

Introduction This Service Bulletin contains Oxygen Sensor (O2S) Monitor threshold values for all models from 1996 to 2003 and some 2004 models. Starting in 2004, the O2S Monitor threshold values can be found in the repair manual. These values are used when analyzing the O2S test results to determine the O2S condition.

- Applicable Vehicles**
- All 1996 – 2003 model year **Toyota** vehicles.
 - 2004 model year **Corolla, ECHO, Matrix** and **Sienna** vehicles.
 - 2004 model year **Scion xA** and **xB** vehicles.



Function Description **Checking O2S Test Results**

To view O2S test results, the O2S Monitor must be completed and the test results must be checked within the same key cycle. If the ignition key is cycled OFF, the O2S test results will be set to the minimum or maximum limits, and all test results will be erased. The O2S test results are stored in the ECU (SAE term: Powertrain Control Module/PCM) when the monitor is completed. The test results are static and will not change once the monitor is complete.

The process for checking O2S test results is described in the following three basic steps:

1. Completing the O2S Readiness Monitor (page 2).
2. Accessing O2S Test Results (page 3).
3. Comparing O2S Test Results to Failure Thresholds (page 4).

Required SSTs

SPECIAL SERVICE TOOLS (SSTs)	PART NUMBER	QUANTITY
Toyota Diagnostic Tester Kit* (or any OBDII Scantool) 	01001271	1
12 Megabyte Diagnostic Tester Program Card with version 10.1a Software (or later)* 	01002593-005	1

* Essential SSTs.

NOTE:
Additional Diagnostic Tester Kits, Program Cards or other SSTs may be ordered by calling SPX/OTC at 1-800-933-8335.

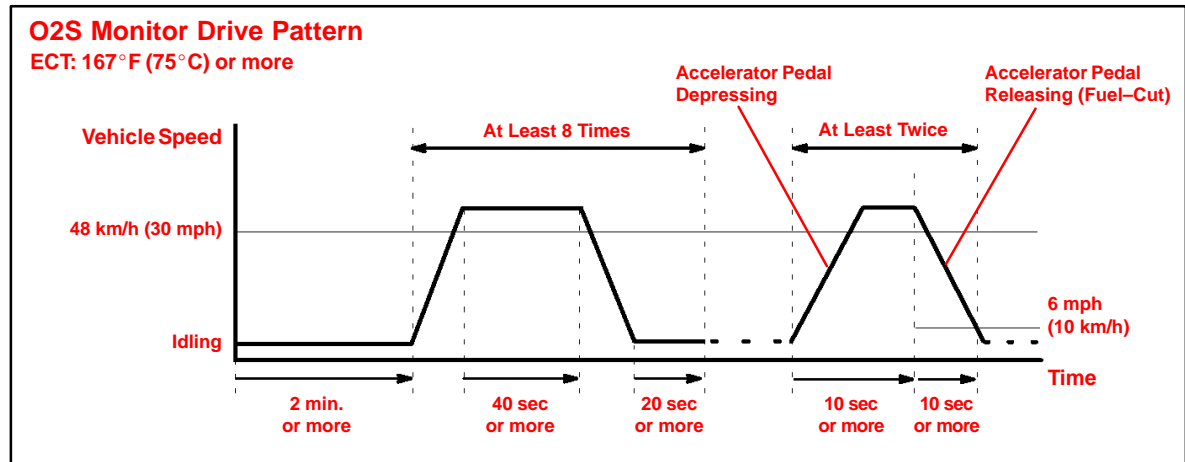
Warranty Information

OP CODE	DESCRIPTION	TIME	OFF	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–



**Completing
O2S
Readiness
Monitor**

1. Clear any stored Diagnostic Trouble Codes (DTCs) using the Toyota Diagnostic Tester.
2. Start the engine.
3. Perform the drive pattern below to run and complete the Oxygen Sensor (O2S) Monitor.



HINT:

The O2S Monitor is completed when the following conditions are met:

- Two (2) minutes or more passed after the engine start.
- The Engine Coolant Temperature (ECT) is 167°F (75°C) or more.
- Cumulative running time at 30 mph (48 km/h) or more exceeds 6 minutes.
- Vehicle is in closed loop.
- The fuel-cut is operated for 8 seconds or more (for Rear O2S Monitor).

- Allow the engine to idle for two minutes.
- Warm up the engine until the Engine Coolant Temperature (ECT) reaches 167°F (75°C).
- Drive the vehicle over 30 mph (48 km/h) for more than 40 seconds.
- Stop the vehicle and allow the engine to idle for more than 20 seconds.
- Repeat steps C and D at least 8 times in one driving cycle.
(Do not cycle the ignition key.)

In addition, perform the following steps for the Rear O2S Readiness Monitor:

- Select second gear.
- Allow the vehicle to run at 30 mph (48 km/h) or more.
- Keep the accelerator pedal “off-idle” for more than 10 seconds.
- Immediately after step C, release the accelerator pedal for at least 10 seconds without depressing the brake pedal (to execute the fuel-cut).
- Decelerate the vehicle until the vehicle speed reaches less than 6 mph (10 km/h).
- Repeat steps B – E at least twice in one driving cycle.

**Accessing
O2S Test
Results**

1. On the Diagnostic Tester* screen, select the following menus:
 - DIAGNOSTICS
 - CARB OBD II
 - O2S TEST RESULTS

A list of the available oxygen sensors will be displayed.
2. Select the desired oxygen sensor and press Enter.

NOTE:

The monitor result of the A/F sensor will not be displayed. If you select “Bank 1–Sensor 1” or Bank 2–Sensor 1” for a vehicle equipped with an A/F sensor, the Diagnostic Tester will display “No parameter to display.”

3. Compare the test results with the values listed in the Failure Threshold Chart.

O2S TEST RESULT Screen

01 BANK 1 – SENSOR 1
01 BANK 1 – SENSOR 2
01 BANK 2 – SENSOR 1
01 BANK 2 – SENSOR 2

TEST DATA Screen

LOW SW V 0.400 V
HIGH SW V 0.550 V
MIN O2S V 0.100 V
MAX O2S V 0.900 V
TIME \$81 17

* Although this procedure references the Toyota Diagnostic Tester, the O2S test results can be checked using a generic OBDII scantool. Refer to your OBDII scantool operator’s manual for specific procedures.

Comparing O2S Test Results to Failure Thresholds

1. Determine the correct O2S Failure Threshold Chart for your vehicle by looking in the “O2S Application Table,” pages 5 – 9 in this bulletin.
2. Select appropriate year, model, and engine for specified O2S Failure Threshold Chart.
3. Compare O2S test results with the specified O2S Failure Threshold Chart. It may be necessary to convert O2S test results to a specific measurement unit using the conversion factor that is supplied in the specified table. See example below:

Example:

- A. The Diagnostic Tester displays “17” as a value of the “Time \$81” (see illustration).
- B. Find the Conversion Factor value of “Time \$81” in the O2S Failure Threshold chart below.
0.3906 is specified for Time \$81 in this chart.
- C. Multiply “17” in step “A” by 0.3906 (Conversion Factor) in step “B.”
17 x 0.3906 = 6.6 %
- D. If the answer is within the Standard Value of TEST LIMIT, the “Time \$81” can be confirmed to be normal.

Example

LOW SW V	0.400 V
HIGH SW V	0.550 V
MIN O2S V	0.035 V
MAX O2S V	0.835 V
Time \$81	17
Time \$84	84
Time \$85	79

NOTE:

- “LOW SW V” indicates the O2S voltage when the O2S status changes from rich to lean.
- “HIGH SW V” indicates the O2S voltage when the O2S status changes from lean to rich.
- If the O2S voltage is lower than “LOW SW V,” the O2S status is lean.
- If the O2S voltage is higher than “HIGH SW V,” the O2S status is rich.

Example of O2S Failure Threshold Chart:

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$81	Percentage of monitoring time where Oxygen Sensor voltage is less than 0.05V	Multiply 0.3906	%	Within 60%

NOTE:

Before the O2S Monitor completes or after the ignition switch is turned OFF, the Diagnostic Tester displays the viewable upper limit or a lower limit of the test value (example: 0 V, 1.275 V, 0 s [seconds], 10.2 s, 0 and 255).

**O2S
Application
Table**

MODEL YEAR	MODEL	ENGINE	DRIVE TRAIN	CERTIFICATION	SEE CHART NO. (TSB PAGE)	
1996	Avalon	1MZ-FE	All	50-State	1 (p. 10)	
	Camry	5S-FE	All	California	2 (p. 11)	
			All	Federal	1 (p. 10)	
		1MZ-FE	All	50-State		
	Celica	7A-FE	All	50-State	1 (p. 10)	
			All	California	2 (p. 11)	
		5S-FE	All	Federal	1 (p. 10)	
	Corolla	ALL	All	50-State	1 (p. 10)	
	Land Cruiser	1FZ-FE	All	50-State	1 (p. 10)	
	Paseo	5E-FE	All	50-State	1 (p. 10)	
	Previa	2TZ-FZE	All	50-State	1 (p. 10)	
	RAV4	3S-FE	All	50-State	2 (p. 11)	
	Supra	ALL	All	50-State	1 (p. 10)	
	Tacoma	ALL	All	50-State	1 (p. 10)	
	Tercel	5E-FE	All	50-State	1 (p. 10)	
T100	ALL	All	50-State	1 (p. 10)		
4Runner	ALL	All	50-State	1 (p. 10)		
1997	Avalon	1MZ-FE	All	50-State	1 (p. 10)	
	Camry	5S-FE	All	California	3 (p. 12)	
			All	Federal	1 (p. 10)	
		1MZ-FE	All	50-State		
	Celica	7A-FE	All	50-State	1 (p. 10)	
			All	California	2 (p. 11)	
		5S-FE	All	Federal	1 (p. 10)	
	Corolla	ALL	All	50-State	1 (p. 10)	
	Land Cruiser	1FZ-FE	All	50-State	1 (p. 10)	
	Paseo	5E-FE	All	50-State	1 (p. 10)	
	Previa	2TZ-FZE	All	50-State	1 (p. 10)	
	RAV4	3S-FE	All	50-State	2 (p. 11)	
	Supra	ALL	All	50-State	1 (p. 10)	
	Tacoma	3RZ-FE	2RZ-FE	All	50-State	1 (p. 10)
			A/T	50-State		
			M/T, 2WD	50-State		
			M/T, 4WD	50-State	2 (p. 11)	
	5VZ-FE	All	50-State			
Tercel	5E-FE	All	50-State	1 (p. 10)		
T100	3RZ-FE	All	50-State	1 (p. 10)		
		All	50-State	2 (p. 11)		
4Runner	3RZ-FE	All	50-State	1 (p. 10)		
		All	50-State	2 (p. 11)		

**O2S
Application
Table**
(Continued)

MODEL YEAR	MODEL	ENGINE	DRIVE TRAIN	CERTIFICATION	SEE CHART NO. (TSB PAGE)
1998	Avalon	1MZ-FE	All	California	4 (p. 12)
			All	Federal	1 (p. 10)
	Camry	5S-FE	All	California	3 (p. 12)
			All	Federal	2 (p. 11)
		1MZ-FE	A/T	California	4 (p. 12)
			M/T	Federal	1 (p. 10)
	Celica	5S-FE	All	California	
			All	Federal	1 (p. 10)
	Corolla	1ZZ-FE	All	50-State	2 (p. 11)
	Land Cruiser	2UZ-FE	All	50-State	2 (p. 11)
	Paseo	5E-FE	All	50-State	1 (p. 10)
	RAV4	3S-FE	All	California	3 (p. 12)
			All	Federal	2 (p. 11)
	Sienna	1MZ-FE	All	50-State	1 (p. 10)
	Supra	2JZ-GE	All	50-State	2 (p. 11)
		2JZ-GTE	All	50-State	1 (p. 10)
	Tacoma	ALL	All	50-State	2 (p. 11)
	Tercel	5E-FE	All	50-State	1 (p. 10)
T100	ALL	All	50-State	2 (p. 11)	
4Runner	ALL	All	50-State	2 (p. 11)	
1999	Avalon	1MZ-FE	All	California	4 (p. 12)
			All	Federal	5 (p. 13)
	Camry CNG	5S-FNE	All	50-State	6 (p. 13)
	Celica	5S-FE	All	50-State	5 (p. 13)
	Corolla	1ZZ-FE	All	50-State	2 (p. 11)
	Land Cruiser	2UZ-FE	All	50-State	2 (p. 11)
	Paseo	5E-FE	All	50-State	1 (p. 10)
	RAV4	3S-FE	All	California	3 (p. 12)
			All	Federal	2 (p. 11)
	Sienna	1MZ-FE	All	California	4 (p. 12)
			All	Federal	5 (p. 13)
	Solara	5S-FE	All	California	3 (p. 12)
			All	Federal	5 (p. 13)
		1MZ-FE	A/T	California	4 (p. 12)
			M/T	Federal	5 (p. 13)
	Tacoma	ALL	All	50-State	
	Tercel	5E-FE	All	50-State	1 (p. 10)
	4Runner	3RZ-FE	All	50-State	2 (p. 11)
5VZ-FE		All	California	4 (p. 12)	
		All	Federal	2 (p. 11)	

**O2S
Application
Table
(Continued)**

MODEL YEAR	MODEL	ENGINE	DRIVE TRAIN	CERTIFICATION	SEE CHART NO. (TSB PAGE)
2000	Avalon	1MZ-FE	All	50-State	4 (p. 12)
	Camry CNG	5S-FNE	All	50-State	6 (p. 13)
	Celica	ALL	All	50-State	1 (p. 10)
	Corolla	1ZZ-FE	All	50-State	7 (p. 14)
	ECHO	1NZ-FE	All	50-State	1 (p. 10)
	Land Cruiser	2UZ-FE	All	50-State	2 (p. 11)
	MR2	1ZZ-FE	All	50-State	1 (p. 10)
	RAV4	3S-FE	All	California	4 (p. 12)
			All	Federal	2 (p. 11)
	Sienna	1MZ-FE	All	California	4 (p. 12)
			All	Federal	5 (p. 13)
	Solara	5S-FE	All	California	4 (p. 12)
			All	Federal	5 (p. 13)
		1MZ-FE	A/T	California	4 (p. 12)
			M/T	Federal	5 (p. 13)
	Tacoma	2RZ-FE	All	California	
			All	Federal	2 (p. 11)
		3RZ-FE	All	California	4 (p. 12)
			All	Federal	2 (p. 11)
		5VZ-FE	All	California	8 (p. 15)
			All	Federal	2 (p. 11)
	Tundra	2UZ-FE	All	50-State	2 (p. 11)
		5VZ-FE	All	California	8 (p. 15)
			All	Federal	2 (p. 11)
	4Runner	3RZ-FE	All	California	4 (p. 12)
			All	Federal	2 (p. 11)
		5VZ-FE	All	California	8 (p. 15)
			All	Federal	2 (p. 11)

**O2S
Application
Table
(Continued)**

MODEL YEAR	MODEL	ENGINE	DRIVE TRAIN	CERTIFICATION	SEE CHART NO. (TSB PAGE)
2001	Avalon	1MZ-FE	All	50-State	4 (p. 12)
	Camry CNG	5S-FNE	All	50-State	6 (p. 13)
	Celica	ALL	All	50-State	1 (p. 10)
	Corolla	1ZZ-FE	All	50-State	7 (p. 14)
	ECHO	1NZ-FE	All	50-State	1 (p. 10)
	Highlander	1MZ-FE	All	50-State	9 (p. 15)
		2AZ-FE	All	50-State	3 (p. 12)
	Land Cruiser	2UZ-FE	All	50-State	1 (p. 10)
	MR2	1ZZ-FE	All	50-State	1 (p. 10)
	Prius	1NZ-FXE	All	50-State	11 (p. 17)
	RAV4	1AZ-FE	All	50-State	4 (p. 12)
	Sequoia	2UZ-FE	All	50-State	1 (p. 10)
	Sienna	1MZ-FE	All	50-State	4 (p. 12)
	Solara	5S-FE	All	50-State	3 (p. 12)
		1MZ-FE	A/T	50-State	9 (p. 15)
			M/T	50-State	10 (p. 16)
	Tacoma	ALL	All	50-State	4 (p. 12)
Tundra	2UZ-FE	All	50-State	1 (p. 10)	
	5VZ-FE	All	50-State	4 (p. 12)	
4Runner	ALL	All	50-State	4 (p. 12)	
2002	Avalon	1MZ-FE	All	50-State	4 (p. 12)
	Celica	1ZZ-FE	All	50-State	1 (p. 10)
		2ZZ-GE	All	50-State	13 (p. 19)
	Corolla	1ZZ-FE	All	50-State	7 (p. 14)
	ECHO	1NZ-FE	All	50-State	1 (p. 10)
	Highlander	1MZ-FE	All	50-State	4 (p. 12)
		2AZ-FE	All	50-State	3 (p. 12)
	Land Cruiser	2UZ-FE	All	50-State	14 (p. 20)
	MR2	1ZZ-FE	All	50-State	1 (p. 10)
	Prius	1NZ-FXE	All	50-State	15 (p. 21)
	RAV4	1AZ-FE	All	50-State	3 (p. 12)
	Sequoia	2UZ-FE	All	50-State	14 (p. 20)
	Sienna	1MZ-FE	All	50-State	4 (p. 12)
	Solara	2AZ-FE	All	50-State	12 (p. 18)
		1MZ-FE	A/T	50-State	9 (p. 15)
			M/T	50-State	5 (p. 13)
	Tacoma	ALL	All	50-State	12 (p. 18)
Tundra	2UZ-FE	All	50-State	14 (p. 20)	
	5VZ-FE	All	50-State	12 (p. 18)	
4Runner	ALL	All	50-State	12 (p. 18)	

**O2S
Application
Table**
(Continued)

MODEL YEAR	MODEL	ENGINE	DRIVE TRAIN	CERTIFICATION	SEE CHART NO. (TSB PAGE)
2003	Avalon	1MZ-FE	All	50-State	16 (p. 22)
	Camry	2AZ-FE	All	Federal	17 (p. 23)
			M/T	California	
			A/T	California	18 (p. 24)
		1MZ-FE	All	With VVT	19 (p. 25)
	All		Without VVT	20 (p. 26)	
	Celica	1ZZ-FE	All	50-State	13 (p. 19)
		2ZZ-GE	All	50-State	21 (p. 27-28)
	Corolla	1ZZ-FE	All	50-State	22 (p. 29)
	ECHO	1NZ-FE	All	50-State	23 (p. 30-31)
	Highlander	1MZ-FE	All	50-State	16 (p. 22)
		2AZ-FE	All	50-State	12 (p. 18)
	Land Cruiser	2UZ-FE	All	50-State	24 (p. 32-33)
	Matrix	1ZZ-FE	All	50-State	22 (p. 29)
		2ZZ-GE	All	50-State	21 (p. 27-28)
	MR2	1ZZ-FE	All	50-State	13 (p. 19)
	Prius	1NZ-FXE	All	50-State	15 (p. 21)
	RAV4	1AZ-FE	All	50-State	25 (p. 34)
	Sequoia	2UZ-FE	All	50-State	24 (p. 32-33)
	Sienna	1MZ-FE	All	50-State	16 (p. 22)
	Solara	2AZ-FE	All	50-State	17 (p. 23)
		1MZ-FE	All	50-State	20 (p. 26)
	Tacoma	ALL	All	50-State	16 (p. 22)
Tundra	2UZ-FE	All	50-State	24 (p. 32-33)	
	5VZ-FE	All	50-State	16 (p. 22)	
4Runner	1GR-FE	All	50-State	12 (p. 18)	
	2UZ-FE	All	50-State	26 (p. 35-36)	
2004	Corolla	1ZZ-FE	All	50-State	27 (p. 37-38)
	ECHO	1NZ-FE	All	50-State	23 (p. 30-31)
	Matrix	1ZZ-FE	2WD	50-State	27 (p. 37-38)
			4WD	50-State	28 (p. 39-40)
	2ZZ-GE	All	50-State	29 (41-42)	
	Sienna	3MZ-FE	All	50-State	30 (p. 43)
	Scion xA	1NZ-FE	All	50-State	23 (p. 30-31)
Scion xB	1NZ-FE	All	50-State	23 (p. 30-31)	

O2S
Failure
Threshold
Charts

CHART 1:

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Voltage Monitor

Related DTCs: P0130, P0150, P2195, P2196, P2197 and P2198

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.55 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Response Monitor

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$31	Time to change from Lean (≤ 0.4 V) to Rich (≥ 0.55 V)	N/A	Second	Between 0 and 1 second
Time \$32	Time to change from Rich (≥ 0.55 V) to Lean (≥ 0.4 V)	N/A	Second	Between 0 and 1 second

If the time required to change is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.5 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

**O2S
Failure
Threshold
Charts**
(Continued)

CHART 2:**Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Voltage Monitor**

Related DTCs: P0130, P0150, P2195, P2196, P2197 and P2198

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
\$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.35 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.55 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Response Monitor

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$31	Time to change from Lean (≤ 0.35 V) to Rich (≥ 0.55 V)	N/A	Second	Between 0 and 1.1 seconds
Time \$32	Time to change from Rich (≥ 0.55 V) to Lean (≥ 0.35 V)	N/A	Second	Between 0 and 1.1 seconds

If the time required to change is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.5 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

O2S
Failure
Threshold
Charts
(Continued)

CHART 3:**Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor**

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.45 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.6 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

CHART 4:**Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor**

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.6 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

O2S
Failure
Threshold
Charts
(Continued)

CHART 5:**Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Voltage Monitor**

Related DTCs: P0130, P0150, P2195, P2196, P2197 and P2198

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.55 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Response Monitor

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$31	Time to change from Lean (≤ 0.4 V) to Rich (≥ 0.55 V)	N/A	Second	Between 0 and 1.1 seconds
Time \$32	Time to change from Rich (≥ 0.55 V) to Lean (≤ 0.4 V)	N/A	Second	Between 0 and 1.1 seconds

If the time required to change is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.5 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

CHART 6:**Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor**

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.55 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 1 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

O2S
Failure
Threshold
Charts
(Continued)

CHART 7:**Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Voltage Monitor**

Related DTCs: P0130, P0150, P2195, P2196, P2197 and P2198

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.55 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Response Monitor

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$31	Time to change from Lean (≤ 0.4 V) to Rich (≥ 0.55 V)	N/A	Second	Between 0 and 0.9 seconds
Time \$32	Time to change from Rich (≥ 0.55 V) to Lean (≤ 0.4 V)	N/A	Second	Between 0 and 0.9 seconds

If the time required to change is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.5 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

O2S
Failure
Threshold
Charts
(Continued)

CHART 8:**Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Voltage Monitor**

Related DTCs: P0130, P0150, P2195, P2196, P2197 and P2198

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.35 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.55 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Response Monitor

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$31	Time to change from Lean (≤ 0.35 V) to Rich (≥ 0.55 V)	N/A	Second	Between 0 and 1 second
Time \$32	Time to change from Rich (≥ 0.55 V) to Lean (≤ 0.35 V)	N/A	Second	Between 0 and 1 second

If the time required to change is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.6 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

CHART 9:**Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor**

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.5 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.6 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

O2S
Failure
Threshold
Charts
(Continued)

CHART 10:**Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Voltage Monitor**

Related DTCs: P0130, P0150, P2195, P2196, P2197 and P2198

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.55 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Response Monitor

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$31	Time to change from Lean (≤ 0.4 V) to Rich (≥ 0.55 V)	N/A	Second	Between 0 and 1.1 seconds
Time \$32	Time to change from Rich (≥ 0.55 V) to Lean (≤ 0.4 V)	N/A	Second	Between 0 and 1.1 seconds

If the time required to change is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.5 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.6 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

O2S
Failure
Threshold
Charts
(Continued)

CHART 11:**Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Voltage Monitor**

Related DTCs: P0130, P0150, P2195, P2196, P2197 and P2198

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.42 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.48 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Response Monitor

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$31	Time to change from Lean (≤ 0.42 V) to Rich (≥ 0.48 V)	N/A	Second	Between 0 and 0.4 seconds
Time \$32	Time to change from Rich (≥ 0.48 V) to Lean (≤ 0.42 V)	N/A	Second	Between 0 and 0.4 seconds

If the time required to change is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.45 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.55 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

O2S
Failure
Threshold
Charts
(Continued)

CHART 12:**Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor**

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.45 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.6 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Element Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$81	Percentage of monitoring time where Oxygen Sensor voltage is less than 0.05 V	Multiply 0.3906	%	Between 0 and 60%
Time \$84	Percentage of monitoring time where Oxygen Sensor voltage is 0.70 V or more	Multiply 0.3906	%	Between 20 and 100%
Time \$85	Maximum Rich (≤ 0.45 V) time	Multiply 0.2621	Second	Between 20 and 66.8 seconds

If all the values (Time \$81, Time \$84 and Time \$85) are out of the standard values, the ECM interprets this as a malfunction.

O2S
Failure
Threshold
Charts
(Continued)

CHART 13:**Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Voltage Monitor**

Related DTCs: P0130, P0150, P2195, P2196, P2197 and P2198

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.55 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Response Monitor

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$31	Time to change from Lean (≤ 0.4 V) to Rich (≥ 0.55 V)	N/A	Second	Between 0 and 1 seconds
Time \$32	Time to change from Rich (≥ 0.55 V) to Lean (≤ 0.4 V)	N/A	Second	Between 0 and 1 seconds

If the time required to change is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.5 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Element Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$81	Percentage of monitoring time where Oxygen Sensor voltage is less than 0.5 V	Multiply 0.3906	%	Between 0 and 60%
Time \$84	Percentage of monitoring time where Oxygen Sensor voltage is 0.70 V or more	Multiply 0.3906	%	Between 20 and 100%
Time \$85	Maximum Rich (≥ 0.45 V) time	Multiply 0.2621	Second	Between 20 and 66.8 seconds

If all the values (Time \$81, Time \$84 and Time \$85) are out of the standard values, the ECM interprets this as a malfunction.

O2S
Failure
Threshold
Charts
(Continued)

CHART 14:**Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Voltage Monitor**

Related DTCs: P0130, P0150, P2195, P2196, P2197 and P2198

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.55 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Response Monitor

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$31	Time to change from Lean (≤ 0.4 V) to Rich (≥ 0.55 V)	N/A	Second	Between 0 and 0.9 seconds
Time \$32	Time to change from Rich (≥ 0.55 V) to Lean (≤ 0.4 V)	N/A	Second	Between 0 and 0.9 seconds

If the time required to change is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.5 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Element Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$81	Percentage of monitoring time where Oxygen Sensor voltage is less than 0.5 V	Multiply 0.3906	%	Between 0 and 90%
Time \$84	Percentage of monitoring time where Oxygen Sensor voltage is 0.70 V or more	Multiply 0.3906	%	Between 20 and 100%
Time \$85	Maximum Rich (≥ 0.45 V) time	Multiply 0.2621	Second	Between 20 and 66.8 seconds

If all the values (Time \$81, Time \$84 and Time \$85) are out of the standard values, the ECM interprets this as a malfunction.

O2S
Failure
Threshold
Charts
(Continued)

CHART 15:**Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Voltage Monitor**

Related DTCs: P0130, P0150, P2195, P2196, P2197 and P2198

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.42 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.48 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Response Monitor

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$31	Time to change from Lean (≤ 0.42 V) to Rich (≥ 0.48 V)	N/A	Second	Between 0 and 0.4 seconds
Time \$32	Time to change from Rich (≥ 0.48 V) to Lean (≤ 0.42 V)	N/A	Second	Between 0 and 0.4 seconds

If the time required to change is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.45 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.55 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Element Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$81	Percentage of monitoring time where Oxygen Sensor voltage is less than 0.5 V	Multiply 0.3906	%	Between 0 and 80%
Time \$84	Percentage of monitoring time where Oxygen Sensor voltage is 0.70 V or more	Multiply 0.3906	%	Between 20 and 100%
Time \$85	Maximum Rich (≥ 0.45 V) time	Multiply 0.2621	Second	Between 10 and 66.8 seconds

If all the values (Time \$81, Time \$84 and Time \$85) are out of the standard values, the ECM interprets this as a malfunction.

O2S
Failure
Threshold
Charts
(Continued)

CHART 16:**Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Voltage Monitor**

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.6 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Element Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$81	Percentage of monitoring time where Oxygen Sensor voltage is less than 0.5 V	Multiply 0.3906	%	Between 0 and 60%
Time \$84	Percentage of monitoring time where Oxygen Sensor voltage is 0.70 V or more	Multiply 0.3906	%	Between 20 and 100%
Time \$85	Maximum Rich (≥ 0.45 V) time	Multiply 0.2621	Second	Between 20 and 66.8 seconds

If all the values (Time \$81, Time \$84 and Time \$85) are out of the standard values, the ECM interprets this as a malfunction.

O2S
Failure
Threshold
Charts
(Continued)

CHART 17:**Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor**

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.45 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.6 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Element Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$81	Percentage of monitoring time where Oxygen Sensor voltage is less than 0.05 V	Multiply 0.3906	%	Between 0 and 55%
Time \$84	Percentage of monitoring time where Oxygen Sensor voltage is 0.70 V or more	Multiply 0.3906	%	Between 20 and 100%
Time \$85	Maximum Rich (≥ 0.45 V) time	Multiply 0.2621	Second	Between 20 and 66.8 seconds

If all the values (Time \$81, Time \$84 and Time \$85) are out of the standard values, the ECM interprets this as a malfunction.

O2S
Failure
Threshold
Charts
(Continued)

CHART 18:**Rear O2S (Bank 1 Sensor 2) Voltage Monitor**

Related DTCs: P0136

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.2 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.6 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 3) Deterioration Monitor

Related DTCs: P0142

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$86	Average of the second impedance ratio between high-frequency and low-frequency	Multiply 0.0312	%	Between 0.7 and 1.35

If the average of the sensor impedance ratio is out of the standard value, the ECM interprets this as a malfunction.

**O2S
Failure
Threshold
Charts**
(Continued)

CHART 19:**Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor**

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.5 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.6 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Element Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$81	Percentage of monitoring time where Oxygen Sensor voltage is less than 0.05 V	Multiply 0.3906	%	Between 0 and 95%
Time \$84	Percentage of monitoring time where Oxygen Sensor voltage is 0.70 V or more	Multiply 0.3906	%	Between 20 and 100%
Time \$85	Maximum Rich (≥ 0.45 V) time	Multiply 0.2621	Second	Between 20 and 66.8 seconds

If all the values (Time \$81, Time \$84 and Time \$85) are out of the standard values, the ECM interprets this as a malfunction.

O2S
Failure
Threshold
Charts
(Continued)

CHART 20:**Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor**

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.5 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.6 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Element Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$81	Percentage of monitoring time where Oxygen Sensor voltage is less than 0.05 V	Multiply 0.3906	%	Between 0 and 80%
Time \$84	Percentage of monitoring time where Oxygen Sensor voltage is 0.70 V or more	Multiply 0.3906	%	Between 20 and 100%
Time \$85	Maximum Rich (≥ 0.45 V) time	Multiply 0.2621	Second	Between 20 and 66.8 seconds

If all the values (Time \$81, Time \$84 and Time \$85) are out of the standard values, the ECM interprets this as a malfunction.

O2S
Failure
Threshold
Charts
(Continued)

CHART 21:**Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Voltage Monitor**

Related DTCs: P0130, P0150, P2195, P2196, P2197 and P2198

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.55 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Response Monitor

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$31	Time to change from Lean (≤ 0.4 V) to Rich (≥ 0.55 V)	N/A	Second	Between 0 and 0.8 seconds
Time \$32	Time to change from Rich (≥ 0.55 V) to Lean (≤ 0.4 V)	N/A	Second	Between 0 and 0.8 seconds

If the time required to change is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Frequency Monitor During Engine Idling

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$33	Average Lean (≤ 0.4 V) time of one waveform cycle	N/A	Second	Between 0 and 3.05 seconds
Time \$34	Average Rich (≥ 0.55 V) time of one waveform cycle	N/A	Second	Between 0 and 3.05 seconds

If the sum of Time \$33 and Time \$34 is out of the standard value, the ECM interprets this as a malfunction.

O2S
Failure
Threshold
Charts
(Continued)

CHART 21 (Continued):**Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Frequency Monitor During Vehicle Running**

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$35	Average Lean (≤ 0.4 V) time of one waveform cycle	N/A	Second	Between 0 and 0.95 seconds (varies depending on feedback compensation factor)
Time \$36	Average Rich (≤ 0.55 V) time of one waveform cycle	N/A	Second	Between 0 and 0.95 seconds (varies depending on feedback compensation factor)

If the sum of Time \$35 and Time \$36 is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.5 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Element Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$81	Percentage of monitoring time where Oxygen Sensor voltage is less than 0.05 V	Multiply 0.3906	%	Between 0 and 60%
Time \$84	Percentage of monitoring time where Oxygen Sensor voltage is 0.70 V or more	Multiply 0.3906	%	Between 20 and 100%
Time \$85	Maximum Rich (≥ 0.45 V) time	Multiply 0.2621	Second	Between 20 and 66.8 seconds

If all the values (Time \$81, Time \$84 and Time \$85) are out of the standard values, the ECM interprets this as a malfunction.

O2S
Failure
Threshold
Charts
(Continued)

CHART 22:**Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Voltage Monitor**

Related DTCs: P0130, P0150, P2195, P2196, P2197 and P2198

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.55 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Response Monitor

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$31	Time to change from Lean (≤ 0.4 V) to Rich (≥ 0.55 V)	N/A	Second	Between 0 and 0.9 seconds
Time \$32	Time to change from Rich (≥ 0.55 V) to Lean (≤ 0.4 V)	N/A	Second	Between 0 and 0.9 seconds

If the time required to change is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.5 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Element Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$81	Percentage of monitoring time where Oxygen Sensor voltage is less than 0.5 V	Multiply 0.3906	%	Between 0 and 60%
Time \$84	Percentage of monitoring time where Oxygen Sensor voltage is 0.70 V or more	Multiply 0.3906	%	Between 20 and 100%
Time \$85	Maximum Rich (≥ 0.45 V) time	Multiply 0.2621	Second	Between 20 and 66.8 seconds

If all the values (Time \$81, Time \$84 and Time \$85) are out of the standard values, the ECM interprets this as a malfunction.

O2S
Failure
Threshold
Charts
(Continued)

CHART 23:**Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Voltage Monitor**

Related DTCs: P0130, P0150, P2195, P2196, P2197 and P2198

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.55 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Response Monitor

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$31	Time to change from Lean (≤ 0.4 V) to Rich (≥ 0.55 V)	N/A	Second	Between 0 and 0.9 seconds
Time \$32	Time to change from Rich (≥ 0.55 V) to Lean (≤ 0.4 V)	N/A	Second	Between 0 and 0.9 seconds

If the time required to change is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Frequency Monitor During Engine Idling

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$33	Average Lean (≤ 0.4 V) time of one waveform cycle	N/A	Second	Between 0 and 4.5 seconds
Time \$34	Average Rich (≤ 0.55 V) time of one waveform cycle	N/A	Second	Between 0 and 4.5 seconds

If the sum of Time \$33 and Time \$34 is out of the standard value, the ECM interprets this as a malfunction.

O2S
Failure
Threshold
Charts
(Continued)

CHART 23 (Continued):**Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Frequency Monitor During Vehicle Running**

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$35	Average Lean (≤ 0.4 V) time of one waveform cycle	N/A	Second	Between 0 and 0.9 seconds (varies depending on feedback compensation factor)
Time \$36	Average Rich (≤ 0.55 V) time of one waveform cycle	N/A	Second	Between 0 and 0.9 seconds (varies depending on feedback compensation factor)

If the sum of Time \$35 and Time \$36 is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.5 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Element Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$81	Percentage of monitoring time where Oxygen Sensor voltage is less than 0.05 V	Multiply 0.3906	%	Between 0 and 60%
Time \$84	Percentage of monitoring time where Oxygen Sensor voltage is 0.70 V or more	Multiply 0.3906	%	Between 20 and 100%
Time \$85	Maximum Rich (≥ 0.45 V) time	Multiply 0.2621	Second	Between 20 and 66.8 seconds

If all the values (Time \$81, Time \$84 and Time \$85) are out of the standard values, the ECM interprets this as a malfunction.

O2S
Failure
Threshold
Charts
(Continued)

CHART 24:**Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Voltage Monitor**

Related DTCs: P0130, P0150, P2195, P2196, P2197 and P2198

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.55 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Response Monitor

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$31	Time to change from Lean (≤ 0.4 V) to Rich (≥ 0.55 V)	N/A	Second	Between 0 and 0.9 seconds
Time \$32	Time to change from Rich (≥ 0.55 V) to Lean (≤ 0.4 V)	N/A	Second	Between 0 and 0.9 seconds

If the time required to change is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Frequency Monitor During Engine Idling

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$33	Average Lean (≤ 0.4 V) time of one waveform cycle	N/A	Second	Between 0 and 2.8 seconds
Time \$34	Average Rich (≥ 0.55 V) time of one waveform cycle	N/A	Second	Between 0 and 2.8 seconds

If the sum of Time \$33 and Time \$34 is out of the standard value, the ECM interprets this as a malfunction.

O2S
Failure
Threshold
Charts
(Continued)

CHART 24 (Continued):**Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Frequency Monitor During Vehicle Running**

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$35	Average Lean (≤ 0.4 V) time of one waveform cycle	N/A	Second	Between 0 and 0.75 seconds (varies depending on feedback compensation factor)
Time \$36	Average Rich (≤ 0.55 V) time of one waveform cycle	N/A	Second	Between 0 and 0.75 seconds (varies depending on feedback compensation factor)

If the sum of Time \$35 and Time \$36 is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.5 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Element Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$81	Percentage of monitoring time where Oxygen Sensor voltage is less than 0.05 V	Multiply 0.3906	%	Between 0 and 90%
Time \$84	Percentage of monitoring time where Oxygen Sensor voltage is 0.70 V or more	Multiply 0.3906	%	Between 20 and 100%
Time \$85	Maximum Rich (≥ 0.45 V) time	Multiply 0.2621	Second	Between 20 and 66.8 seconds

If all the values (Time \$81, Time \$84 and Time \$85) are out of the standard values, the ECM interprets this as a malfunction.

O2S
Failure
Threshold
Charts
(Continued)

CHART 25:**Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor**

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.45 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.6 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Element Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$81	Percentage of monitoring time where Oxygen Sensor voltage is less than 0.05 V	Multiply 0.3906	%	Between 0 and 80%
Time \$84	Percentage of monitoring time where Oxygen Sensor voltage is 0.70 V or more	Multiply 0.3906	%	Between 20 and 100%
Time \$85	Maximum Rich (≥ 0.45 V) time	Multiply 0.2621	Second	Between 20 and 66.8 seconds

If all the values (Time \$81, Time \$84 and Time \$85) are out of the standard values, the ECM interprets this as a malfunction.

O2S
Failure
Threshold
Charts
(Continued)

CHART 26:**Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Voltage Monitor**

Related DTCs: P0130, P0150, P2195, P2196, P2197 and P2198

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.55 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Response Monitor

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$31	Time to change from Lean (≤ 0.4 V) to Rich (≥ 0.55 V)	N/A	Second	Between 0 and 0.9 seconds
Time \$32	Time to change from Rich (≥ 0.55 V) to Lean (≤ 0.4 V)	N/A	Second	Between 0 and 0.9 seconds

If the time required to change is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Frequency Monitor During Engine Idling

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$33	Average Lean (≤ 0.4 V) time of one waveform cycle	N/A	Second	Between 0 and 2.8 seconds
Time \$34	Average Rich (≥ 0.55 V) time of one waveform cycle	N/A	Second	Between 0 and 2.8 seconds

If the sum of Time \$33 and Time \$34 is out of the standard value, the ECM interprets this as a malfunction.

O2S
Failure
Threshold
Charts
(Continued)

CHART 26 (Continued):**Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Frequency Monitor During Vehicle Running**

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$35	Average Lean (≤ 0.4 V) time of one waveform cycle	N/A	Second	Between 0 and 0.75 seconds (varies depending on feedback compensation factor)
Time \$36	Average Rich (≤ 0.55 V) time of one waveform cycle	N/A	Second	Between 0 and 0.75 seconds (varies depending on feedback compensation factor)

If the sum of Time \$35 and Time \$36 is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.5 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Element Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$81	Percentage of monitoring time where Oxygen Sensor voltage is less than 0.05 V	Multiply 0.3906	%	Between 0 and 60%
Time \$84	Percentage of monitoring time where Oxygen Sensor voltage is 0.70 V or more	Multiply 0.3906	%	Between 20 and 100%
Time \$85	Maximum Rich (≥ 0.45 V) time	Multiply 0.2621	Second	Between 20 and 66.8 seconds

If all the values (Time \$81, Time \$84 and Time \$85) are out of the standard values, the ECM interprets this as a malfunction.

O2S
Failure
Threshold
Charts
(Continued)

CHART 27:**Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Voltage Monitor**

Related DTCs: P0130, P0150, P2195, P2196, P2197 and P2198

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.35 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.45 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Response Monitor

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$31	Time to change from Lean (≤ 0.35 V) to Rich (≥ 0.45 V)	N/A	Second	Between 0 and 0.6 seconds
Time \$32	Time to change from Rich (≥ 0.45 V) to Lean (≤ 0.35 V)	N/A	Second	Between 0 and 0.6 seconds

If the time required to change is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Frequency Monitor During Engine Idling

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$33	Average Lean (≤ 0.35 V) time of one waveform cycle	N/A	Second	Between 0 and 3 seconds
Time \$34	Average Rich (≥ 0.45 V) time of one waveform cycle	N/A	Second	Between 0 and 3 seconds

If the sum of Time \$33 and Time \$34 is out of the standard value, the ECM interprets this as a malfunction.

O2S
Failure
Threshold
Charts
(Continued)

CHART 27 (Continued):**Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Frequency Monitor During Vehicle Running**

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$35	Average Lean (≤ 0.35 V) time of one waveform cycle	N/A	Second	Between 0 and 0.55 seconds (varies depending on feedback compensation factor)
Time \$36	Average Rich (≤ 0.45 V) time of one waveform cycle	N/A	Second	Between 0 and 0.55 seconds (varies depending on feedback compensation factor)

If the sum of Time \$35 and Time \$36 is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.5 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Element Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$81	Percentage of monitoring time where Oxygen Sensor voltage is less than 0.05 V	Multiply 0.3906	%	Between 0 and 60%
Time \$84	Percentage of monitoring time where Oxygen Sensor voltage is 0.70 V or more	Multiply 0.3906	%	Between 20 and 100%
Time \$85	Maximum Rich (≥ 0.45 V) time	Multiply 0.2621	Second	Between 20 and 66.8 seconds

If all the values (Time \$81, Time \$84 and Time \$85) are out of the standard values, the ECM interprets this as a malfunction.

O2S
Failure
Threshold
Charts
(Continued)

CHART 28:**Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Voltage Monitor**

Related DTCs: P0130, P0150, P2195, P2196, P2197 and P2198

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.35 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.45 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Response Monitor

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$31	Time to change from Lean (≤ 0.35 V) to Rich (≥ 0.45 V)	N/A	Second	Between 0 and 0.6 seconds
Time \$32	Time to change from Rich (≥ 0.45 V) to Lean (≤ 0.35 V)	N/A	Second	Between 0 and 0.6 seconds

If the time required to change is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Frequency Monitor During Engine Idling

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$33	Average Lean (≤ 0.35 V) time of one waveform cycle	N/A	Second	Between 0 and 2 seconds
Time \$34	Average Rich (≥ 0.45 V) time of one waveform cycle	N/A	Second	Between 0 and 2 seconds

If the sum of Time \$33 and Time \$34 is out of the standard value, the ECM interprets this as a malfunction.

O2S
Failure
Threshold
Charts
(Continued)

CHART 28 (Continued):**Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Frequency Monitor During Vehicle Running**

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$35	Average Lean (≤ 0.35 V) time of one waveform cycle	N/A	Second	Between 0 and 0.5 seconds (varies depending on feedback compensation factor)
Time \$36	Average Rich (≤ 0.45 V) time of one waveform cycle	N/A	Second	Between 0 and 0.5 seconds (varies depending on feedback compensation factor)

If the sum of Time \$35 and Time \$36 is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.5 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Element Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$81	Percentage of monitoring time where Oxygen Sensor voltage is less than 0.05 V	Multiply 0.3906	%	Between 0 and 60%
Time \$84	Percentage of monitoring time where Oxygen Sensor voltage is 0.70 V or more	Multiply 0.3906	%	Between 20 and 100%
Time \$85	Maximum Rich (≥ 0.45 V) time	Multiply 0.2621	Second	Between 20 and 66.8 seconds

If all the values (Time \$81, Time \$84 and Time \$85) are out of the standard values, the ECM interprets this as a malfunction.

O2S
Failure
Threshold
Charts
(Continued)

CHART 29:**Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Frequency Monitor During Engine Idling**

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$33	Average Lean (≤ 0.4 V) time of one waveform cycle	N/A	Second	Between 0 and 4 seconds
Time \$34	Average Rich (≥ 0.55 V) time of one waveform cycle	N/A	Second	Between 0 and 4 seconds

If the sum of Time \$33 and Time \$34 is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Frequency Monitor During Vehicle Running

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$35	Average Lean (≤ 0.4 V) time of one waveform cycle	N/A	Second	Between 0 and 1.08 seconds (varies depending on feedback compensation factor)
Time \$36	Average Rich (≥ 0.55 V) time of one waveform cycle	N/A	Second	Between 0 and 1.08 seconds (varies depending on feedback compensation factor)

If the sum of Time \$35 and Time \$36 is out of the standard value, the ECM interprets this as a malfunction.

O2S
Failure
Threshold
Charts
(Continued)

CHART 29 (Continued):**Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor**

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.5 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Element Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$81	Percentage of monitoring time where Oxygen Sensor voltage is less than 0.05 V	Multiply 0.3906	%	Between 0 and 60%
Time \$84	Percentage of monitoring time where Oxygen Sensor voltage is 0.70 V or more	Multiply 0.3906	%	Between 20 and 100%
Time \$85	Maximum Rich (≥ 0.45 V) time	Multiply 0.2621	Second	Between 20 and 66.8 seconds

If all the values (Time \$81, Time \$84 and Time \$85) are out of the standard values, the ECM interprets this as a malfunction.

O2S
Failure
Threshold
Charts
(Continued)

CHART 30:**Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor**

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.45 V
Time \$08	The maximum voltage during O2S monitoring	N/A	V	Between 0.5 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Element Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time \$81	Percentage of monitoring time where Oxygen Sensor voltage is less than 0.05 V	Multiply 0.3906	%	Between 0 and 80%
Time \$84	Percentage of monitoring time where Oxygen Sensor voltage is 0.70 V or more	Multiply 0.3906	%	Between 20 and 100%
Time \$85	Maximum Rich (≥ 0.45 V) time	Multiply 0.2621	Second	Between 20 and 66.8 seconds

If all the values (Time \$81, Time \$84 and Time \$85) are out of the standard values, the ECM interprets this as a malfunction.