

13 OBDG05B FSCM Diagnostics

This document was prepared in the following main sections (worksheets) for MY13 ERFs Diagnostics in Group 5B

Section 1 : S1-C101_Inline4_Common

Contains information for any C101-controller applications within 13OBDG05B with Electronically Regulated Fuel System and no Active Grill Air Shutters with engine RPOs and VPPCs

- 1) LEA 2.4L I-4 SIDI, 2) LHU 2.0L Turbocharged I-4 SIDI, 3) LTG 2.0L Turbocharged I-4 SIDI, 4) LCV 2.5L I-4 SIDI
- 1) D1SB, 2) D1NC-YH, 3) A1SL

Section 2 : S2-C101_Inline4_&XFE

Contains information for any C101-controller applications within 13OBDG05B with ERFs and optional Active Grill Air Shutters with engine RPOs and optional RPOs and VPPCs

- 1) LTG 2.0L Turbocharged I-4 SIDI, 2) LCV 2.5L I-4 SIDI
- 1) XFE Extra Fuel Economy
- 1) A1SL

Section 3 : S3-C101&VRI&XFE

Contains information for any C101-controller applications within 13OBDG05B with optional Active Grill Air Shutters only (ERFs is ECM-controlled) with engine RPOs and optional RPOs and VPPCs

- 1) LTG 2.0L Turbocharged I-4 SIDI, 2) LCV 2.5L I-4 SIDI
- 1) VRI Active Grill Air Shutters, XFE Extra Fuel Economy
- 1) GMX351

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Rail Pressure (FRP) Sensor Performance (rationality)	P018B	This DTC detects a fuel pressure sensor response stuck within the normal operating range	Absolute value of fuel pressure change as sensed during intrusive test.	<= 30 kPa	1. FRP Circuit Low DTC (P018C) 2. FRP Circuit High DTC (P018D) 3. FuelPump Circuit Low DTC (P0231) 4. FuelPump Circuit High DTC (P0232) 5. FuelPump Circuit Open DTC (P023F) 6. Reference Voltage DTC (P0641) 7. Fuel Pump Control Module Driver Over-temperature DTC (P064A) 8. Control Module Internal Performance DTC (P0606) 9. Engine run time 10. Emissions fuel level (PPEI \$3FB) 11. Fuel pump control	not active not active not active not active not active not active not active >=5 seconds not low enabled	Frequency: Continuous; 12.5 ms loop. 60 seconds between intrusive tests that pass Intrusive test requested if fuel system is clamped for >= 5 seconds or fuel pressure error variance <= typically (0.3 to 0.6) (calculated over a 2.5sec period); otherwise report pass Duration of intrusive test is fueling related (5 to 12 seconds). Intrusive test is run when fuel flow is below Max allowed fuel flow rate (Typical values in the range of 11 to 50 g/s)	DTC Type A 1 trip

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					12. Fuel pump control state 13. Engine fuel flow 14. ECM fuel control system failure (PPEI \$1ED)	normal or FRP Rationality control > 0.047 g/s failure has not occurred		
Fuel Rail Pressure (FRP) Sensor Circuit Low Voltage	P018C	This DTC detects if the fuel pressure sensor circuit is shorted low	FRP sensor voltage	< 0.14 V	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Rail Pressure (FRP) Sensor Circuit High Voltage	P018D	This DTC detects if the fuel pressure sensor circuit is shorted high	FRP sensor voltage	> 4.86 V	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Pump Control Circuit Low Voltage	P0231	This DTC detects if the fuel pump control circuit is shorted to low	Fuel Pump Current	> 14.48A	Ignition OR HS Comm OR Fuel Pump Control AND Ignition Run/Crank Voltage	Run or Crank enabled enabled 9V < voltage < 32V	72 test failures in 80 test samples if Fuel Pump Current <100A 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Pump Control Circuit High Voltage	P0232	This DTC detects if the fuel pump control circuit is shorted to high	Voltage measured at fuel pump circuit	> 3.86 V	Commanded fuel pump output	0% duty cycle (off)	36 test failures in 40 test samples; 1 sample/12.5ms	DTC Type A 1 trip

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Fuel pump control enable Time that above conditions are met	False >=4.0 seconds	Pass/Fail determination made only once per trip	
Fuel Pump Control Circuit (Open)	P023F	This DTC detects if the fuel pump control circuit is open	Fuel Pump Current AND Fuel Pump Duty Cycle	<=0.5A □ >20%	Ignition OR HS Comm OR Fuel Pump Control AND Ignition Run/Crank Voltage	Run or Crank enabled enabled 9V < voltage < 32V	72 test failures in 80 test samples; 1 sample/12.5ms	DTC Type A 1 trip
Fuel System Control Module Enable Control Circuit	P025A	This DTC detects if there is a fault in the fuel pump control enable circuit	PPEI (PPEI (Powertrain Platform Electrical Interface) Fuel System Request (\$1ED)	≠ Fuel Pump Control Module Enable Control Circuit	Ignition AND PPEI Fuel System Request (\$1ED)	Run or Crank valid	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if any software or calibration check sum is incorrect	Calculated Checksum (CRC16)	≠ stored checksum for any of the parts (boot, software, application calibration, system calibration)	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 failure if it occurs during the first ROM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background	DTC Type A 1 trip
Control Module Not Programmed	P0602	Indicates that the FSCM needs to be programmed	This DTC is set via calibration, when KeMEMD_b_NoStartCal	= TRUE	Ignition	Run or Crank	Runs once at power up	DTC Type A 1 trip

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR HS Comm OR Fuel Pump Control	enabled enabled		
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error at controller power-up	Checksum at power-up	≠ checksum at power-down	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 failure Frequency: Once at power-up	DTC Type A 1 trip
Control Module Random Access Memory (RAM)	P0604	Indicates that control module is unable to correctly write and read data to and from RAM	Data read	≠ Data written	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 failure if it occurs during the first RAM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background.	DTC Type A 1 trip
Control Module Internal Performance 1. Main Processor Configuration Register Test	P0606	This DTC indicates the FSCM has detected an internal processor fault or external watchdog fault (PID 2032 discriminates the source of the fault)	1. For all I/O configuration register faults: •Register contents	Incorrect value.	Ignition OR HS Comm OR	Run or Crank enabled	Tests 1 and 2 1 failure Frequency: Continuously (12.5ms)	DTC Type A 1 trip

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
2. Processor clock test 3. External watchdog test			2. For Processor Clock Fault: •EE latch flag in EEPROM. OR • RAM latch flag. 3. For External Watchdog Fault: • Software control of fuel pump driver	0x5A5A 0x5A	Fuel Pump Control 1. For all I/O configuration register faults: •KeMEMD_b_ProcFitCfgReg Enbl 2. For Processor Clock Fault: •KeMEMD_b_ProcFitCLKDia gEnbl 3. For External Watchdog Fault: •KeFRPD_b_FPExtWDogDia gEnbl 3. For External Watchdog Fault: •Control Module ROM(P0601) 3. For External Watchdog Fault: •Control Module RAM(P0604)	enabled TRUE TRUE TRUE not active not active	Test 3 3 failures out of 15 samples 1 sample/12.5 ms	
Control Module Long Term Memory (EEPROM) Performance	P062F	Indicates that the NVM Error flag has not been cleared	Last EEPROM write	Did not complete	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 test failure Once on controller power-up	DTC Type A 1 trip
5Volt Reference Circuit (Short High/Low/Out of Range)	P0641	Detects continuous short or out of range on the #1 5V sensor reference circuit	Reference voltage AND Output	>= 0.5V inactive	Ignition	Run or Crank	15 failures out of 20 samples 1 sample/12.5 ms	DTC Type A 1 trip

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			OR Reference voltage AND Output OR Reference voltage AND Output	>= 5.5V active <= 4.5V active				
			OR Reference voltage □	> 105% nominal (i.e., 5.25V) OR <95% nominal (i.e., 4.75V)				
Fuel Pump Control Module - Driver Over-temperature 1	P064A	This DTC detects if an internal fuel pump driver overtemperature condition exists under normal operating conditions	Pump Driver Temp	> 150C	Ignition OR HS Comm OR Fuel Pump Control KeFRPD_b_FPOverTempDia gEnbl Ignition Run/Crank	Run or Crank enabled enabled TRUE 9V<voltage<32V	3 failures out of 15 samples 1 sample/12.5 ms	DTC Type B 2 trips
Ignition 1 Switch Circuit Low Voltage	P2534	This DTC detects if the Ignition1 Switch circuit is shorted to low or open	Ignition 1 voltage	<= 6 V	Engine	Running	180 failures out of 200 samples 1 sample/25.0 ms	DTC Type A 1 trip

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Flow Performance (rationality)	P2635	This DTC detects degradation in the performance of the SIDI electronic return-less fuel system	Filtered fuel rail pressure error	<= Low Threshold (Function of desired fuel rail pressure and fuel flow rate. Margin is 15% of resultant target pressure except at flow <= 1.5g/s and target pressure <= 350kPa where the margin increases continuously at 66.6kPa/g/s as flow decreases) OR >= High Threshold (function of desired fuel rail pressure and fuel flow rate. 15% of resultant Target Pressure) (See Supporting Tables tab)	1. FRP Circuit Low DTC (P018C)	not active	Filtered fuel rail pressure error Time Constant = 12.5 seconds Frequency: Continuous 12.5 ms loop	DTC Type B 2 trips
					2. FRP Circuit High DTC (P018D)	not active		
					3. Fuel Rail Pressure Sensor Performance DTC (P018B)	not active		
					4. FuelPump Circuit Low DTC (P0231)	not active		
					5. FuelPump Circuit High DTC (P0232)	not active		

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					6. FuelPump Circuit Open DTC (P023F)	not active		
					7. Reference Voltage DTC (P0641)	not active		
					8. Fuel Pump Control Module Driver Over-temperature DTC's (P064A)	not active		
					9. Control Module Internal Performance DTC (P0606)	not active		
					10. An ECM fuel control system failure (PPEI \$1ED)	has not occurred		
					11. The Barometric pressure (PPEI \$4C1) signal	valid (for absolute fuel pressure sensor)		
					12. Engine run time	>= 30 seconds		
					13. Emissions fuel level (PPEI \$3FB)	not low		
					14. Fuel pump control	enabled		
					15. Fuel pump control state	normal		
					16. Battery Voltage	11V<=voltage=<32V		
					17. Fuel flow rate (See Supporting Tables tab)	> 0.047 g/s AND <= Max allowed fuel flow rate as a function of desired rail pressure & Vbatt (Typical values in the range of 11 to 50 g/s)		
					18. Fuel Pressure Control System	Is not responding to an over- pressurization due to pressure build during DFCD or a decreasing desired pressure command.		

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication Bus "A" Off	U0073	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state	Bus Status	Off	Power mode	Run/Crank	5 failures out of 5 samples (5 seconds)	DTC Type B 2 trips
Lost Communication With ECM/PCM "A"	U0100	Detects that CAN serial data communication has been lost with the ECM	Message \$0C9	Undetected	1. Power mode 2. Ignition Run/Crank Voltage 3. U0073	Run/Crank 11V<voltage<32V not active	12 failures out of 12 samples (12 seconds)	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Rail Pressure (FRP) Sensor Performance (rationality)	P018B	This DTC detects a fuel pressure sensor response stuck within the normal operating range	Absolute value of fuel pressure change as sensed during intrusive test.	<= 30 kPa	1. FRP Circuit Low DTC (P018C) 2. FRP Circuit High DTC (P018D) 3. FuelPump Circuit Low DTC (P0231) 4. FuelPump Circuit High DTC (P0232) 5. FuelPump Circuit Open DTC (P023F) 6. Reference Voltage DTC (P0641) 7. Fuel Pump Control Module Driver Over-temperature DTC (P064A) 8. Control Module Internal Performance DTC (P0606) 9. Engine run time 10. Emissions fuel level (PPEI \$3FB) 11. Fuel pump control	not active not active not active not active not active not active not active >=5 seconds not low enabled	<p><u>Frequency:</u> Continuous; 12.5 ms loop. 60 seconds between intrusive tests that pass</p> <p>Intrusive test requested if fuel system is clamped for >= 5 seconds or fuel pressure error variance <= typically (0.3 to 0.6) (calculated over a 2.5sec period); otherwise report pass</p> <p>Duration of intrusive test is fueling related (5 to 12 seconds).</p> <p>Intrusive test is run when fuel flow is below Max allowed fuel flow rate (Typical values in the range of 11 to 50 g/s)</p>	DTC Type A 1 trip

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					12. Fuel pump control state 13. Engine fuel flow 14. ECM fuel control system failure (PPEI \$1ED)	normal or FRP Rationality control > 0.047 g/s failure has not occurred		
Fuel Rail Pressure (FRP) Sensor Circuit Low Voltage	P018C	This DTC detects if the fuel pressure sensor circuit is shorted low	FRP sensor voltage	< 0.14 V			72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Rail Pressure (FRP) Sensor Circuit High Voltage	P018D	This DTC detects if the fuel pressure sensor circuit is shorted high	FRP sensor voltage	> 4.86 V			72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Pump Control Circuit Low Voltage	P0231	This DTC detects if the fuel pump control circuit is shorted to low	Fuel Pump Current	> 14.48A			72 test failures in 80 test samples if Fuel Pump Current <100A 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Pump Control Circuit High Voltage	P0232	This DTC detects if the fuel pump control circuit is shorted to high	Voltage measured at fuel pump circuit	> 3.86 V	Ignition OR HS Comm OR Fuel Pump Control AND Ignition Run/Crank Voltage	Run or Crank enabled enabled 9V < voltage < 32V	36 test failures in 40 test samples; 1 sample/12.5ms	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Fuel pump control enable Time that above conditions are met	False >=4.0 seconds	Pass/Fail determination made only once per trip	
Fuel Pump Control Circuit (Open)	P023F	This DTC detects if the fuel pump control circuit is open	Fuel Pump Current AND Fuel Pump Duty Cycle	<=0.5A □ >20%	Ignition OR HS Comm OR Fuel Pump Control AND Ignition Run/Crank Voltage	Run or Crank enabled enabled 9V < voltage < 32V	72 test failures in 80 test samples; 1 sample/12.5ms	DTC Type A 1 trip
Fuel System Control Module Enable Control Circuit	P025A	This DTC detects if there is a fault in the fuel pump control enable circuit	PPEI (PPEI (Powertrain Platform Electrical Interface) Fuel System Request (\$1ED)	≠ Fuel Pump Control Module Enable Control Circuit	Ignition AND PPEI Fuel System Request (\$1ED)	Run or Crank valid	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Mechanical Actuator Performance (Functionality)	P059F	Compare commanded shutter position to sensed position	Failure to achieve commanded position	Two (2) consecutive intrusive tests fail to achieve commanded position. Intrusive tests are triggered immediately following any failure to achieve a commanded position.	1. Power mode	Run/Crank	Frequency: 1 sample after every shutter movement. Intrusive test requested if shutter movement is commanded and position feedback differs after 19.5 seconds; otherwise report pass. Duration of intrusive test is shutter movement related (40 to 120 seconds)	DTC Type B 2 trips

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					2. Shutter Control 3. Ignition Run/Crank Voltage	Enabled 11V < voltage < 32V		
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if any software or calibration check sum is incorrect	Calculated Checksum (CRC16)	≠ stored checksum for any of the parts (boot, software, application calibration, system calibration)	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 failure if it occurs during the first ROM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background	DTC Type A 1 trip
Control Module Not Programmed	P0602	Indicates that the FSCM needs to be programmed	This DTC is set via calibration, when KeMEMD_b_NoStartCal	= TRUE	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	Runs once at power up	DTC Type A 1 trip
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error at controller power-up	Checksum at power-up	≠ checksum at power-down	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 failure Frequency: Once at power-up	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Random Access Memory (RAM)	P0604	Indicates that control module is unable to correctly write and read data to and from RAM	Data read	≠ Data written	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 failure if it occurs during the first RAM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background.	DTC Type A 1 trip
Control Module Internal Performance 1. Main Processor Configuration Register Test 2. Processor clock test 3. External watchdog test	P0606	This DTC indicates the FSCM has detected an internal processor fault or external watchdog fault (PID 2032 discriminates the source of the fault)	1. For all I/O configuration register faults: •Register contents 2. For Processor Clock Fault: •EE latch flag in EEPROM. OR • RAM latch flag. 3. For External Watchdog Fault: • Software control of fuel pump driver	Incorrect value. 0x5A5A 0x5A Control Lost	Ignition OR HS Comm OR Fuel Pump Control 1. For all I/O configuration register faults: •KeMEMD_b_ProcFitCfgRegEnbl 2. For Processor Clock Fault: •KeMEMD_b_ProcFitCLKDia gEnbl 3. For External Watchdog Fault: •KeFRPD_b_FPExtWDogDia gEnbl	Run or Crank enabled enabled TRUE TRUE TRUE	Tests 1 and 2 1 failure Frequency: Continuously (12.5ms) Test 3 3 failures out of 15 samples 1 sample/12.5 ms	DTC Type A 1 trip

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					3. For External Watchdog Fault: •Control Module ROM(P0601) 3. For External Watchdog Fault: •Control Module RAM(P0604)	not active not active		
Control Module Long Term Memory (EEPROM) Performance	P062F	Indicates that the NVM Error flag has not been cleared	Last EEPROM write	Did not complete	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 test failure Once on controller power- up	DTC Type A 1 trip
5Volt Reference Circuit (Short High/Low/Out of Range)	P0641	Detects continuous short or out of range on the #1 5V sensor reference circuit	Reference voltage AND Output OR Reference voltage AND Output OR Reference voltage AND Output	>= 0.5V inactive >= 5.5V active <= 4.5V active	Ignition	Run or Crank	15 failures out of 20 samples 1 sample/12.5 ms	DTC Type A 1 trip
			OR Reference voltage □	> 105% nominal (i.e., 5.25V) OR <95% nominal (i.e., 4.75V)				

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Control Module - Driver Over- temperature 1	P064A	This DTC detects if an internal fuel pump driver overtemperature condition exists under normal operating conditions	Pump Driver Temp	> 150C	Ignition OR HS Comm OR Fuel Pump Control KeFRPD_b_FPOverTempDia gEnbl Ignition Run/Crank	Run or Crank enabled enabled TRUE 9V<voltage<32V	3 failures out of 15 samples 1 sample/12.5 ms	DTC Type B 2 trips
Ignition 1 Switch Circuit Low Voltage	P2534	This DTC detects if the Ignition1 Switch circuit is shorted to low or open	Ignition 1 voltage	<= 6 V	Engine	Running	180 failures out of 200 samples 1 sample/25.0 ms	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Flow Performance (rationality)	P2635	This DTC detects degradation in the performance of the SIDI electronic return-less fuel system	Filtered fuel rail pressure error	<= Low Threshold (Function of desired fuel rail pressure and fuel flow rate. Margin is 15% of resultant target pressure except at flow <= 1.5g/s and target pressure <= 350kPa where the margin increases continuously at 66.6kPa/g/s as flow decreases) OR >= High Threshold (function of desired fuel rail pressure and fuel flow rate. 15% of resultant Target Pressure) (See Supporting Tables tab)	1. FRP Circuit Low DTC (P018C)	not active	Filtered fuel rail pressure error Time Constant = 12.5 seconds Frequency: Continuous 12.5 ms loop	DTC Type B 2 trips
					2. FRP Circuit High DTC (P018D)	not active		
					3. Fuel Rail Pressure Sensor Performance DTC (P018B)	not active		
					4. FuelPump Circuit Low DTC (P0231)	not active		
					5. FuelPump Circuit High DTC (P0232)	not active		

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					6. FuelPump Circuit Open DTC (P023F)	not active		
					7. Reference Voltage DTC (P0641)	not active		
					8. Fuel Pump Control Module Driver Over-temperature DTC's (P064A)	not active		
					9. Control Module Internal Performance DTC (P0606)	not active		
					10. An ECM fuel control system failure (PPEI \$1ED)	has not occurred		
					11. The Barometric pressure (PPEI \$4C1) signal	valid (for absolute fuel pressure sensor)		
					12. Engine run time	>= 30 seconds		
					13. Emissions fuel level (PPEI \$3FB)	not low		
					14. Fuel pump control	enabled		
					15. Fuel pump control state	normal		
					16. Battery Voltage	11V<=voltage=<32V		
					17. Fuel flow rate (See Supporting Tables tab)	> 0.047 g/s AND <= Max allowed fuel flow rate as a function of desired rail pressure & Vbatt (Typical values in the range of 11 to 50 g/s)		
					18. Fuel Pressure Control System	Is not responding to an over-pressurization due to pressure build during DFCO or a decreasing desired pressure command.		

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication Bus "A" Off	U0073	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state	Bus Status	Off	Power mode	Run/Crank	5 failures out of 5 samples (5 seconds)	DTC Type B 2 trips
Lost Communication With ECM/PCM "A"	U0100	Detects that CAN serial data communication has been lost with the ECM	Message \$0C9	Undetected	1. Power mode 2. Ignition Run/Crank Voltage 3. U0073	Run/Crank 11V<voltage<32V not active	12 failures out of 12 samples (12 seconds)	DTC Type B 2 trips
Lost Communication With "Actuator"	U0284	Detects loss of communication condition has occurred between ECU and device Active Grill Air Shutter "A" actuator	PWM Message	Undetected	1. Power mode 2. Ignition Run/Crank Voltage	Run/Crank 11V < voltage < 32V	Frequency: 100ms 150 failures out of 167 samples	DTC Type B 2 trips

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Mechanical Actuator Performance (Functionality)	P059F	Compare commanded shutter position to sensed position	Failure to achieve commanded position	Two (2) consecutive intrusive tests fail to achieve commanded position. Intrusive tests are triggered immediately following any failure to achieve a commanded position.	1. Power mode 2. Shutter Control 3. Ignition Run/Crank Voltage	Run/Crank Enabled 11V < voltage < 32V	Frequency: 1 sample after every shutter movement. Intrusive test requested if shutter movement is commanded and position feedback differs after 19.5 seconds; otherwise report pass. Duration of intrusive test is shutter movement related (40 to 120 seconds)	DTC Type B 2 trips
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if any software or calibration check sum is incorrect	Calculated Checksum (CRC16)	≠ stored checksum for any of the parts (boot, software, application calibration, system calibration)	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 failure if it occurs during the first ROM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background	DTC Type A 1 trip
Control Module Not Programmed	P0602	Indicates that the FSCM needs to be programmed	This DTC is set via calibration, when KeMEMD_b_NoStartCal	= TRUE	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	Runs once at power up	DTC Type A 1 trip

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error at controller power-up	Checksum at power-up	≠ checksum at power-down	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 failure Frequency: Once at power-up	DTC Type A 1 trip
Control Module Random Access Memory (RAM)	P0604	Indicates that control module is unable to correctly write and read data to and from RAM	Data read	≠ Data written	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 failure if it occurs during the first RAM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background.	DTC Type A 1 trip
Control Module Internal Performance 1. Main Processor Configuration Register Test	P0606	This DTC indicates the ECU has detected an internal processor fault or external watchdog fault (PID 2032 discriminates the source of the fault)	1. For all I/O configuration register faults: •Register contents	Incorrect value.	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	Tests 1 and 2 1 failure Frequency: Continuously (12.5ms)	DTC Type A 1 trip

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
2. Processor clock test			2. For Processor Clock Fault: •EE latch flag in EEPROM. OR • RAM latch flag.	0x5A5A 0x5A	1. For all I/O configuration register faults: •KeMEMD_b_ProcFitCfgR egEnbl 2. For Processor Clock Fault: •KeMEMD_b_ProcFitCLKD iagEnbl	TRUE TRUE	Test 3 3 failures out of 15 samples 1 sample/12.5 ms	
3. External watchdog test			3. For External Watchdog Fault: • Software control of fuel pump driver	Control Lost	3. For External Watchdog Fault: •KeFRPD_b_FPExtWDogD iagEnbl 3. For External Watchdog Fault: •Control Module ROM(P0601) 3. For External Watchdog Fault: •Control Module RAM(P0604)	TRUE not active not active		
Control Module Long Term Memory (EEPROM) Performance	P062F	Indicates that the NVM Error flag has not been cleared	Last EEPROM write	Did not complete	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 test failure Once on controller power-up	DTC Type A 1 trip

13 OBDG05B FSCM Diagnostics

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition 1 Switch Circuit Low Voltage	P2534	This DTC detects if the Ignition1 Switch circuit is shorted to low or open	Ignition 1 voltage	<= 6 V	Engine	Running	180 failures out of 200 samples 1 sample/25.0 ms	DTC Type A 1 trip
Control Module Communication Bus "A" Off	U0073	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state	Bus Status	Off	Power mode	Run/Crank	5 failures out of 5 samples (5 seconds)	DTC Type B 2 trips
Lost Communication With ECM/PCM "A"	U0100	Detects that CAN serial data communication has been lost with the ECM	Message \$0C9	Undetected	1. Power mode 2. Ignition Run/Crank Voltage 3. U0073	Run/Crank 11V<voltage<32V not active	12 failures out of 12 samples (12 seconds)	DTC Type B 2 trips
Lost Communication With "Actuator"	U0284	Detects loss of communication condition has occurred between ECU and device Active Grill Air Shutter "A" actuator	PWM Message	Undetected	1. Power mode 2. Ignition Run/Crank Voltage	Run/Crank 11V < voltage < 32V	Frequency: 100ms 150 failures out of 167 samples	DTC Type B 2 trips

P2635-Fuel Pump Performance Maximum Fuel Flow map (grams / s)

X-axis= Desired Fuel Pressure (kiloPascals)

Y-axis= Battery voltage (volts)

	200	250	300	350	400	450	500	550	600
4.5	17.5	17.5	17.5	17.5	17.5	14.86	11.73	8.672	5.664
6	17.5	17.5	17.5	17.5	17.5	14.86	11.73	8.672	5.664
7.5	17.5	17.5	17.5	17.5	17.5	14.86	11.73	8.672	5.664
9	17.5	17.5	17.5	17.5	17.5	14.86	11.73	8.672	5.664
10.5	17.5	17.5	17.5	17.5	17.5	14.86	11.73	8.672	5.664
12	17.5	17.5	17.5	17.5	17.5	17.5	17.5	15.84	12.77
13.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
15	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
16.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
18	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
19.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
21	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
22.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
24	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
25.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
27	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
28.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5

P2635-Fuel Pump Performance Filtered Pressure Error Fault Threshold High map (kiloPascals)

X-axis= Target Fuel Pressure (kiloPascals)

Y-axis= Fuel Flow (grams / s)

	200	250	300	350	400	450	500	550	600
0	30	37.5	45	52.5	60	67.5	75	82.5	90
1.5	30	37.5	45	52.5	60	67.5	75	82.5	90
3	30	37.5	45	52.5	60	67.5	75	82.5	90
4.5	30	37.5	45	52.5	60	67.5	75	82.5	90
6	30	37.5	45	52.5	60	67.5	75	82.5	90
7.5	30	37.5	45	52.5	60	67.5	75	82.5	90
9	30	37.5	45	52.5	60	67.5	75	82.5	90
10.5	30	37.5	45	52.5	60	67.5	75	82.5	90
12	30	37.5	45	52.5	60	67.5	75	82.5	90
13.5	30	37.5	45	52.5	60	67.5	75	82.5	90
15	30	37.5	45	52.5	60	67.5	75	82.5	90
16.5	30	37.5	45	52.5	60	67.5	75	82.5	90
18	30	37.5	45	52.5	60	67.5	75	82.5	90
19.5	30	37.5	45	52.5	60	67.5	75	82.5	90
21	30	37.5	45	52.5	60	67.5	75	82.5	90
22.5	30	37.5	45	52.5	60	67.5	75	82.5	90
24	30	37.5	45	52.5	60	67.5	75	82.5	90
25.5	30	37.5	45	52.5	60	67.5	75	82.5	90
27	30	37.5	45	52.5	60	67.5	75	82.5	90
28.5	30	37.5	45	52.5	60	67.5	75	82.5	90
30	30	37.5	45	52.5	60	67.5	75	82.5	90
31.5	30	37.5	45	52.5	60	67.5	75	82.5	90
33	30	37.5	45	52.5	60	67.5	75	82.5	90
34.5	30	37.5	45	52.5	60	67.5	75	82.5	90
36	30	37.5	45	52.5	60	67.5	75	82.5	90
37.5	30	37.5	45	52.5	60	67.5	75	82.5	90
39	30	37.5	45	52.5	60	67.5	75	82.5	90
40.5	30	37.5	45	52.5	60	67.5	75	82.5	90
42	30	37.5	45	52.5	60	67.5	75	82.5	90
43.5	30	37.5	45	52.5	60	67.5	75	82.5	90
45	30	37.5	45	52.5	60	67.5	75	82.5	90
46.5	30	37.5	45	52.5	60	67.5	75	82.5	90
48	30	37.5	45	52.5	60	67.5	75	82.5	90

P2635-Fuel Pump Performance Filtered Pressure Error Fault RePass Threshold High map (kiloPascals)

X-axis= Target Fuel Pressure (kiloPascals)

Y-axis= Fuel Flow (grams / s)

	200	250	300	350	400	450	500	550	600
0	25.5	31.88	38.25	44.63	51	57.38	63.75	70.13	76.5
1.5	25.5	31.88	38.25	44.63	51	57.38	63.75	70.13	76.5
3	25.5	31.88	38.25	44.63	51	57.38	63.75	70.13	76.5
4.5	25.5	31.88	38.25	44.63	51	57.38	63.75	70.13	76.5
6	25.5	31.88	38.25	44.63	51	57.38	63.75	70.13	76.5
7.5	25.5	31.88	38.25	44.63	51	57.38	63.75	70.13	76.5
9	25.5	31.88	38.25	44.63	51	57.38	63.75	70.13	76.5
10.5	25.5	31.88	38.25	44.63	51	57.38	63.75	70.13	76.5
12	25.5	31.88	38.25	44.63	51	57.38	63.75	70.13	76.5
13.5	25.5	31.88	38.25	44.63	51	57.38	63.75	70.13	76.5
15	25.5	31.88	38.25	44.63	51	57.38	63.75	70.13	76.5
16.5	25.5	31.88	38.25	44.63	51	57.38	63.75	70.13	76.5
18	25.5	31.88	38.25	44.63	51	57.38	63.75	70.13	76.5
19.5	25.5	31.88	38.25	44.63	51	57.38	63.75	70.13	76.5
21	25.5	31.88	38.25	44.63	51	57.38	63.75	70.13	76.5
22.5	25.5	31.88	38.25	44.63	51	57.38	63.75	70.13	76.5
24	25.5	31.88	38.25	44.63	51	57.38	63.75	70.13	76.5
25.5	25.5	31.88	38.25	44.63	51	57.38	63.75	70.13	76.5
27	25.5	31.88	38.25	44.63	51	57.38	63.75	70.13	76.5
28.5	25.5	31.88	38.25	44.63	51	57.38	63.75	70.13	76.5
30	25.5	31.88	38.25	44.63	51	57.38	63.75	70.13	76.5
31.5	25.5	31.88	38.25	44.63	51	57.38	63.75	70.13	76.5
33	25.5	31.88	38.25	44.63	51	57.38	63.75	70.13	76.5
34.5	25.5	31.88	38.25	44.63	51	57.38	63.75	70.13	76.5
36	25.5	31.88	38.25	44.63	51	57.38	63.75	70.13	76.5
37.5	25.5	31.88	38.25	44.63	51	57.38	63.75	70.13	76.5
39	25.5	31.88	38.25	44.63	51	57.38	63.75	70.13	76.5
40.5	25.5	31.88	38.25	44.63	51	57.38	63.75	70.13	76.5
42	25.5	31.88	38.25	44.63	51	57.38	63.75	70.13	76.5
43.5	25.5	31.88	38.25	44.63	51	57.38	63.75	70.13	76.5
45	25.5	31.88	38.25	44.63	51	57.38	63.75	70.13	76.5
46.5	25.5	31.88	38.25	44.63	51	57.38	63.75	70.13	76.5
48	25.5	31.88	38.25	44.63	51	57.38	63.75	70.13	76.5

P2635-Fuel Pump Performance Filtered Pressure Error Fault Threshold Low map (kiloPascals)

X-axis= Target Fuel Pressure (kiloPascals)

Y-axis= Fuel Flow (grams / s)

	200	250	300	350	400	450	500	550	600
0	-260	-210	-160	-110	-60	-67.5	-75	-82.5	-90
1.5	-145	-125	-102.5	-81.25	-60	-67.5	-75	-82.5	-90
3	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
4.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
6	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
7.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
9	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
10.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
12	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
13.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
15	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
16.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
18	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
19.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
21	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
22.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
24	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
25.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
27	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
28.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
30	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
31.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
33	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
34.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
36	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
37.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
39	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
40.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
42	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
43.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
45	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
46.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
48	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90

P2635-Fuel Pump Performance Filtered Pressure Error Fault RePass Threshold Low map (kiloPascals)

X-axis= Target Fuel Pressure (kiloPascals)

Y-axis= Fuel Flow (grams / s)

	200	250	300	350	400	450	500	550	600
0	-221	-178.5	-136	-93.5	-51	-57.38	-63.75	-70.13	-76.5
1.5	-123.3	-106.3	-87.13	-69.06	-51	-57.38	-63.75	-70.13	-76.5
3	-25.5	-31.88	-38.25	-44.63	-51	-57.38	-63.75	-70.13	-76.5
4.5	-25.5	-31.88	-38.25	-44.63	-51	-57.38	-63.75	-70.13	-76.5
6	-25.5	-31.88	-38.25	-44.63	-51	-57.38	-63.75	-70.13	-76.5
7.5	-25.5	-31.88	-38.25	-44.63	-51	-57.38	-63.75	-70.13	-76.5
9	-25.5	-31.88	-38.25	-44.63	-51	-57.38	-63.75	-70.13	-76.5
10.5	-25.5	-31.88	-38.25	-44.63	-51	-57.38	-63.75	-70.13	-76.5
12	-25.5	-31.88	-38.25	-44.63	-51	-57.38	-63.75	-70.13	-76.5
13.5	-25.5	-31.88	-38.25	-44.63	-51	-57.38	-63.75	-70.13	-76.5
15	-25.5	-31.88	-38.25	-44.63	-51	-57.38	-63.75	-70.13	-76.5
16.5	-25.5	-31.88	-38.25	-44.63	-51	-57.38	-63.75	-70.13	-76.5
18	-25.5	-31.88	-38.25	-44.63	-51	-57.38	-63.75	-70.13	-76.5
19.5	-25.5	-31.88	-38.25	-44.63	-51	-57.38	-63.75	-70.13	-76.5
21	-25.5	-31.88	-38.25	-44.63	-51	-57.38	-63.75	-70.13	-76.5
22.5	-25.5	-31.88	-38.25	-44.63	-51	-57.38	-63.75	-70.13	-76.5
24	-25.5	-31.88	-38.25	-44.63	-51	-57.38	-63.75	-70.13	-76.5
25.5	-25.5	-31.88	-38.25	-44.63	-51	-57.38	-63.75	-70.13	-76.5
27	-25.5	-31.88	-38.25	-44.63	-51	-57.38	-63.75	-70.13	-76.5
28.5	-25.5	-31.88	-38.25	-44.63	-51	-57.38	-63.75	-70.13	-76.5
30	-25.5	-31.88	-38.25	-44.63	-51	-57.38	-63.75	-70.13	-76.5
31.5	-25.5	-31.88	-38.25	-44.63	-51	-57.38	-63.75	-70.13	-76.5
33	-25.5	-31.88	-38.25	-44.63	-51	-57.38	-63.75	-70.13	-76.5
34.5	-25.5	-31.88	-38.25	-44.63	-51	-57.38	-63.75	-70.13	-76.5
36	-25.5	-31.88	-38.25	-44.63	-51	-57.38	-63.75	-70.13	-76.5
37.5	-25.5	-31.88	-38.25	-44.63	-51	-57.38	-63.75	-70.13	-76.5
39	-25.5	-31.88	-38.25	-44.63	-51	-57.38	-63.75	-70.13	-76.5
40.5	-25.5	-31.88	-38.25	-44.63	-51	-57.38	-63.75	-70.13	-76.5
42	-25.5	-31.88	-38.25	-44.63	-51	-57.38	-63.75	-70.13	-76.5
43.5	-25.5	-31.88	-38.25	-44.63	-51	-57.38	-63.75	-70.13	-76.5
45	-25.5	-31.88	-38.25	-44.63	-51	-57.38	-63.75	-70.13	-76.5
46.5	-25.5	-31.88	-38.25	-44.63	-51	-57.38	-63.75	-70.13	-76.5
48	-25.5	-31.88	-38.25	-44.63	-51	-57.38	-63.75	-70.13	-76.5