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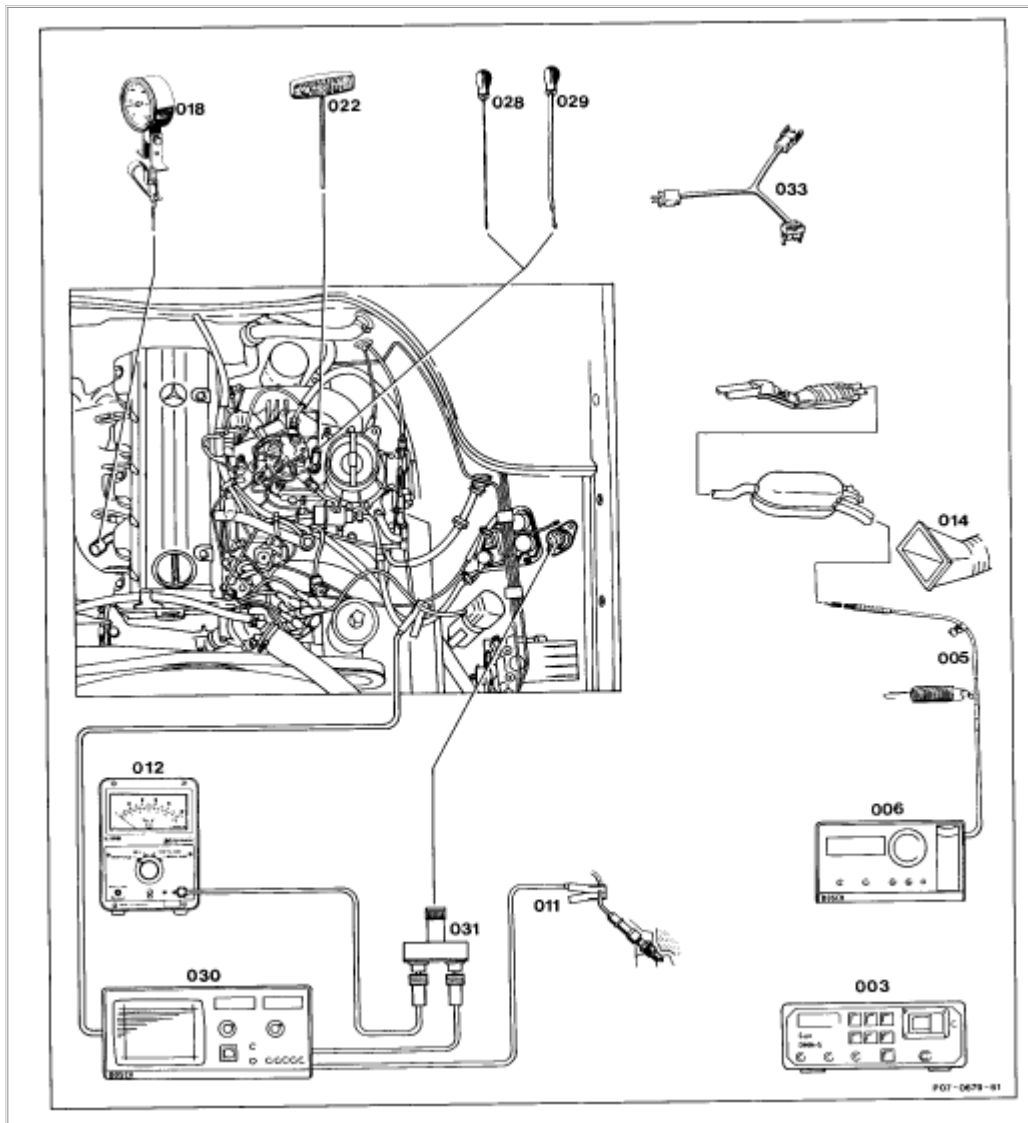
**1984 Mercedes Benz 190E (201 Chassis) L4-2299cc 2.3L SOHC (102)**

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### Engine Testing, Adjustment

[Notes](#)

### Engine testing, adjustment



Test and Adjustment Data

<b>(USA) black information plate</b>					
Engine	Version	Model year	Idle speed	Idle speed	Lambda control
			1/min	Control range	Control range
102.961 (2.3)	<b>(USA)</b>	1983/1984	720 ± 50	25–31%	2.1–4.8 volts <sup>5)</sup>
102.983		1986–1989	900 ± 50	35–45%	50 ± 10%
102.985		1985/1986	720 ± 50	25–31%	2.1–4.8 volts <sup>5)</sup>
102.985		1987/1988 <sup>7)</sup>	750 ± 50	36–50%	50 ± 10%
102.985		1991 <sup>7)</sup>	700–800	580 ± 50 mA <sup>8)</sup>	50 ± 10%

<sup>1)</sup> With self aspiration system.  
<sup>2)</sup> 700–800/min with A/C compressor (electronically controlled).  
<sup>3)</sup> Without idle speed control.  
<sup>4)</sup> Without air injection. Detach shaped hose and plug.  
<sup>5)</sup> Adjust. Detach heated oxygen sensor connector. Take reading of control value (volts). Readout must not fluctuate. Plug together heated oxygen sensor connector – readout fluctuates. Test value must vary not more than ± 0.8 volts from control value.  
<sup>6)</sup> Current measurement at idle speed air valve with multimeter (wait at least 28 seconds after starting, heating speed).  
<sup>7)</sup> California 1988 and **(USA)** 1991 with DTC memory: "CHECK ENGINE" malfunction indicator lamp must not light up. First of all switch over CFI control module (N3) to on/off ratio output.  
<sup>8)</sup> Control measurement at idle speed air valve with multimeter (wait at least 28 seconds after starting, heating speed).

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### Current at Actuator with Ignition Switched On

<b>National version (USA)</b>		
Engine	Version	Current at actuator with ignition switched on mA
102.961	<b>(USA)</b>	75–85 <sup>7)</sup>
102.985	<b>(USA)</b> up to 1986 <b>(USA)</b> as of 1987	75–85 <sup>7)</sup> 20

<sup>1)</sup> 100 mA with CFI control module 004 545 12 32.  
<sup>2)</sup> Manual transmission.  
<sup>3)</sup> As of 01.87 for manual and automatic transmission.  
<sup>4)</sup> Automatic transmission.  
<sup>5)</sup> CFI control module 004 545 93 32 (1986/87).  
<sup>6)</sup> CFI control module 004 545 94 32 (as of 1988).  
<sup>7)</sup> Connector at engine coolant temperature sensor disconnected.

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### Ignition Point (TSZ) US Version

Ignition point (TSZ) US version									
Engine	Type of fuel <sup>2)</sup>	Distributor Bosch No.	Test value and setting <sup>1)</sup> of ignition point in °CKA BTDC ± 1 without/with vacuum		Ignition point adjustment in °CKA before TDC without vacuum			Vacuum advance of ignition point in °CKA BTDC at 4500/min	Installed ignition point value in °CKA BTDC at starting speed without vacuum
			4500/min	Idling	Idling	1500/min	3000/min		
(USA) 102.961 1984	un-leaded	0 237 002 094	-	5 with	-	5-11	19-25 <sup>2)</sup>	24-28 <sup>2)</sup>	5
		0 237 002 098				10-14	22-26 <sup>2)</sup>	14-18 <sup>2)</sup>	5
102.961 102.985 as of 1983									











<sup>1)</sup> If normal-compression engines are operated with fuel of less than 98 RON (min. 88 MON) or low-compression engines with fuel of less than 92 RON (min. 82 MON), the ignition point should be retarded and adapted to the octane number of the fuel used. The rule of thumb for this adjustment is: retard ignition point by 1 - 2° CKA per 1 RON. The ignition point must not be retarded more than 6° CKA.  
 The ignition correction should be entered by hand on the "engine setting data" information plate.  
 This results in reduction in power output and increased fuel consumption. In addition, the engine must not be operated at full load. Full ignition advance should be re-set as soon as fuel of the specified octane number is available.

<sup>2)</sup> Test at 3500/min.  
<sup>3)</sup> Vehicles with catalytic converter must be operated with unleaded fuel.  
<sup>4)</sup> This value must be identical with and without vacuum when engine is at normal operating temperature; test ignition advance in warm-up phase if necessary (15-543).

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### Special Tools

 000 589 14 11 00	 123 589 05 33 00	 123 589 00 15 00	 124 589 07 21 00	 201 589 00 99 00
 103 589 00 91 00	 126 589 11 63 00	 124 589 09 63 00	 102 589 04 63 00	 124 589 19 21 00

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### Commercially Available Testers

Commercially available testers		
CO measuring instrument		
Engine tester (rpm, dwell angle, ignition angle, oscilloscope, voltmeter)	e. g.	Bosch, MOT 002.02 Sun, 1019
Lambda control tester	e. g.	Hermann, L 115
Multimeter	e. g.	Sun, DMM-5
Twin socket	e. g.	Hermann, ECD 53

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Shop Made Tool		
Shop-made tool		
Intake pipe DIN 19534 DN 100 for volume air flow sensor Seal	length approx. 500 mm e. g. from air cleaner	

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**Note:**

Test and adjust lambda control with a lambda control tester.

The lambda control and the [idle speed](#) emissions level must not be tested when the engine is very hot, e.g. immediately after driving sharply or after measuring engine output on the dynamometer.

**Testing, adjusting**

- 1 Complete measurement sheet.
- 2 Switch off air conditioning or automatic climate control. Move selector lever into position "P".
- 3 Read out DTC memory. **Note:** Not available on model year 1984-1986.
- 4 Connect testers:

oil remote thermometer (018)124 589 07 21 00

lambda control tester (012)

twin socket (031)

trigger clamp (011)

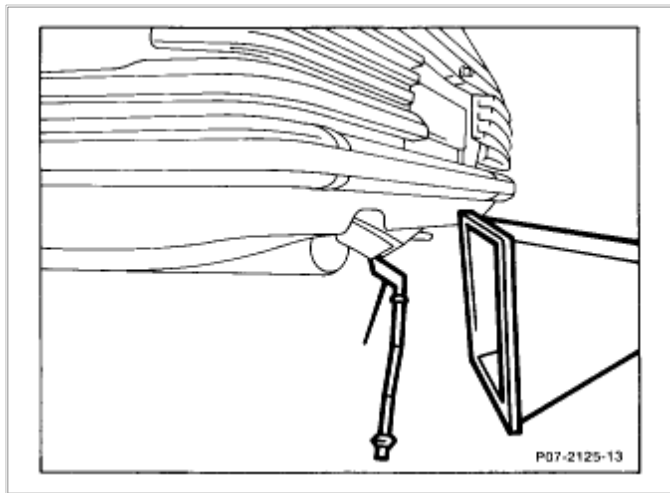
exhaust probe (005)126 589 11 63 00

CO measuring instrument (006)

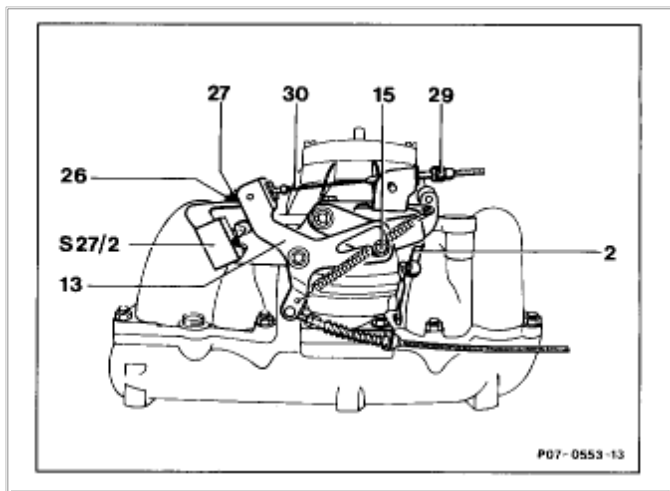
engine tester with oscilloscope (030)

multimeter (003)

test cable (033)102 589 04 63 00.


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- 5 Position extraction device (014) at exhaust tail pipe.
- 6 Check engine coolant level, adjust to correct level.
- 7 Check engine oil level, pay attention to condition of oil (visual inspection).
- 8 Take off air cleaner.
- 9 Check ease of movement and condition of throttle control linkage and throttle valve. Grease all bearing points and ball sockets.


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- 10 Check fulcrum lever, adjust. Check whether the roller (15) in the fulcrum lever (13) is resting free of tension against end stop. Adjust fulcrum lever (13) with the connecting rod (2), if necessary, so that the roller (15) is resting free of tension against end stop.

## 11 Idle stop.

Check whether the throttle valve is resting against idle stop. Disconnect connecting rod (2) for this step. Adjust throttle control.

Engines with cruise control only. Check whether the actuator is resting against idle stop of cruise control by pressing the lever of the actuator clockwise against idle stop at cruise control. When attaching the connecting rod (21), ensure that the lever of the actuator is lifted approx. 1 mm off the idle stop at the cruise control. Adjust tie rod, if necessary. Adjust throttle control.

## 12 Check wide open throttle stop from the [accelerator pedal](#), adjust.

## 13 Voltages

Test (battery and [ignition coil](#)):

### No-load voltage

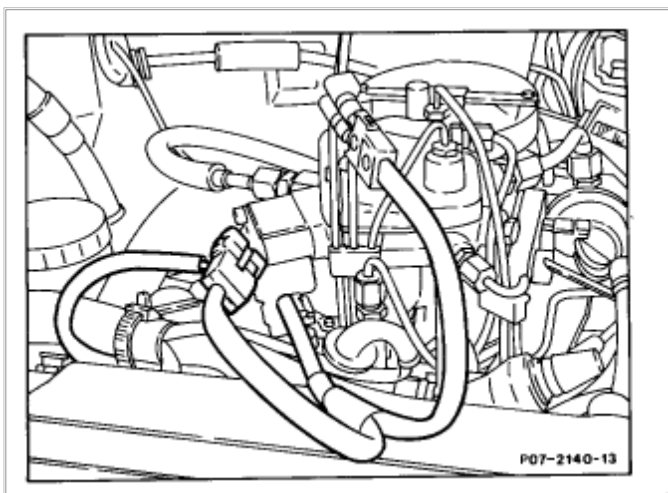
Connect voltmeter to the battery, paying attention to the polarity, and take reading of voltage. Specification: **12.2 volts** .

### [Ignition coil](#)

Switch on ignition with engine not running. Test the voltage terminal 15 to ground at contact 5 of diagnostic connector. Specification: **battery voltage**

Test difference in voltage between terminal 15 and terminal 1 at contacts 5 and 4 of diagnostic connector. Specification: **0 volts**

If the specified values are not reached, test [ignition system](#).



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- 14 Test current at actuator with ignition switched on by detaching coupling at actuator and inserting test cable 102 589 004 63 DO into the circuit. Connect multimeter, set to mA (see table).

On Std. version, detach connector at engine coolant temperature sensor.

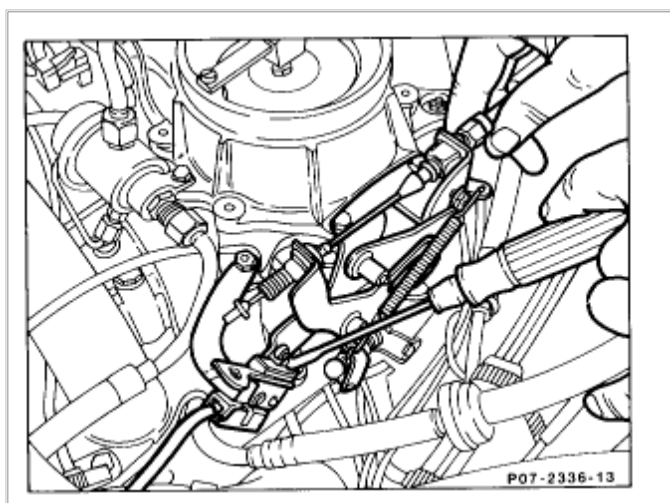
If the specified values are not reached, test electrical components.

- 15 Test ignition point and vacuum advance (see table). For TSZ version, test centrifugal advance.

If the specified values are not reached, test [ignition system](#).

- 16 Check oil level in automatic transmission.

- 17 Test deceleration shut-off (engine coolant temperature  $>50^{\circ}\text{C}$ ).



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Hold engine speed at a constant  $>3000/\text{min}$ . Operate microswitch by hand; this must cause the engine to saw.

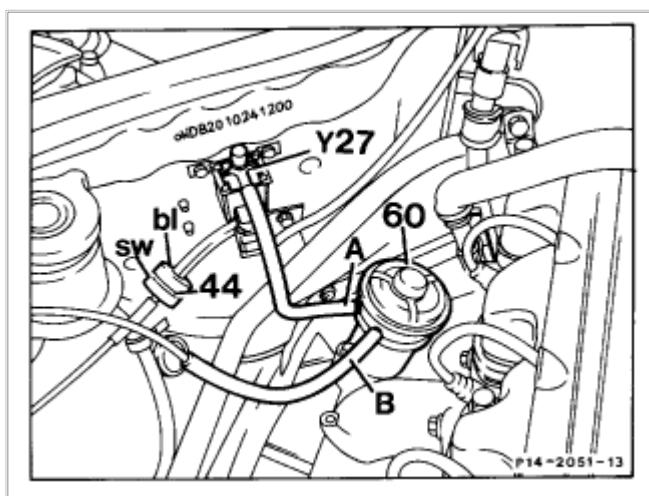
Electrical test of deceleration shutoff. [See: Testing Electrical Components of CFI System](#)

Check [fuel pressures](#) and internal leaktightness if necessary. [See: Fuel Pressure\Testing and Inspection](#)

- 18 Run engine to raise oil temperature to approx.  $80^{\circ}\text{C}$ .

- 19 Analyze oscilloscope image.
- 20 Check intake system for leaks. Fit "shop-made intake pipe" to [fuel distributor](#) before spraying. Spray all sealing points with ISO octane DIN 51 756 or cleaning petroleum. CO rise <2%.

WARNING! Do not use commercially available fuel for spraying (risk of harmful vapors). Pay attention to fire hazard and do not spray onto glowing parts or parts of the [ignition system](#).



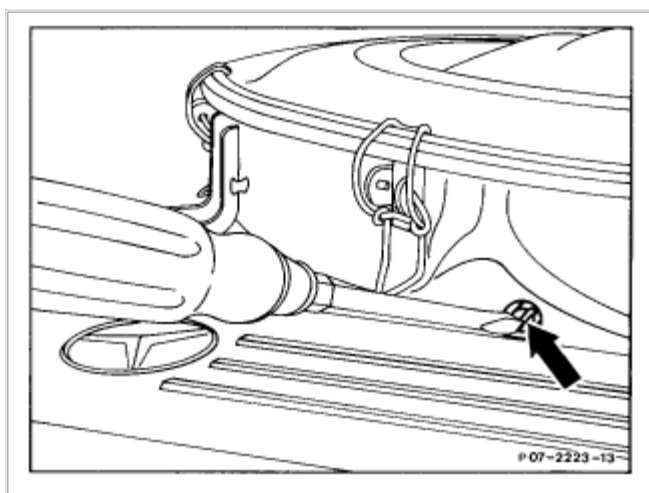
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- 21 Check function of exhaust gas recirculation valve.

Detach both vacuum lines at the exhaust gas recirculation valve (60). Connect tester to EGR valve (connection A, red) and pressurize with vacuum. If there is not a clear deterioration in engine running, replace exhaust gas recirculation valve. Check valve actuation, if necessary.

- 22 Install air cleaner.

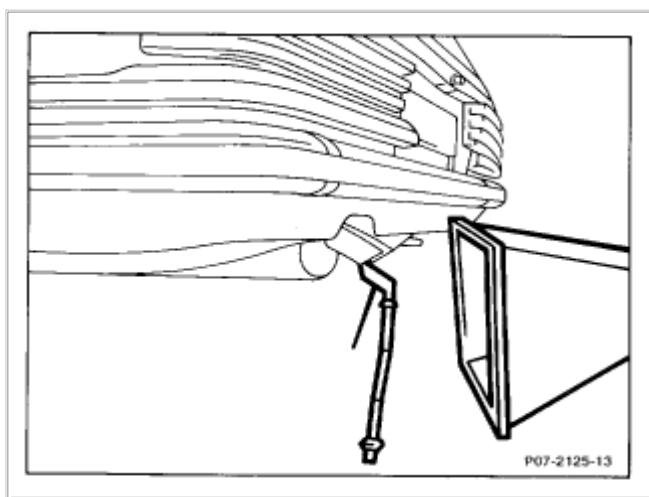
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23 Test [idle speed](#) (see table).

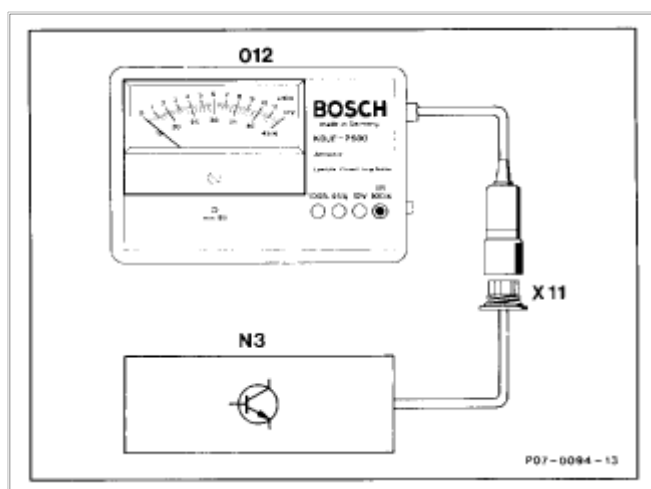
**Note:** The [idle speed](#) of engines fitted with electronic idle speed control cannot be adjusted. If the idle speed varies, test electronic idle speed control. [See: Idle Speed](#)

Engine 102.961 without idle speed control:  
Adjust engine speed with the idle air screw (arrow).

Check idle stop at [throttle body](#) assembly when performing this step.

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24 Test idle emissions level (see table). Measured at exhaust tail pipe. Setting idle emissions level, see step 25.



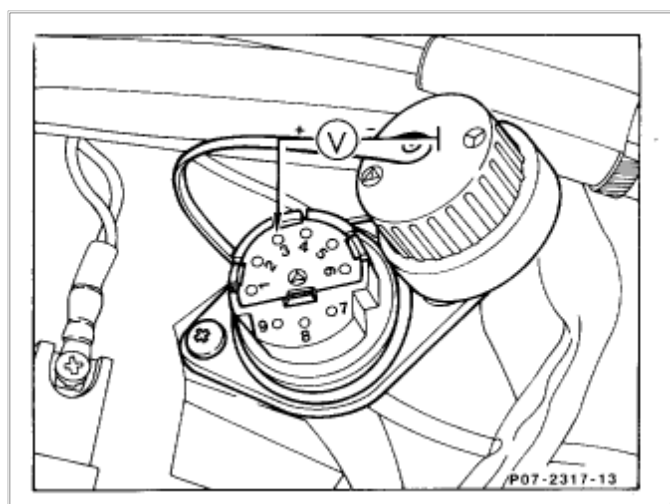
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25 Test lambda control (see table).

**Note:** The readout must fluctuate during the measurement. If a constant value is indicated, there is a fault in the lambda control, e.g. exhaust sensor disconnected.

See "Testing electrical components of CFI system" for trouble diagnosis. [See: Testing Electrical Components of CFI System](#)



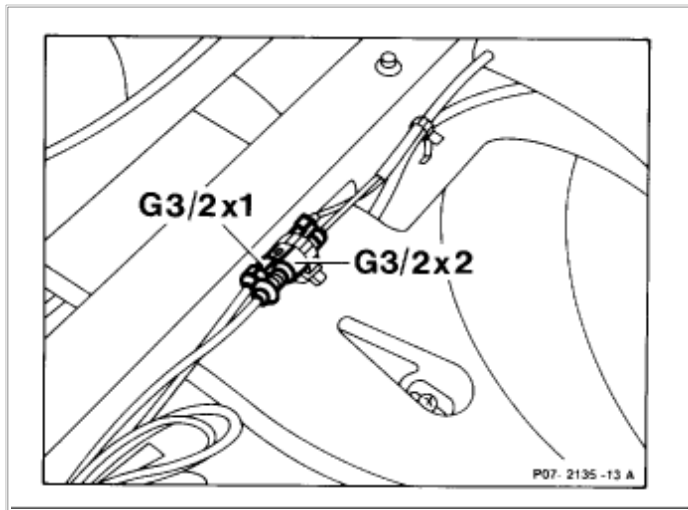
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Measuring voltage with multimeter or lambda control tester (12 volt position) at contact 3 of diagnosis socket to ground.

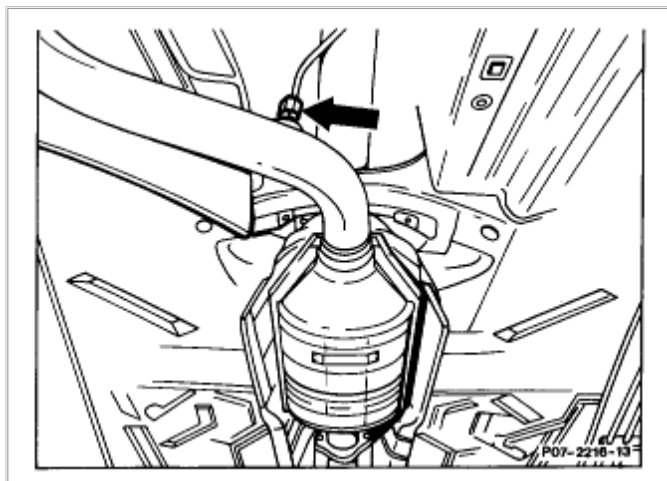
Test value: 2.1-4.8 volts

Switch off all auxiliary components.

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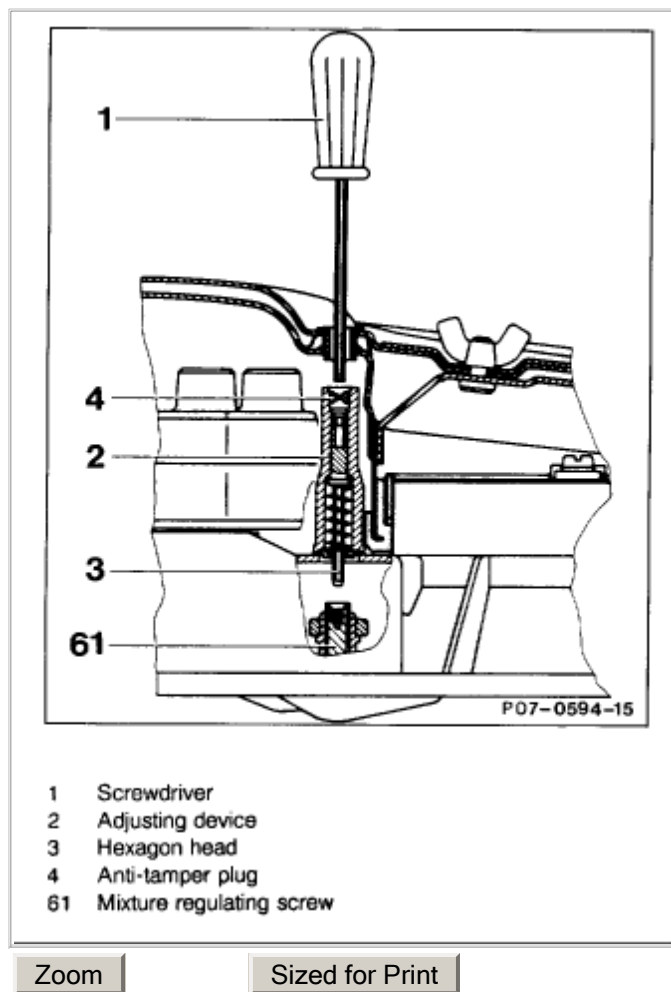
Detach [oxygen sensor](#) signal plug connection (G3/2x2). Take reading of control value (e.g. 3.3 volts). Readout must not fluctuate.

Plug together heated oxygen sensor signal plug connection (G3/2x2) - readout fluctuates. Test value must vary not more than  $\pm 0.8$  volts from the control value. Variation  $> 0.8$  volts, set control value.

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26 Adjust idle emissions level and lambda control (see table).

Measuring point (arrow) for Std. KAT (open-loop), upstream of [catalytic converter](#).



Remove anti-tamper plug (4) with the extractor.

Insert a screwdriver (1) through the recess on the top of the air cleaner onto the adjusting device (2). Press the adjusting device down with the screwdriver against the spring force, turn it slightly until the hexagon head (3) engages in the mixture regulating screw (61).

Turning to the left = leaner - on/off ratio/ voltage rises.

Turning to the right = richer - on/off ratio/ voltage drops.

After each adjustment, blip throttle slightly; readjust if necessary.

After adjusting, insert a blue anti-tamper plug (4), Part No.000 997 59 86, with the inserting drift.

- 27 Check smooth engine running by moving selector lever into Drive mode, switching on air conditioning/automatic climate control, turning power steering to full lock. The engine must continue to run smoothly.

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