

2002 ENGINE PERFORMANCE

Sensor Operating Range Charts

INTRODUCTION

Sensor operating range information can help determine if a sensor is out of calibration. An out-of-calibration sensor may not set a trouble code, but it may cause driveability problems.

NOTE: Unless stated otherwise in test procedure, perform all voltage tests using a Digital Volt-Ohmmeter (DVOM) with a minimum 10-megohm input impedance.

NOTE: Crankshaft Position (CKP) sensor and Camshaft Position (CMP) sensor resistance information is not available from manufacturer.

NOTE: For circuit identification, see WIRING DIAGRAMS article. For connector views, see TERMINAL IDENTIFICATION in appropriate SELF-DIAGNOSTICS article, unless otherwise noted.

NOTE: Resistance values will vary depending on temperature. In some instances, temperature value is not given by manufacturer.

ENGINE COOLANT TEMPERATURE SENSOR RESISTANCE

Sensor Temperature - °F (°C)	⁽¹⁾ Resistance - K/Ohms
Optima	
68 (20)	2.31-2.59
176 (80)	0.30-0.33
Rio	
-6 (-20)	13.3-16.8
68 (20)	0.65-4.24
176 (80)	0.30-0.33
Sedona	
32 (0)	5.9
68 (20)	2.31-2.59
104 (40)	1.1
176 (80)	0.30-0.33
Spectra & Sportage	
-6 (-20)	14.6-17.8
68 (20)	2.30-2.70
176 (80)	0.30-0.33
Measure resistance between sensor terminals.	

(1)

INTAKE AIR TEMPERATURE SENSOR RESISTANCE

Sensor Temperature - °F (°C)	(1) Resistance - K/Ohms
Optima	
68 (20)	2.20-2.82
176 (80)	0.30-0.36
Rio	
-6 (-20)	13.3-16.9
68 (20)	0.65-4.25
176 (80)	0.27-0.43
Sedona	
-104 (-40)	34.0-61.0
68 (20)	2.22-2.82
176 (80)	0.30-0.38
Spectra & Sportage	
-6 (-20)	14.6-17.8
68 (20)	2.20-2.70
176 (80)	0.30-0.33
(1) Measure resistance between sensor terminals.	

MASS AIRFLOW SENSOR VOLTAGE

Condition	(1) Volts
Optima (2.4L)	
At Idle	1.2-1.6
Revving Up Engine	1.6-2.2
Optima (2.7L)	
At Idle	0.6-1.0
Revving Up Engine	1.0-1.6
Rio	
At Idle	0.6-0.8
Revving Up Engine	3.0-4.0
Sedona	
At Idle	0.6-0.8
Revving Up Engine	1.0
Spectra & Sportage	
At Idle	0.8-1.2
Revving Up Engine	3.5-4.0

(1) At normal operating temperature.

OXYGEN SENSOR HEATER RESISTANCE

Application	Between Terminals No.	(1) Ohms
Optima	3 & 4	3-6
Rio	1 & 3	3-7
Sedona	3 & 4	3-6
Spectra	1 & 3	2-4
Sportage	1 & 3	6

(1) Measured at 68°F (20°C).

OXYGEN SENSOR VOLTAGE (OPTIMA 2.4L)

Condition	(1) Volts
Key On, Engine Off	Less Than .5
Idle	
Front HO2S	0-1
Rear HO2S	.6-.8

(1) Measure voltage between ground and front HO2S connector terminal No. 2 (Tan wire) or rear HO2S connector terminal No. 2 (Tan wire), with engine at normal operating temperature.

OXYGEN SENSOR VOLTAGE (OPTIMA 2.7L)

Condition	(1) Volts
Key On, Engine Off	Less Than .5
Idle	
Front HO2S	0-1
Rear HO2S	.6-.9

(1) Measure voltage between ground and right front HO2S connector terminal No. 2 (Violet wire), left front HO2S connector terminal No. 2 (Yellow wire), right rear HO2S connector terminal No. 2 (Violet wire) and left rear HO2S connector terminal No. 2 (Violet/White wire), with engine at normal operating temperature.

OXYGEN SENSOR VOLTAGE (RIO)

Condition	(1) Volts
Key On, Engine Off	Less Than .5
Idle	
Front HO2S	0-1
Rear HO2S	.6-.9

(1) Measure voltage between ground and front HO2S connector terminal No. 3 (Yellow/Blue wire) or rear HO2S connector terminal No. 3 (Light Green/Yellow wire), with engine at normal operating temperature.

OXYGEN SENSOR VOLTAGE (SEDONA)

Condition	(1) Volts
Key On, Engine Off	Less Than .5
Idle	
Front HO2S	0-1
Rear HO2S	.6-.9
(1) Measure voltage between ground and right front HO2S connector terminal No. 2 (Yellow/Green wire), left front HO2S connector terminal No. 2 (Blue wire), right rear HO2S connector terminal No. 2 (White/Yellow wire) and left rear HO2S connector terminal No. 2 (Red wire), with engine at normal operating temperature.	

OXYGEN SENSOR VOLTAGE (SPECTRA)

Condition	(1) Volts
Key On, Engine Off	Less Than .5
Idle	
Front HO2S	0-1
Rear HO2S	.6-.8
(1) Measure voltage between ground and front HO2S connector terminal No. 4 (Green/Brown wire) or rear HO2S connector terminal No.4 (Green/White wire), with engine at normal operating temperature.	

OXYGEN SENSOR VOLTAGE (SPORTAGE)

Condition	(1) Volts
Key On, Engine Off	Less Than .5
Idle	
Front HO2S	.1-.9
Rear HO2S	.6-.7
(1) Measure voltage between ground and front HO2S connector terminal No. 4 (Yellow/White wire) or rear HO2S connector terminal No. 4 (Blue wire) with engine at normal operating temperature.	

THROTTLE POSITION SENSOR RESISTANCE SPECIFICATIONS

Application	Check between Terminals No.	Resistance - k/ohms Throttle Closed
Optima		
2.4L	2 & 3	3.5-6.5
2.7L	2 & 3	1.6-2.4

Rio	1 & 2	1.6-2.4
Sedona	1 & 4	3.5-6.5
Spectra	1 & 2	1.6-2.4
Sportage	1 & 2	1.0

THROTTLE POSITION SENSOR VOLTAGE SPECIFICATIONS

Condition	Check Between Terminals No.	Volts
Optima		
2.4L		
Throttle Fully Closed	1 & 3	0.3-0.9
Throttle Fully Open	1 & 3	4.0-4.6
2.7L		
Throttle Fully Closed	1 & 2	0.2-0.8
Throttle Fully Open	1 & 2	4.0-4.4
Rio		
Throttle Fully Closed	1 & 3	0.2-0.8
Throttle Fully Open	1 & 3	4.0-4.8
Sedona		
Throttle Fully Closed	1 & 4	0.3-0.9
Throttle Fully Open	1 & 4	4.0-4.6
Spectra		
Throttle Fully Closed	1 & 3	0.3-0.9
Throttle Fully Open	1 & 3	4.0-4.4
Sportage		
Throttle Fully Closed	1 & 3	0.5
Throttle Fully Open	1 & 3	4.1