

K - SENSOR RANGE CHARTS

Article Text

1989 Volkswagen Golf

For Volkswagen Technical Site

Copyright © 1998 Mitchell Repair Information Company, LLC

Monday, August 23, 1999 11:56PM

ARTICLE BEGINNING

1989 ENGINE PERFORMANCE

Volkswagen Sensor Operating Range Charts

Fox, Golf, Jetta, Vanagon

INTRODUCTION

Sensor operating range information is supplied so that it can be determined if a sensor is out of calibration. A sensor that is out of calibration may not set a trouble code; however, it will cause driveability problems.

NOTE: All voltage tests should be performed with a Digital Volt Ohmmeter (DVOM) with a minimum 10-megohm input impedance, unless specifically stated different in testing procedures.

VOLTAGE CHECKS ¹

Voltmeter Between Terminals	Test Conditions	Specifications
No. 1 & 2 No. 2 & 24	Ignition on Operate Starter	Battery voltage. Minimum 8 Volts

¹ - TESTING CONDITIONS: Disconnect CIS-E ECU connector with ignition off. Remove and ground high tension lead (from coil) at distributor cap. Set multimeter to 20-volt DC scale.

RESISTANCE CHECKS ¹

Ohmmeter Between Terminals	Components Checked	Specifications
No. 2 & No. 15 No. 9 & No. 15 No. 7 & No. 8 No. 2 & No. 8	Ground Connection Ground Connection O ₂ Sensor Shield O ₂ Sensor & Wiring	Reading of zero ohms Reading of zero ohms Reading of infinity (∞) ohms Reading of zero ohms with Green O ₂ lead disconnected and grounded. If not, Green wire has open.
No. 2 & No. 8	O ₂ Sensor & Wiring	Reading of infinity (∞) ohms with Green O ₂ lead connected to harness. If not, O ₂ is defective. Replace O ₂ sensor.
No. 10 & No. 12	Differential Pressure Reg. & Wiring	Reading of 17.5-21.5 ohms. If not, check for open wires. If wires are good, replace differential pressure regulator.
No. 14 & No. 17	Potentiometer & Wiring	Reading of less than 1000 ohms with airflow sensor plate in rest position. If not, check for open wires. If wires are good, adjust or replace potentiometer.
No. 17 & No. 18	Potentiometer & Wiring	Reading of more than 4000 ohms. If not, check for open wires. If wires are good, adjust or replace potentiometer.
No. 2 & No. 21	Temperature Sensor & Wiring	Reading of 2.5 k/ohms at 68°F (20°C). Lower ohm reading below 68°F or higher above 68°F. If readings are incorrect, check wire No. 21. If wiring is good, replace temperature sensor.

¹ - TESTING CONDITIONS: Always disconnect ECU with ignition off. Disconnect main ECU connector behind glove box. Wiring connectors on temperature sensor, potentiometer, and differential pressure regulator must be connected. Set multimeter to 20 k/ohm scale. Prevent ohmmeter damage by checking ONLY terminals listed.

Fig. 1: Fox ECU Voltage & Resistance Checks
Courtesy of Volkswagen United States, Inc.

K - SENSOR RANGE CHARTS

Article Text (p. 2)

1989 Volkswagen Golf

For Volkswagen Technical Site

Copyright © 1998 Mitchell Repair Information Company, LLC

Monday, August 23, 1999 11:56PM

VOLTAGE CHECKS ¹

Terminal control unit connector	To be tested	Additional test conditions	Specified values	Causes
1+2	Voltage supply and ground connection for control unit 1 (+) from ignition starter switch 2 (-) from intake manifold (ground)	• ignition switched ON	approx. battery voltage	NO voltage present • fuse 18 defective • ground cable connection to intake manifold open
	Voltage supply (starter actuated)	• actuate starter	minimum 8 V	NO voltage present • wires for terminal 15 x-contact on relay panel interchanged — check current schematic
2+24	Wire from starter to control unit	• actuate starter	minimum 8 V	NO voltage display • line 24 open • starter (solenoid switch) defective

RESISTANCE CHECKS ¹

Terminal control unit connector	To be tested	Additional test conditions	Specified values	Causes
Measuring range: switch ON resistance measuring 20 kΩ				
2+15	Ground cable bridge	—	0 Ω	—
2+9	with manual transmission only	—	0 Ω	—
2+22	with automatic transmission only	—	0 Ω	—
7+2	Shield, oxygen sensor wires	—	0 Ω	—

¹ - Always disconnect ECU connector with ignition off.

Fig. 2: Golf & Jetta ECU Voltage & Resistance Checks (1 of 2)

Courtesy of Volkswagen United States, Inc.

K - SENSOR RANGE CHARTS

Article Text (p. 3)

1989 Volkswagen Golf

For Volkswagen Technical Site

Copyright © 1998 Mitchell Repair Information Company, LLC

Monday, August 23, 1999 11:56PM

RESISTANCE CHECKS (Cont.) ¹

Terminal control unit connector	To be tested	Additional test conditions	Specified values	Causes
Measuring range: switch ON resistance measuring 20 kΩ				
2 + 8	Oxygen sensor and wires	• green wire terminal disconnected from black oxygen sensor wire and connected to ground cable	0 Ω	No continuity • green oxygen sensor wire open
		• oxygen sensor wire connected	∞ Ω	Continuity • oxygen sensor defective
10 + 12	Differential pressure regulator and lines	—	17-22 Ω	Resistance outside of specified value • wire 10/12 broken • differential pressure regulator defective
17 + 18	Potentiometer and wires	• air flow sensor plate in rest position	below 1 kΩ	Specified values not attained • wires 14, 17 and 18 open • potentiometer improperly adjusted or defective
14 + 17	connection: potentio- central meter connect. 1 to 18 2 to 17 3 to 14	• lift air flow sensor plate	above 4 kΩ	
2 + 21	Temperature sensor and wires	• temperature of sensor: 0°C (32°F) 20°C (68°F) 80°C (176°F)	6.0 kΩ 2.5 kΩ 300 Ω	Resistance values NOT OK • ground line to intake manifold and line 21 open If OK • temperature sensor defective

¹ — Always disconnect ECU connector with ignition off.

Fig. 3: Golf & Jetta ECU Voltage & Resistance Checks (2 of 2)

Courtesy of Volkswagen United States, Inc.

K - SENSOR RANGE CHARTS

Article Text (p. 4)

1989 Volkswagen Golf

For Volkswagen Technical Site

Copyright © 1998 Mitchell Repair Information Company, LLC

Monday, August 23, 1999 11:56PM

VOLTAGE CHECKS ¹

VOLTMETER TO TERMINAL	COMPONENTS	CHECKS/TEST CONDITIONS	SPECIFICATIONS
1 and 13	Wiring from Starter	• Voltage from Terminal 50 During Cranking (Starting Injection)	Cranking voltage
3 and 13 Bridged	Fuel Pump Relay	• Ignition ON	Fuel pumps run
13 and 14	Power Supply Relay	• Ignition ON	Battery voltage

RESISTANCE CHECKS ¹

OHMMETER TO TERMINAL	COMPONENTS	CHECKS/TEST CONDITIONS	SPECIFICATIONS
2 and 13	Oxygen Sensor	• Connector Disconnected and Grounded • Connector Connected	0 ohms ∞ ohms
6 and 9	Temp. Sensor I (Intake Air Temp.)	• Resistance	Corresponding with graph
6 and 10	Temp. Sensor II (Coolant Temp.)	• Resistance	
6 and 11	Throttle Switch	• Idle Position • Full Throttle Position	0 ohms 0 ohms
6 and 17	Air Flow Sensor	• Total Resistance	500 to 1000 ohms
17 and 21	Air Flow Sensor	• Resistance Through the Potentiometer	Ohms fluctuate as sensor plate is opened
#12 at ECU and #87 at Fuel Pump Relay	Fuel Injectors and Wiring	• Total Resistance	3 to 5 ohms
Check at Components	Individual Fuel Injectors	• Resistance (Each)	14 to 18 ohms
13 and Ground	Control Unit Ground Connection	• Wiring	0 ohms

¹ - Always disconnect ECU connector with ignition off.

Fig. 4: Vanagon ECU Voltage & Resistance Checks
Courtesy of Volkswagen United States, Inc.

END OF ARTICLE