



BMW Fault Codes (DTCs)

Below is a comprehensive listing of BMW DTCs and the corresponding SAE P-codes.

Table a. Diagnostic trouble codes (DTCs)

BMW code	P-code	Fault type and function	Signal type and range	Explanation
1		Ignition coil cyl.2	Input analog timing (100 mV)	DME initiates secondary ignition for each cylinder then looks for feedback through shunt resistor in harness to determine if ignition actually occurred.
2		Ignition coil cyl.4	Input analog timing (100 mV)	DME initiates secondary ignition for each cylinder then looks for feedback through shunt resistor in harness to determine if ignition actually occurred.
3		Ignition coil cyl.6	Input analog timing (100 mV)	DME initiates secondary ignition for each cylinder then looks for feedback through shunt resistor in harness to determine if ignition actually occurred.
5	P0202	Injector circuit cyl. 2	Output digital pulse width (active low)	DME final stage will set flag whenever a short to ground, a short to battery voltage or a disconnection between output transistor and component exists.
6	P0201	Injector circuit cyl. 1	Output digital pulse width (active low)	DME final stage will set flag whenever a short to ground, a short to battery voltage or a disconnection between output transistor and component exists.
8	P0101	Mass air flow circuit range/perf.	Input analog (0-5V)	Failed signal range check against predefined diagnostic limits.
10		Engine coolant temp. circuit range/perf.	Input analog (0-5V)	Signal range is checked against predefined diagnostic limits within specific engine operations.
11		Coolant temp. coolant outlet	Input analog (0-5V)	Signal range is checked against predefined diagnostic limits within specific engine operations.
14	P0111	Intake air temp. range/performance	Input analog (0-5V)	Signal range is checked against predefined diagnostic limits within specific engine operations.
18	P1397	Exhaust cam	Input analog	Internal check of phase shift from

		position sensor malfunction	phase shift (0-5V)	camshaft sensor - should change during every crankshaft revolution. Phase shift occurs due to 2:1 relationship between camshafts.
19	P1529	VANOS solenoid activation, exhaust	Output digital pulse width (active low)	DME final stage will set flag whenever a short to ground, a short to battery voltage or a disconnection between output transistor and component exists.
21	P1525	VANOS solenoid activation, intake	Output digital pulse width (active low)	DME final stage will set flag whenever a short to ground, a short to battery voltage or a disconnection between output transistor and component exists.
22	P0203	Injector circuit cyl. 3	Output digital pulse width (active low)	DME final stage will set flag whenever a short to ground, a short to battery voltage or a disconnection between output transistor and component exists.
23	P0206	Injector circuit cyl. 6	Output digital pulse width (active low)	DME final stage will set flag whenever a short to ground, a short to battery voltage or a disconnection between output transistor and component exists.
24	P0204	Injector circuit cyl. 4	Output digital pulse width (active low)	DME final stage will set flag whenever a short to ground, a short to battery voltage or a disconnection between output transistor and component exists.
25	P0135	Oxygen sensor heater pre-cat (Bank1)	Output digital pulse width (active low)	DME final stage will set flag whenever a short to ground, a short to battery voltage or a disconnection between output transistor and component exists.
27	P1550	Idle control valve closing coil	Output digital pulse width (active low)	DME final stage will set flag whenever a short to ground, a short to battery voltage or a disconnection between output transistor and component exists.
29		Ignition coil cyl.1	Input analog timing (100 mV)	DME initiates secondary ignition for each cylinder then looks for feedback through shunt resistor in harness to determine if ignition actually occurred.
30		Ignition coil cyl.3	Input analog timing (100 mV)	DME initiates secondary ignition for each cylinder then looks for feedback through shunt resistor in harness to determine if ignition actually occurred.
31		Ignition coil cyl.5	Input analog timing	DME initiates secondary ignition for

			(100 mV)	each cylinder then looks for feedback through shunt resistor in harness to determine if ignition actually occurred.
33	P0205	Injector circuit cyl. 5	Output digital pulse width (active low)	DME final stage will set flag whenever a short to ground, a short to battery voltage or a disconnection between output transistor and component exists.
35	P1453	Secondary air injection pump	Output digital on/off (active low)	TDME final stage will set flag whenever a short to ground, a short to battery voltage or a disconnection between output transistor and component exists.
36	MS 43	Main relay malfunction	Input analog (0-12V)	Signal range check between DME ignition analog input and main relay power circuit analog input.
38	MS 43	Clutch switch faulty	Input digital (0-12V)	Plausibility check of clutch switch and DME internal values such as load and engine speed.
39		Brake light switch, and brake light plausibility test	Input digital (0-12V)	When brake light switch is active, brake light test switch must be also active. If not, fault is stored.
40		Brake light switch, pedal sensor plausibility test	Input digital / analog (0-12V / 0-5V)	If pedal sensor is showing angle greater than "limp home angle" and additionally brake light switch is active, fault is stored.
42		Multi functional steering wheel, redundant code	Input binary stream (0-12V)	Every signal from cruise control switch is transferred redundantly. A fault is set whenever two redundant information paths are showing a different status.
43		Multi functional steering wheel, control switch	Input binary stream (0-12V)	When status from cruise control showing set/accelerate and deceleration are same time, fault is set.
45		Multi functional steering wheel, toggle-bit	Input binary stream (0-12V)	Every 0.5 sec. a message that includes a toggle bit (toggles between 0->1 and 1->0) is transmitted. Change bit is monitored to indicate proper function.
47	MS 43	Torque monitoring level 1	DME internal values logical	
48	MS 43	Internal control module	DME HW test memory	
49		ECU internal test	DME HW test	
50	P1145	Running losses	Output digital	DME final stage will set flag

	MS 42	valve (3/2), final stage	on/off (active low)	whenever a short to ground, a short to battery voltage or a disconnection between output transistor and component exists.
	MS 43	ECU internal test	DME HW test	
51	MS 43	ECU internal test	DME HW test	
52		Rear exhaust valve flap	Output digital steady (active low)	DME final stage will set flag whenever a short to ground, a short to battery voltage or a disconnection between output transistor and component exists.
53	P1509	Idle control valve opening coil	Output digital pulse width (active low)	DME final stage will set flag whenever a short to ground, a short to battery voltage or a disconnection between output transistor and component exists.
55	P0155	Oxygen sensor heater pre-cat (Bank 2)	Output digital pulse width (active low)	DME final stage will set flag whenever a short to ground, a short to battery voltage or a disconnection between output transistor and component exists.
56		Ignition feedback, interruption at shunt resistor	Input analog (32V)	Check for correct signal voltage. If voltage is 32V (limitation voltage) then secondary ignition voltage is detected and shunt resistor may be faulty.
57	P0325	Knock sensor 1 circuit, (Bank 1) circuit continuity	Input analog amplitude (13-19kHz)	Plausibility check between knock sensor amplitude during knocking with internal knock detection mapped DME values.
59	P0330	Knock sensor 2 circuit, (Bank 2) circuit continuity	Input analog amplitude (13-19kHz)	Plausibility check between knock sensor amplitude during knocking with internal knock detection mapped DME values.
61	P0141	Oxygen sensor heater post-cat (Bank 2)	Output digital pulse width (active low)	DME final stage will set flag whenever a short to ground, a short to battery voltage or a disconnection between output transistor and component exists.
62	P0412	Secondary air injection system switching valve	Output digital on/off (active low)	DME final stage will set flag whenever a short to ground, a short to battery voltage or a disconnection between output transistor and component exists.
65	P0340	Intake cam position sensor, malfunction	Input analog phase shift 0-5V	DME final stage will set flag whenever a short to ground, a short to battery voltage or a disconnection

				between output transistor and component exists.
68		EVAP system, purge control valve circuit	Output digital pulse width (active low)	DME final stage will set flag whenever a short to ground, a short to battery voltage or a disconnection between output transistor and component exists.
69		Relay fuel pump	Output digital on/off (active low)	DME final stage will set flag whenever a short to ground, a short to battery voltage or a disconnection between output transistor and component exists.
74		AC compressor relay	Output digital on/off (active low)	DME final stage will set flag whenever a short to ground, a short to battery voltage or a disconnection between output transistor and component exists.
79	P0161	Oxygen sensor heater post-cat (Bank 1)	Output digital pulse width (active low)	DME final stage will set flag whenever a short to ground, a short to battery voltage or a disconnection between output transistor and component exists.
83	P0335	Crankshaft position sensor, malfunction	Input digital (0-12V)	Checks for correct signal pattern and correct number of expected flywheel teeth.
100	P0601	Internal control module, memory check sum or communication	DME internal values logical	Internal hardware test of RAM, ROM, and Flash Prom.
103	P1519	VANOS faulty reference value intake	DME internal values logical	Maximum VANOS adjustment angle, checked at every engine start must be within a specified limit.
104	P1520	VANOS faulty reference value exhaust	DME internal values logical	Maximum VANOS adjustment angle, checked at every engine start must be within a specified limit.
105	P1522	VANOS stuck (Bank 1) intake	DME internal values	Monitoring of a desired VANOS adjustment within a predefined diagnostic time limit.
106	P1523	VANOS stuck (Bank 2) exhaust	DME internal values	Monitoring of a desired VANOS adjustment within a predefined diagnostic time limit.
109	P1580	Motor throttle valve pulse width not plausible	Output digital pulse width (0-12V)	Throttle position control algorithm checks for problems with mechanical coupling spring within motor throttle body.
110	P1542	Pedal sensor	Input analog (0-	Failed signal range check against

		potentiometer 1	5V)	predefined diagnostic limits.
111	P1542	Pedal Sensor Potentiometer 2	Input analog (0-5V)	Failed signal range check against predefined diagnostic limits.
112	P0120 MS 42	Motor throttle valve potentiometer 1	Input analog (0-5V)	Failed signal range check against predefined diagnostic limits.
	MS 43	Throttle position sensor 1	Input analog (0-5V)	Failed signal range check against predefined diagnostic limits.
113	P0120	Motor throttle valve potentiometer 2	Input analog (0-5V)	Failed signal range check against predefined diagnostic limits.
114	P1580 MS 42	Motor throttle valve final stage	DME internal test	Final stage inside DME (special H-bridge), will set internal flag whenever a short to ground, a short to battery voltage or a disconnection occurs.
	MS 43	A second pedal sensor range check failure is determined	DME internal values logical	If pedal sensor malfunction is determined, followed by a second malfunction, a signal is sent.
115	P1623 MS 42	Output voltage 5V for potentiometer operation 1	DME internal (5V)	Check for proper 5 volts supply to potentiometers is possible within a predefined voltage limit.
	MS 43	Range check for throttle position adaptation	Input analog (0-5V)	Range check for closed position of throttle sensors.
116	P1623	Output voltage for potentiometer operation 2	DME internal (5V)	Check for proper 5 volts supply to potentiometers is possible within a predefined voltage limit.
117	P1542	Pedal sensor potentiometer plausibility	Input analog (0-5V)	If there is a difference greater than specified between two redundant signals from potentiometer, fault will be set.
118	P0120 MS 42	Motor throttle feedback potentiometer plausibility	Input analog (0-5V)	If there is a difference greater than specified between two redundant signals from potentiometer, fault will be set.
	MS 43	Throttle position sensor 1; plausibility check sensor 1 to mass air flow meter	DME internal values	Signal range is checked against predetermined diagnostic limits. Rationality check with mass air flow meter.
119	P1580 MS 42	MDK, throttle mechanical sticking	DME internal test	Throttle doesn't reach desired opening angle within a specified time.
	MS 43	Throttle position sensor 2; plausibility check sensor 1 to mass	DME internal values	Signal range is checked against predetermined diagnostic limits. Rationality check with mass air flow meter.

		air flow meter		
120	P1542 MS 42	Pedal sensor/ motor throttle valve potentiometer not plausible	DME internal values logical motor	Signal from motor throttle valve potentiometer must be equal signal from pedal sensor potentiometer plus any adaptive values.
	MS 43	Plausibility check between brake switch and pedal sensor	Input digital / analog	Plausibility check between constant pedal value and brake switch. First pedal value must be constant and for next step brake switch must be active.
122	P1101	Oil temp. sensor malfunction	Input analog (0- 5V)	Signal range is checked against predefined diagnostic limits and calculated temperature.
123	P1622	Electric thermostat control, final stage	Output digital on/off (active low)	DME final stage will set flag whenever a short to ground, a short to battery voltage or a disconnection between output transistor and component exists.
124	P1593	DISA, range/perf.	Output digital on/off (active low)	DME final stage will set flag whenever a short to ground, a short to battery voltage or a disconnection between output transistor and component exists.
125		Coolant fan, final stage	Output digital on/off (active low)	DME final stage will set flag whenever a short to ground, a short to battery voltage or a disconnection between output transistor and component exists.
126	P1470 MS 42	LDP-magnetic valve	Output digital on/off (active low)	DME final stage will set flag whenever a short to ground, a short to battery voltage or a disconnection between output transistor and component exists.
	MS 43	DMTL valve	Output digital on/off (active low)	DME final stage will set flag whenever a short to ground, a short to battery voltage or a disconnection between output transistor and component exists.
127		Fuel pump	Output digital on/off (active low)	DME final stage will set flag whenever a short to ground, a short to battery voltage or a disconnection between output transistor and component exists.
128		EWS signal not present or faulty	Input binary stream bit data (0- 12V)	During time out check no signal was present within specific time or faulty information from serial interface (parity, overrun, etc.).

130		CAN time out (ASC1)	Input binary stream bit data (0-12V)	CAN message between DME/EGS not received within expected time.
131		CAN time out (instr 2)	Input binary stream bit data (0-12V)	CAN message between DME/EGS not received within expected time.
132		CAN time out (instr 3)	Input binary stream bit data (0-12V)	CAN message between DME/EGS not received within expected time.
133		CAN time out (ASC3)	Input binary stream bit data (0-12V)	CAN message between DME/EGS not received within expected time.
135	MS 43	Limp home position adaptation necessary	DME internal values logical	Limp home position must be in specified range. If range is exceeded, a fault is set.
136	MS 43	Motor throttle valve open / closing test failed	DME internal values logical	From limp home mode position, throttle valve will be open, afterwards it must fall back into limp home position. If fall back position is not in specified range, fault is set.
140	P1475	LDP reed-switch not closed	Input digital on/off (0-12V)	With shut off valve open and no pressure on system, reed contact should be closed, showing a "high signal". If not the case in beginning of every diagnostics check, a signal is sent.
140	MS 43	DMTL pump final stage	Output digital on/off (active low)	DME final stage will set flag whenever a short to ground, a short to battery voltage or a disconnection between output transistor and component exists.
141	P1477	EVAP: reed switch not closed, doesn't open or doesn't close	Input digital on/off (0-12V)	Within predetermined time LDP reed switch signal must change from high to low or from low to high or LDP reed switch is "low" for longer than predetermined time.
142	P1477	EVAP: reed switch not closed, doesn't open or doesn't close	Input digital on/off (0-12V)	Within predetermined time LDP reed switch signal must change from high to low or from low to high or LDP reed switch is "low" for longer than predetermined time.
142	MS 43	DMTL module fault	DME internal values logical	
143	P1476	EVAP: clamped tube check	Input digital frequency (0-12V)	Frequency of LDP pumps reed switch is lower then predetermined limit. Volume of leak is determined to be too small (i.e. pinched or restricted)

				hose)
146	MS 43	Range check voltage supply pedal sensor 2 and throttle position sensors	DME internal input analog	Supply voltage for sensors must be within a specified range.
147	MS 43	Range check voltage supply pedal sensor 2 and throttle position sensors	DME internal input analog	Supply voltage for sensors must be within a specified range.
149	P1140	Motor throttle feedback potentiometer and air mass sensor signal not plausible	Input analog (0-5V)	Signal from motor throttle valve potentiometer must be suitable to signal from air mass sensor. A fault is set if difference exceeds specified limit.
150	P0130	Oxygen sensor pre-cat (Bank 1), short to battery volt.	Input analog (0-5V)	Oxygen sensor signal range is checked to determine if electrical shorts exist on input line. Voltage signal has to be within a predetermined range (0.1V -1V) or a fault will set.
151	P0130	Oxygen sensor pre-cat (Bank 1), short to ground	Input analog (0-5V)	Oxygen sensor signal range is checked to determine if electrical shorts exist on input line. Voltage signal must be within a predetermined range (0.1V -1V) or fault will set.
152	P0130	Oxygen sensor pre-cat (Bank 1), disconnection	Input analog (0-5V)	Oxygen sensor signal range is checked to determine if electrical disconnection exist on input line.
153	P0150	Oxygen sensor pre-cat (Bank 2), short to battery volt.	Input analog (0-5V)	Oxygen sensor signal range is checked to determine if electrical shorts exist on input line. Voltage signal must be within a predetermined range (0.1V -1V) or fault will set.
154	P0150	Oxygen sensor pre-cat (Bank 2), short to ground	Input analog (0-5V)	Oxygen sensor signal range is checked to determine if electrical shorts exist on input line. Voltage signal must be within a predetermined range (0.1V -1V) or fault will set.
155	P0150	Oxygen sensor pre-cat (Bank 2), disconnection	Input analog (0-5V)	Oxygen sensor signal range is checked to determine if electrical disconnection exist on input line.
156	P0136	Oxygen sensor post-cat (Bank 1),	Input analog (0-5V)	Oxygen sensor signal range is checked to determine if electrical

		short to battery volt.		shorts exist on input line. Voltage signal must be within a predetermined range (0.1V -1V) or fault will set.
157	P0136	Oxygen sensor Post Cat. (Bank 1), short to ground	Input analog (0-5V)	Oxygen sensor signal range is checked to determine if electrical shorts exist on input line. Voltage signal must be within a predetermined range (0.1V -1V) or fault will set.
159	P0156	Oxygen sensor Post Cat. (Bank 2), short to battery volt.	Input analog (0-5V)	Oxygen sensor signal range is checked to determine if electrical shorts exist on input line. Voltage signal must be within a predetermined range (0.1V -1V) or fault will set.
160	P0156	Oxygen sensor post-cat (Bank 2), short to ground	Input analog (0-5V)	Oxygen sensor signal range is checked to determine if electrical shorts exist on input line. Voltage signal must be within a predetermined range (0.1V -1V) or fault will set.
160	MS 43	Throttle valve position controller	DME internal values logical	
161	MS 43	Throttle valve position controller	DME internal values logical	
162	MS 43	Throttle valve position controller	DME internal values logical	
168	MS 43	Throttle valve position, throttle sticking	DME internal test calculated	
169		MDK final stage shut off	DME internal test	This fault indicates problem on pedal sensor, throttle potentiometer or throttle. A separately stored fault code indicates problem.
171	P0601	System has been shut down due to safety controller	DME internal test	Safety controller has shut down motor throttle valve function due to not plausible MDK input values.
172	P1542	Pedal sensor potentiometer short between two potentiometer paths	DME internal check	5 volts for potentiometers are switched on within a specific time pattern.
173	P0120	Motor throttle valve potentiometer contact short	Rationality check	Motor throttle valve potentiometer

174	P0120	Motor throttle valve potentiometer adaptation of idle end position	Input analog (0-5V)	Signal for idle position must be within a specified range. If range is exceeded, fault is set.
175		Pedal sensor potentiometer 1 adaptation of the idle end position	Input analog (0-5V)	Signal for idle position must be within a specified range. If range is exceeded, fault is set.
176	P1542	Pedal sensor potentiometer 2 adaptation of the idle end position	Input analog (0-5V)	Signal for idle position must be within a specified range. If range is exceeded, fault is set.
188	P1132	Oxygen sensor heater, pre-cat (Bank 1), insufficient	Output digital pulse width (active low)	DME internally calculated heater power is checked against predefined diagnostic limits.
189	P1133	Oxygen sensor heater, pre-cat (Bank 2), insufficient	Output digital pulse width (active low)	DME internally calculated heater power is checked against predefined diagnostic limits.
190	P1186	Oxygen sensor-heater, post-cat (Bank 1), insufficient	Output digital pulse width (active low)	DME internally calculated heater power is checked against predefined diagnostic limits.
191	P1187	Oxygen sensor heater, post-cat (Bank 2), insufficient	Output digital pulse width (active low)	DME internally calculated heater power is checked against predefined diagnostic limits.
197	MS 43	Signal range check	DME internal analog input	
202	P0170	Fuel trim (Bank 1), O2 control limit	DME internal values logical	Controller for lambda is too long beyond a min. or a max.
203	P0173	Fuel Trim (Bank 2), O2 control limit	DME internal values logical	Controller for lambda is too long beyond a min. or a max.
204	P0505	Idle control system, idle speed not plausible	DME internal values logical	Functional check between actual engine speed (RPM) and predetermined RPM exceeds maximum deviation of +200/-100 RPM.
208		EWS, engine speed check not ok	DME internal test	Engine speed signal is transferred by EWS to DME. Fault is set if transferred signal is not reflecting engine speed due to input problem in EWS.
209		EWS, content of message	Input binary stream bit data (0-	Content of binary message received from EWS invalid.

			12V)	
210		Ignition feedback, faulty (>2 cylinders)	Input analog timing (100 mV)	Check for correct signal timing after each ignition has been initiated by feedback signal. If more than two ignition signals are not recognized than there might be a problem in feedback line.
211	P1510	Idle control valve stuck	DME internal values logical	Functional check against a calculated value by monitoring flow though air mass meter to determine if idle valve is mechanically stuck open. Tested during closed throttle.
214	P0500	Vehicle speed sensor	Input digital frequency (0-12V)	Signal range is checked against predefined diagnostic limits. No vehicle speed is observed after specific time when compared to engine speed and load equivalent to moving vehicle.
215	P0136	Oxygen sensor post-cat (Bank 1), disconnection	Input analog (0-5V)	Oxygen sensor signal range is checked to determine if electrical disconnection exist on input line.
216	P0136	Oxygen sensor post-cat (Bank 2), disconnection	Input analog (0-5V)	Oxygen sensor signal range is checked to determine if electrical disconnection exist on input line.
217	P0505	CAN time out (EGS1)	Input digital binary information(0-12V)	CAN message between DME/EGS was not received within expected time.
219		CAN-chip, bus off	Input digital binary information (0-12V)	Hardware test determines if CAN bus is off line. Data transmission is disturbed.
220	P1184	Oxygen sensor post-cat (Bank 1) slow response time	Input analog (high is lean) (0-5V)	Checks amount of time oxygen sensor stays in rich or lean state. If it remains there too long in either, fault will set.
221	P1185	Oxygen sensor post-cat (Bank 2) slow response time	Input analog (high is lean) (0-5V)	Checks amount of time oxygen sensor stays in rich or lean state. If it remains there too long in either fault will set.
222	P0125	Insufficient coolant temp. to permit closed loop operation	Input analog (0-5V)	Comparison of actual coolant temperature against calculated DME value which varies with load signal.
223	P1180	Oxygen sensor post-cat (Bank 1), switching time slow	Input analog (high is lean) (0-5V)	Checks amount of time oxygen sensor takes to switch from rich to lean and vice versa. If too long, fault will set.

224	P1181	Oxygen sensor post-cat (Bank 2), switching time slow	Input analog (high is lean) (0-5V)	Checks amount of time oxygen sensor takes to switch from rich to lean and vice versa. If too long, fault will set.
225	P1192	Post-cat sensor (Bank 1); trim control	Input analog (0-5V)	Rationality check for O2 control adaptation with post catalyst sensor bank 1.
226	P0193	Post-cat sensor (Bank 2); trim control	Input analog (0-5V)	Rationality check for O2 control adaptation with post catalyst sensor bank 2.
227	P0188	Fuel trim (Bank 1), O2 control adaptation limit	DME internal values logical	Range control of adaptation values.
228	P0189	Fuel trim (Bank 2), O2 control adaptation limit	DME internal values logical	Range control of adaptation values.
229	P0133	Oxygen sensor pre-cat (Bank 1, slow response time	Input analog (high is lean) (0-5V)	Checks amount of time oxygen sensor takes to switch from rich to lean and vice versa. If too long, fault will set.
230	P0153	Oxygen sensor pre-cat (Bank 2), slow response time	Input analog (high is lean) (0-5V)	Checks amount of time oxygen sensor stays in its rich or lean state. If it remains there too long in either fault will set.
231	P1178	Oxygen sensor pre-cat (Bank 1), switch time too slow	Input analog (high is lean) (0-5V)	Checks amount of time oxygen sensor takes to switch from rich to lean and vice versa. If it takes too long to switch fault will set.
232	P0179	Oxygen sensor pre-cat (Bank 2), switch time too slow	Input analog (high is lean) (0-5V)	Checks amount of time oxygen sensor takes to switch from rich to lean and vice versa. If it takes too long to switch fault will set.
233	P0420	Catalyst efficiency (Bank 1), below threshold	Input analog (0-5V)	Compares value of pre-cat oxygen sensor to value of post-cat oxygen sensor to measure oxygen storage capability / efficiency of catalytic converter. Post-cat oxygen sensor must be relatively lean.
234	P0430	Catalyst efficiency (Bank 2), below threshold	Input analog (0-5V)	Compares value of pre-cat oxygen sensor to value of post-cat oxygen sensor to measure oxygen storage capability / efficiency of catalytic converter. Post-cat oxygen sensor must be relatively lean.
235	P1190	Pre-cat sensor (Bank 1):trim control	Input analog (high is rich) (0-1V)	Rationality check for O2 control adaptation with pre-cat sensor bank 1

236	P1191	Pre-cat sensor (Bank 2):trim control	Input analog (high is rich) (0-1V)	Rationality check for O2 control adaptation with pre-cat sensor bank 2
238	P0301	Cyl. 1 misfire detected	DME internal values logical	Crankshaft speed/acceleration is monitored by crank sensor. Time for each cylinder combustion is compared against avg. of others. If time for cylinder 1 is longer, fault will set.
239	P0302	Cyl. 2 misfire detected	DME internal values logical	Crankshaft speed/acceleration is monitored by crank sensor. Time for each cylinder combustion is compared against avg. of others. If time for cylinder 2 is longer, fault will set.
240	P0303	Cyl. 3 misfire detected	DME internal values logical	Crankshaft speed/acceleration is monitored by crank sensor. Time for each cylinder combustion is compared against avg. of others. If time for cylinder 3 is longer, fault will set.
241	P0304	Cyl. 4 misfire detected	DME internal values logical	Crankshaft speed/acceleration is monitored by crank sensor. Time for each cylinder combustion is compared against avg. of others. If time for cylinder 4 is longer, fault will set.
242	P0305	Cyl. 5 misfire detected	DME internal values logical	Crankshaft speed/acceleration is monitored by crank sensor. Time for each cylinder combustion is compared against avg. of others. If time for cylinder 5 is longer, fault will set.
243	P0306	Cyl. 6 misfire detected	DME internal values logical	Crankshaft speed/acceleration is monitored by crank sensor. Time for each cylinder combustion is compared against avg. of others. If time for cylinder 6 is longer, fault will set.
244		Segment timing faulty, flywheel adaptation	Input analog (0-5V)	Flywheel segments are monitored during deceleration to establish baseline for misfire calculation. If segments are too long/short (bad flywheel) and exceed limit, fault will be set.
245	P1423	Secondary air injection (Bank 1), flow too low	Input analog (0-5V)	Checks to see if oxygen sensor reacts to increase in unmetered airflow generated by secondary air pump operation. Oxygen sensor must

				sense lean condition or fault will set.
246	P1421	Secondary air injection (Bank 2), flow too low	Input analog (0-5V)	Checks to see if oxygen sensor reacts to increase in unmetered airflow generated by secondary air pump operation. Oxygen sensor must sense lean condition or fault will set.
247	P1432	Secondary air valve stuck open	Input analog (0-5V)	Checks to see if oxygen sensor reacts to increase in unmetered airflow generated by secondary air pump operation. Oxygen sensor must sense lean condition or fault will set.
248	P1184	Post-cat sensor; signal after decel phase not plausible; (Bank 1)	Input analog (0-5V)	Signal is checked for a lean signal in decel and a transition between lean to rich after decel
249	P1185	Post-cat sensor; signal after decel phase not plausible; (Bank 2)	Input analog (0-5V)	Signal is checked for a lean signal in decel and a transition between lean to rich after decel
250	P0440	Functional check purge valve	Input analog (0-5V)	This functional check looks for reaction of oxygen sensor signal during canister purging. Oxygen sensor, air flow meter and RPM values must react to purging of canister.