

K - SENSOR RANGE CHARTS

Article Text

1990 Volkswagen Corrado

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Thursday, March 23, 2000 09:46PM

ARTICLE BEGINNING

1990 ENGINE PERFORMANCE

Pin Voltage & Sensor Operating Ranges

Volkswagen; Corrado, Fox, Golf, Jetta, Vanagon

NOTE: Cabriolet pin voltage and sensor operating range charts are not available from manufacturer.

INTRODUCTION

Pin voltage charts are supplied to reduce diagnostic time. Checking pin voltages at the ECU determines whether it's receiving and transmitting proper voltage signals. Charts may also help determine if ECU harness is shorted or opened.

NOTE: Voltage readings may vary slightly due to battery condition or charging rate. All voltage tests should be performed with a Digital Volt-Ohmmeter (DVOM) with a minimum 10-megohm input impedance, unless stated otherwise in testing procedure.

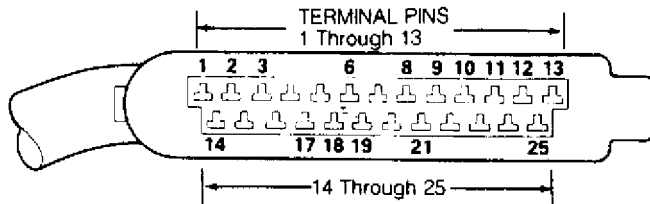


Fig. 1: Typical ECU Terminal Pin Connector
Courtesy of Volkswagen United States, Inc.

NOTE: Cabriolet voltage and resistance checks are not available from manufacturer.

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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. 2: Checking ECU Voltage & Resistance (Fox)

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VOLTAGE CHECKS ¹

VOLTMETER TO TERMINAL	COMPONENTS	CHECKS/TEST CONDITIONS	SPECIFICATIONS
13 and 23	Control unit voltage supply	Ignition switch ON	Approx. battery voltage
13 and 14 14 and 19	Control unit voltage supply	Ignition switch ON	Approx. battery voltage
13 and 25	Wire to terminal No. 1 on coil	Ignition switch On	Approx. battery voltage
Jumper 3 and 14	Wire to fuel pump relay	Ignition switch ON	Fuel pump must run audibly.
13 and 16	Signal from air conditioner	Ignition switch ON A/C okay - Turn A/C on	Approx. battery voltage
1 and 13	Wire from starter terminal No. 50	• Operate starter	Min. 8 volts
		- Ignition off	-

RESISTANCE CHECKS ¹

OHMMETER TO TERMINAL	COMPONENTS	CHECKS/TEST CONDITIONS	SPECIFICATIONS
12 and Red/White wire on O ₂ Sensor	Injectors	Disconnect O ₂ sensor connector & connect DVOM between Red/White O ₂ sensor wire	3.7-5.5 ohms
6 and 10	Coolant temperature sensor		See SYSTEMS & COMPONENT TESTING article
6 and 9	Intake air temperature sender in intake air sensor		See SYSTEMS & COMPONENT TESTING article.
5 and 6	CO Potentiometer		0-2000 ohms
14 and 22	Idle stabilizer valve		2-10 ohms
6 and 11	Idle switch	Throttle valve • Closed	max. 0.5 ohms
		• Fully Open	Infinity
6 and 15	Full throttle switch	Throttle valve • Closed	Infinity
		• Fully Open	max. 0.5 ohms
6 and 8	Wiring to Hall sender	Disconnect Hall sender connector & jumper all 3 connections	max. 0.5 ohms
6 and 18			max. 0.5 ohms
4 and 7	Wiring to knock sensor	Disconnect knock sensor connector & jumper all 3 connections	max. 0.5 ohms
2 and 13	Black wire to O ₂ sensor	Disconnect O ₂ sensor connector & connect Black wire to Ground.	max. 0.5 ohms
		Reconnect O ₂ sensor connector	Infinity

¹ - Always disconnect ECU connector with ignition off.

Fig. 3: Checking ECU Voltage & Resistance (Corrado)

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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. 4: Checking ECU Voltage & Resistance (Golf & Jetta, 1 of 2)

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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.	• 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. 5: Checking ECU Voltage & Resistance (Golf & Jetta, 2 of 2)
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VOLTAGE CHECKS ¹

VOLTMETER TO TERMINAL	COMPONENTS	CHECKS/TEST CONDITIONS	SPECIFICATIONS
13 and 14	Control unit voltage supply	Ignition switch ON	Approx. battery voltage
14 and 19			
13 and 25	Wire to ignition coil terminal No. 1	Ignition switch ON	Approx. battery voltage
1 and 13	Wire from starter terminal No. 50 & from adapter for idle stabilizer control unit terminal No. 50	Disconnect connector from injectors. Operate starter (Trans. in "P" or "N").	Min. 8 volts
Jumper 3 and 13	Wire to fuel pump relay	Ignition switch ON	Fuel pump must run audibly.

RESISTANCE CHECKS ¹

OHMMETER TO TERMINAL	COMPONENTS	CHECKS/TEST CONDITIONS	SPECIFICATIONS
12 and 14	Injectors	Connect only 1 injector at a time	15-20 ohms
6 and 10	Coolant temp. sensor		See SYSTEMS & COMPONENT TESTING article.
6 and 11	Throttle valve switch	Throttle Valve <ul style="list-style-type: none">• Closed	Continuity
		<ul style="list-style-type: none">• Partially Open	No Continuity
		<ul style="list-style-type: none">• Fully Open	Continuity
6 and 17	Intake air sensor potentiometer		0.5-1.0 ohms
17 and 21		Move airflow sensor	Change in resistance
6 and 9	Intake air temperature sender in intake air sensor		See SYSTEMS & COMPONENT TESTING article.
6 and 8	Wiring to Hall sender	Remove connector from Hall sender and jumper all 3 connections.	Continuity
6 and 18			
2 and 13	Wiring to Oxygen sensor	Disconnect connector to oxygen sensor and hold Green wire to ground.	Continuity
		Reconnect oxygen sensor wiring	No Continuity

¹ - Always disconnect ECU connector with ignition off.

Fig. 6: Checking ECU Voltage & Resistance (Vanagon)

Courtesy of Volkswagen United States, Inc.

END OF ARTICLE