGN <= 5 Volt	absolute value of voltage difference: VGPCM_KL30 - VGPCM_IGN > 5 Volt	IGNITION ON 1)VGPCM_KL30 > 6.0 Volt and VGPCM_IGN > 4 Volt glow plugs are commanded on 2)no over temperature condition 3)no over voltage condition 4)no voltage difference between KL30 and IGN 5)voltage KL30 > 7.0 Volts 6)not all 8 glow pugs are in low resistance condition	5 out of 10 counts. Frequency is 650 msec	Monitored by Glow plug switch		

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	Note
GPCM switch defect and conducted	P064C	absolute value of voltage difference: VGPCM_KL30 - VGPCM_IGN <= 5 Volt	"digital response" glow plug == high	IGNITION ON 1)VGPCM_KL30 > 6.0 Volt and VGPCM_IGN > 4 Volt glow plugs are commanded on 2)no over temperature condition 3)no over voltage condition 4)no voltage difference between KL30 and IGN 5)voltage KL30 > 7.0 Volts 6)not all 8 glow pugs are in low resistance condition	5 out of 10 counts. Frequency is 650 msec	Monitored by Glow plug switch		
GPCM internal supply voltage IAH too low	P064C	Voltage VGPCM_IGN >= 6.9 Volt	Voltage VGPCM_IGN < 6.9 Volt	IAH commanded ON 1)VGPCM_KL30 > 6.0 Volt and VGPCM_IGN > 4 Volt glow plugs are commanded on 2)no over temperature condition 3)no over voltage condition 4)no voltage difference between KL30 and IGN 5)voltage KL30 > 7.0 Volts 6)not all 8 glow pugs are in low resistance condition	5 out of 10 counts. Frequency is 1000 msec	Monitored by Glow plug switch		
GPCM voltage difference between internal / external battery voltage signal too high	P064C	-3 <=VGPCM_KL30 - VCAN eng. contrl. relay voltage <= 3.0 Volt	VGPCM_KL30 - VCAN eng. contrl. relay voltage > 3.0 Volt orVGPCM_KL30 - VCAN eng. contrl. relay voltage < -3.0 Volt	IAH commanded ON 1)voltage VGPCM_KL30 > 6.0 Volt glow plugs are commanded on 2)no over temperature condition 3)no over voltage condition 4)no voltage difference between KL30 and IGN 5)voltage KL30 > 7.0 Volts 6)not all 8 glow pugs are in low resistance condition	5 out of 10 counts. Frequency is 1000 msec	Monitored by Glow plug switch		
glow plug open	P0671-P0678	IGP > 4.25 A and	IGP < 4.25 A and "digital response" glow plug == high	Ignition on J1939 Initialization is done	Monitor time is 1000msec. Frequency is every 250msec.	Monitored by GPCM and message	B	
glow plug short	P0671-P0678	IGP < 4.25 A when glow plugs commanded ON	IGP > 4.25 A when glow plugs commanded OFF	Ignition on - glow plugs are commanded on - no over temperature condition- no over voltage condition- no voltage difference between KL30 and IGN- voltage KL30 > 6.0 Volts- not all 8 glow pugs are in low resistance condition- glow plug not disabled because	Monitor time is 500 msec	Monitored by GPCM and message transferred by CAN	B	
glow plug high resistance	P0671-P0678	Resistance < 1000 Ohm	Resistance > 1000 Ohm and IGP >= 4.25 A	Ignition on -- voltage KL30 > 7.0 Volts- PWM_glow plugs >= 7,8 %- glow plugs are commanded on - no over temperature condition- no over voltage condition- no voltage difference between KL30 and IGN-	Monitor time is 500 msec	Monitored by GPCM and message transferred by CAN	B	

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ENGINE DIAGNOSTIC PARAMETERS

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	Note
glow plug low resistance	P0671-P0678	Rgp >300 mOhm	Rgp < 300 mOhm	- glow plugs are commanded on - no over temperature condition- no over voltage condition- no voltage difference between KL30 and IGN- voltage KL30 > 7.0 Volts- not all 8 glow pugs are in low resistance	Monitor time is 500 msec	Monitored by GPCM and message transferred by CAN	B	