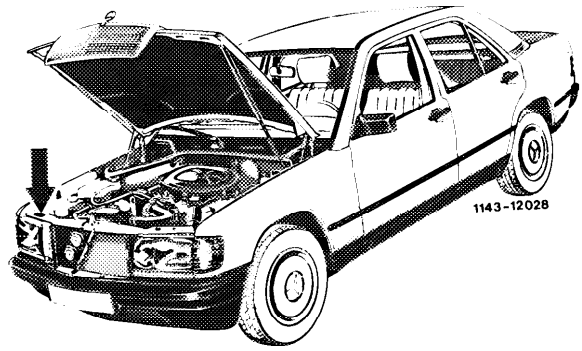
Job No.

14-001 Distinguishing features of vehicles with exhaust emission control system

In order to identify the vehicles an information plate (arrow) is glued onto the cross member. The plate shows the most important engine adjusting data.



(AUS) as of 1986
(CH) (S) as of 1986
Std./RÜF/CAT as of 1985

Identification of the information plates

(AUS)	silver
(CH)	green
(CH) CAT	light green
(S)	blue
(S) CAT	light blue
Std./RÜF/CAT	white

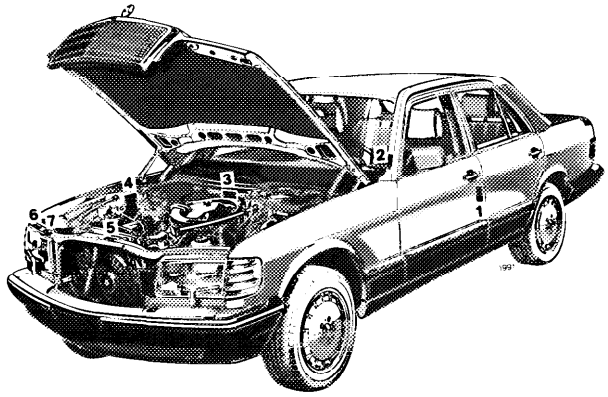
(J) as of 1986

Vehicles in version for Japan are provided with an information plate for the exhaust emission control system in the engine compartment in the local language. This plate shows the most important engine adjusting data.

(USA) as of 1986

Information plate for the exhaust emission control system on the cross member in front of the radiator (7).

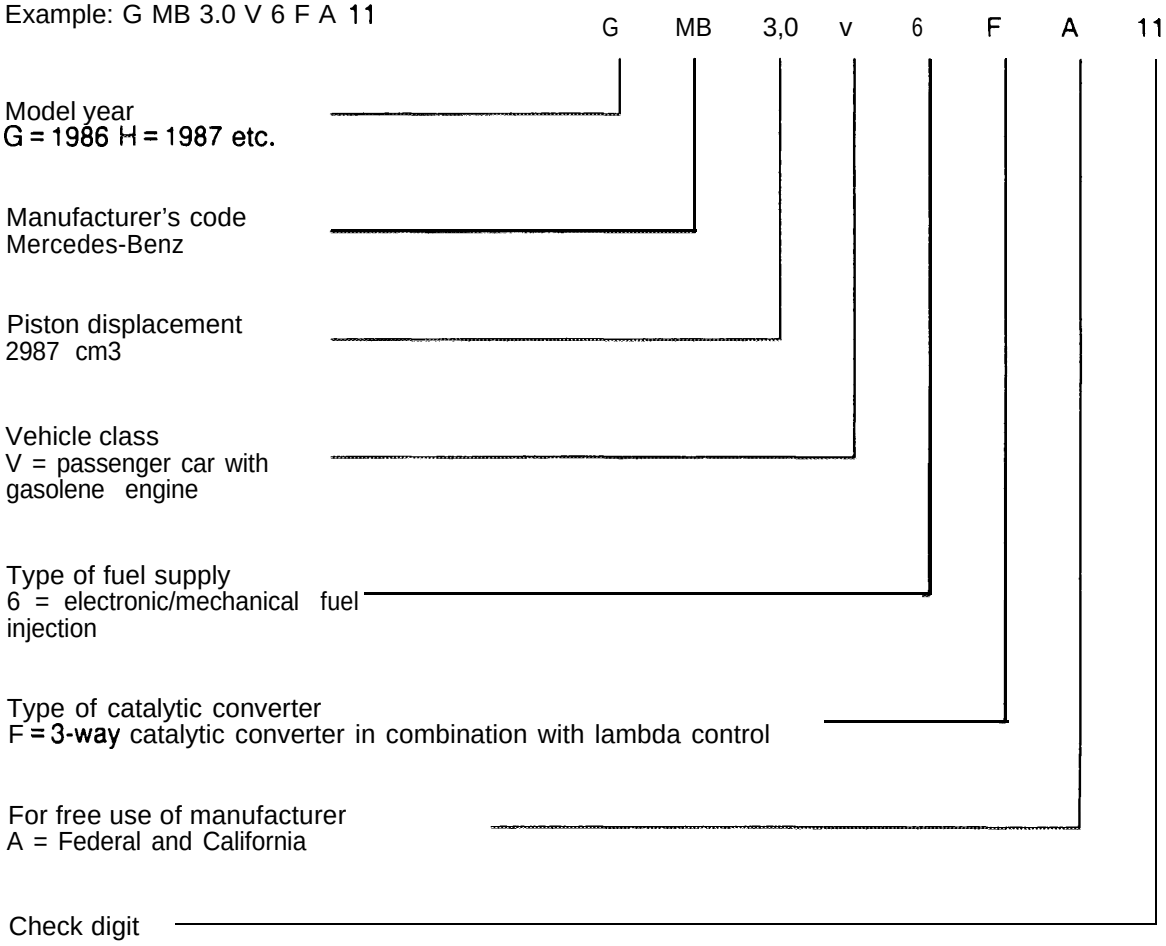
The engine characteristic data as well as the most important engine adjusting data are shown on this plate.



7 Information plate exhaust emission control system

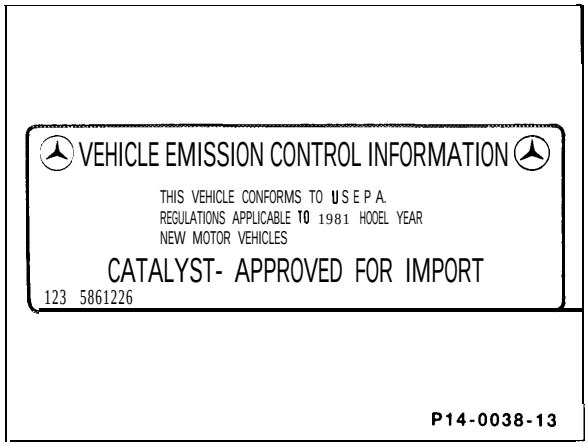
lo-digit code of engine identification data.

Example: G MB 3.0 V 6 F A 11



USA version
This vehicle is equipped with catalytic converters.

Color code of the information plate:
Basic color black, writing silver.



Tourist version
Vehicles in tourist version are not equipped with catalytic converters. Prior to importing into the USA the catalytic converters must be installed.

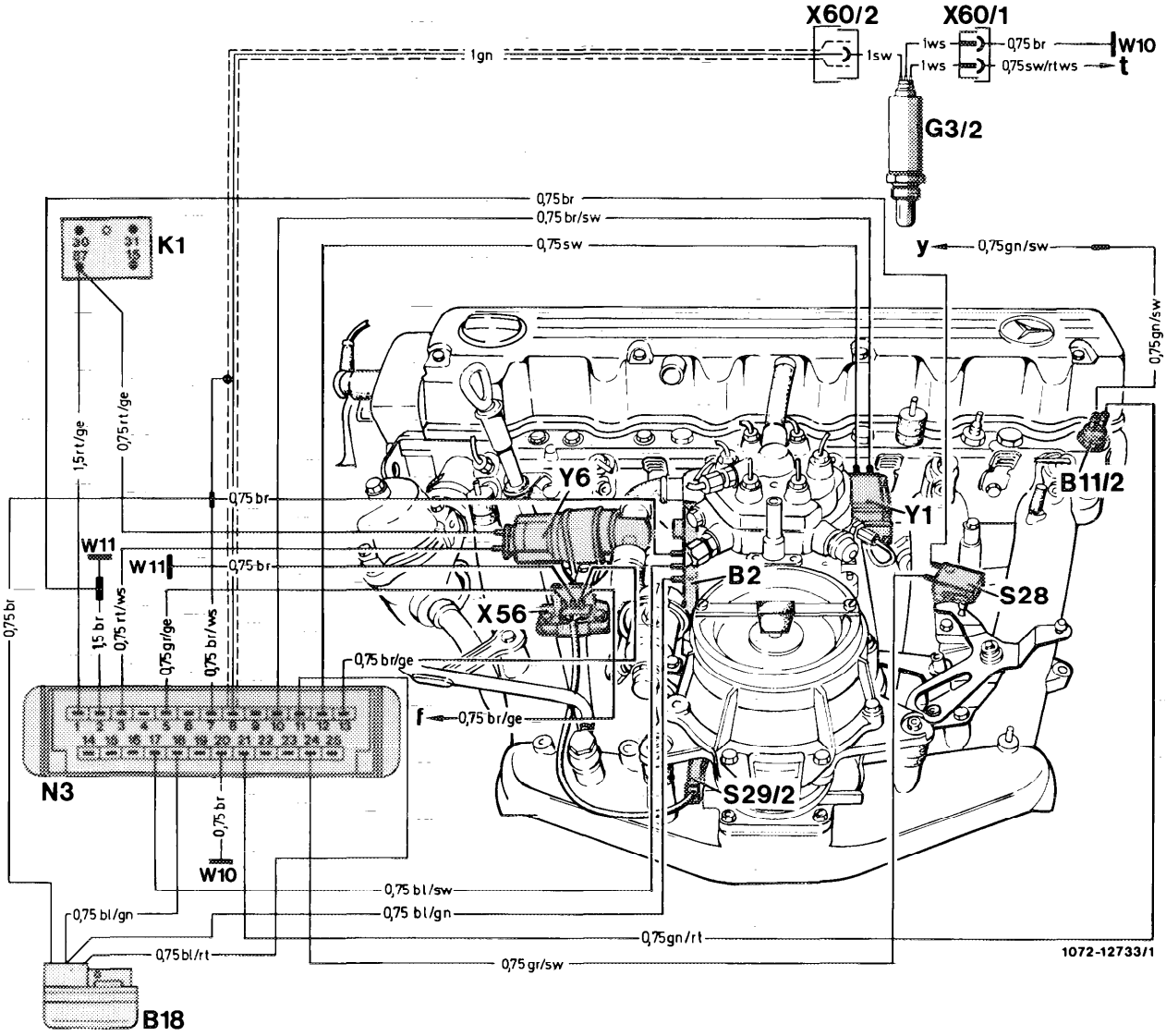
14-050 Function of emission control system

RÜF/CAT as of 1985
(AUS) (CH) (J) (S) (USA)
as of 1986

General

Components:

CIS-E control unit	with mixture characteristic, lambda control, oxygen sensor control signal amplification and from the input signals the calculation of the output signals for the electrohydraulic adjusting element.
Adjustment plug RÜF-version	with writing “ECE” and lead-sealed at the factory in postion 1.
Adjustment plug CAT-version	with writing “CAT” and lead-sealed at the factory in position 1.
Oxygen sensor	installed in the front exhaust pipe.
Catalytic converter	3-way catalytic converter, pre-catalytic converter and underfloor catalytic converter.
Catalytic converter warning system (J)	warning lamp in instrument cluster.
Oxygen sensor failure display (USA) 1986	control lamp in instrument cluster.
Fuel evaporation system	reduces escape of fuel vapors into the atmosphere (47-200, and 47-300).

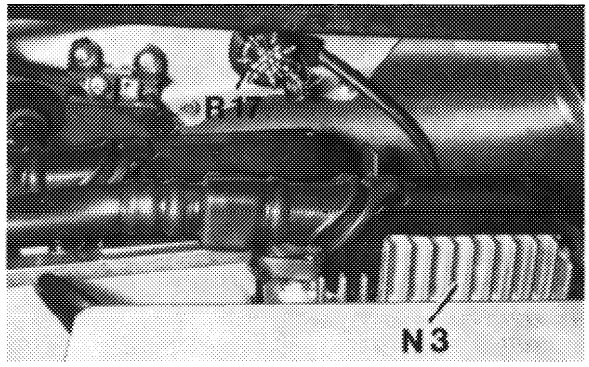


Function diagram for example of (J) (USA) mechanically/electronically controlled fuel injection

82	Sensor, air flow meter
B11/2	Coolant temperature sensor (2-pole)
B18	Altitude adjustment capsule
G3/2	Oxygen sensor heated
K1	Relay, overvoltage protection
N3	Fuel injection system control unit (25-pole coupling)
S28	Deceleration cutoff
S29/2	Throttle valve switch, full load/idle detection
W10	Ground, battery
W11	Ground, engine (electric cable screwed on)
X56	Plug connection, throttle valve switch
X60/1	Plug connection, heater coil oxygen sensor
X60/2	Plug connection, oxygen sensor signal
Y1	Electrohydraulic actuator
Y6	Idle speed adjuster
f	To the control unit electronic Ignition system socket 2
t	To the fuel pump relay socket 7 terminal 87
y	To the control unit electronic ignition system socket 1

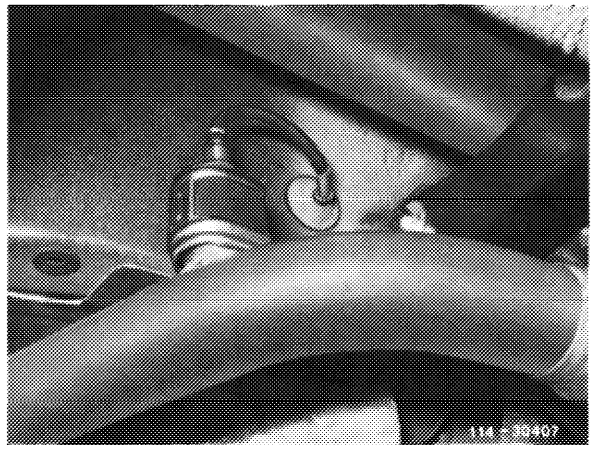
The lambda control is not functioning, i.e. not controlled , under the following operating conditions:
Oxygen sensor not operational or defective.
Coasting with deceleration cutoff.
Full load operation.
Acceleration enrichment.
When starting below 15 °C up to + 40 °C coolant temperature.

CIS-E control unit (N3)
Mounted at the right behind the battery.

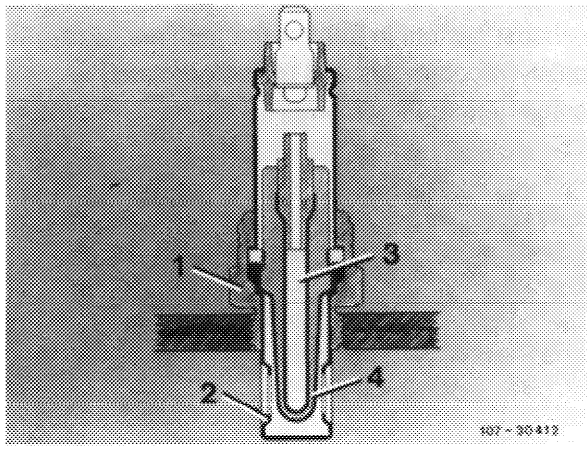


RUF/CAT
N3 Control unit fuel injection system
R17 Adjustment plug fuel injection system

Oxygen sensor
The oxygen sensor is screwed into the front exhaust pipe.



The outer electrocde is exposed to the exhaust emission, the inner electrode is connected with the atmosphere. The active part of the oxygen sensor is a ceramic body mainly consisting of zirconium dioxide. At the surface it is provided with a gas-permeable platinum layer and an additional protective layer on the exhaust side.



1 Sensor housing
2 Slotted protective tube
3 Heater element
4 Sensor ceramic element

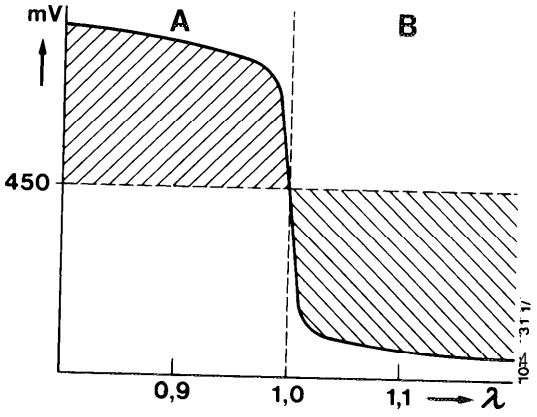
At operating temperature the ceramic material conducts the oxygen ions. The different oxygen proportion of exhaust gas and atmosphere generates a voltage in the oxygen sensor.

In order to maintain a constant operating temperature the sensor is heated.

The heater element of the oxygen sensor is supplied with voltage via terminal 87 of the fuel pump relay and is heated as long as the fuel pump is operating (circuit ciagram).

At operating temperature (> 300 °C) the oxygen sensor emits a voltage signal to the control unit.
Voltage > 450 millivolt mixture rich.
Voltage < 450 millivolt mixture poor

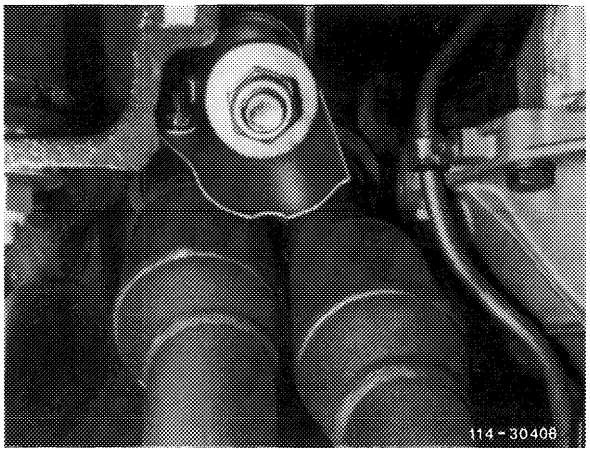
Because of the steep voltage jump with lambda (h) = 1, the exhaust gas composition can be analysed very quickly and the fuel-air mixture corrected within a narrow control range.



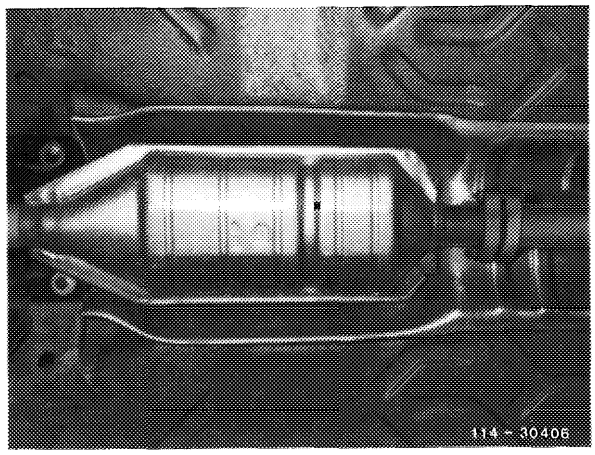
A Rich fuel-air mixture
B Poor fuel-air mixture

Catalytic converters

The 3-way catalytic converters are located in the exhaust system in front of the mufflers. Pre-catalytic converters and underfloor catalytic converters are installed.

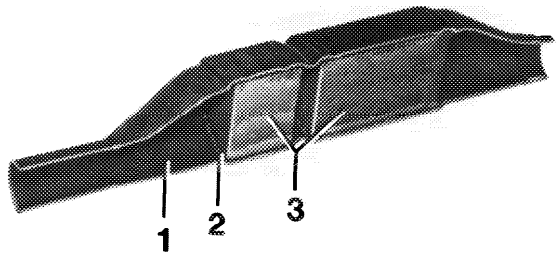


Pre-catalytic converter



Under-floor catalytic converter

The catalytic converters consist of three main parts:
Carrier material made of high-strength ceramic material and highly heat-resistant high-grade steel, also called monolith (ceramic material elastically mounted on wire braiding).
Intermediate layer for surface enlargement.
Catalytically active layer made of platinum/rhodium.



107-16849

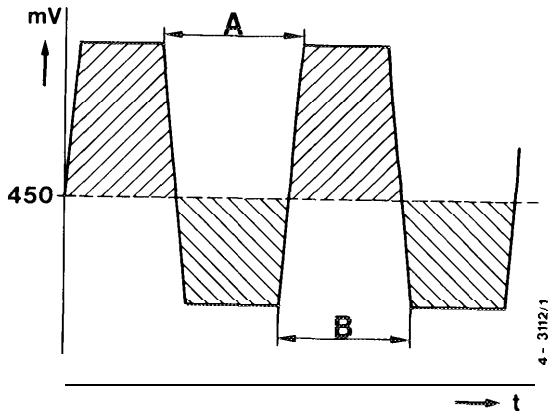
1 Braiding
2 Wire braiding
3 Monolith

Function

Exhaust gas flows through the catalytic converter and comes into contact with the precious metals. By way of **oxidation,** carbon monoxide (CO) is converted into carbon dioxide (CO_2) and hydrocarbons (HC) into water (H_2O), while the nitric oxides (NO_X) are converted into nitrogen (N_2) by way of **reduction.** Decisive in this process are temperature and the residual oxygen content in the exhaust gas. From a temperature of approximately 250 °C the catalytic process commences, i.e. a chemical reaction takes place. Too high temperatures lead to thermal overload.

Oxygen is required for the oxidation of CO and HC. The reduction of the nitric oxides takes place under oxygen deficiency.

Fluctuation betweenoxygen-deficient and oxygen-rich exhaust gas is achieved by changing the fuel-air mixture. The ratio of the fuel-air mixture is described with the letter lambda (A). Lambda <1 means rich mixture, lambda >1 means poor mixture.



A Rich fuel-air mixture
B Poor fuel-air mixture

The fluctuation of the oxygen content in the exhaust gas is controlled by the oxygen sensor. Only by means of these oxygen fluctuations is it possible to chemically convert the three mentioned exhaust cnstituents in the catalytic converter.

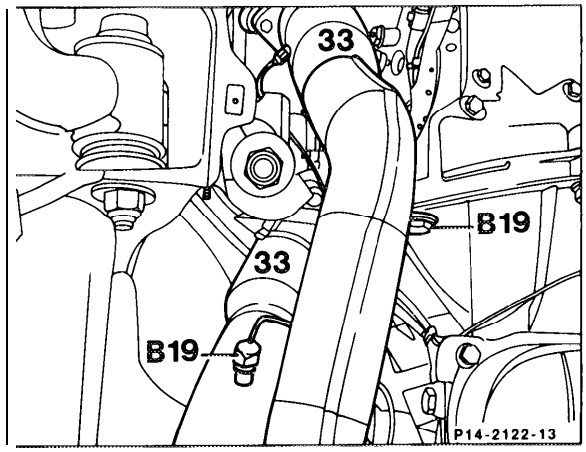
Only unleaded fuel may be used in vehicles with catalytic converters and oxygen sensor. Lead additives in the fuel form deposits on the chemically reactive surface of the catalytic converter and the oxygen sensor, rendering the system inactive.

Catalytic converter temperature warning system (J)

By means of a warning lamp in the instrument cluster, this warning system indicates to the driver an impermissibly high temperature rise in the catalytic converter.

Components of the catalytic converter temperature warning system:

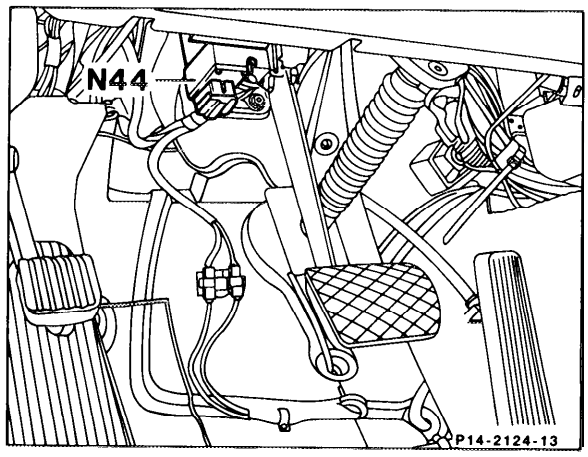
Catalytic converter temperature sensor (B19)
A temperature sensor (B19) is mounted behind the pre-catalytic converter; this sensor feels the exhaust gas temperature in the exhaust system, passing it on to the catalytic converter warning control unit (N44).



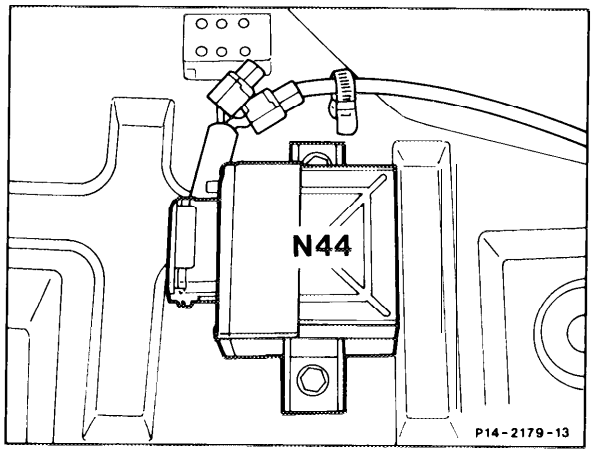
33 Pre-catalytic converter
B19 Temperature sensor

Catalytic converter warning control unit (N44)
A relay and a timer are housed in the control unit.

In the model 124 LHD this unit is installed at the front left near the pedal assembly



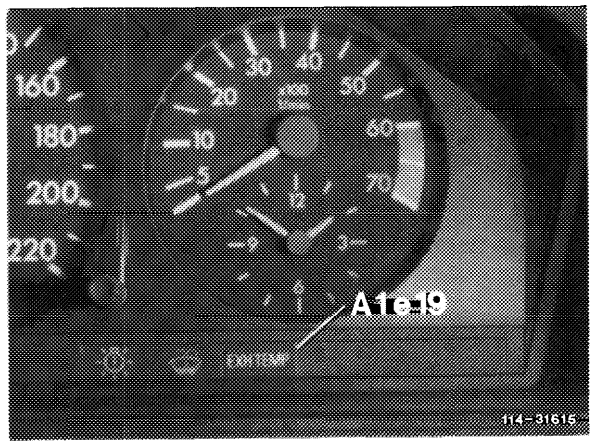
On model 124 RHD at the front left in the footwell.



On model 201 LHD and RHD, at the left below the rear seat.

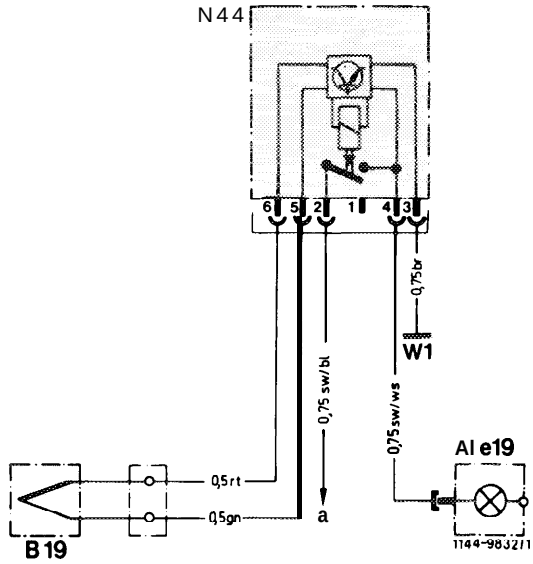
Indicator lamp catalytic converter overheating (A1e19) "EXH TEMP"

The indicator lamp catalytic converter overheating (Ale1 9) "EXH TEMP" is located in the instrument cluster bottom right.



Functional description

Depending on temperature, the temperature sensors (B19) send a very small voltage (millivolt) to the electronics in the control unit **(N44).** At temperatures of approximately 900 °C the voltage is so great that the electronic unit triggers the relay in the control unit. The relay closes and connects plus to the indicator lamp (Ale1 9), which is connected to ground. For an automatic check of the indicator lamp and the lines, actuate the warning system for 5-10 seconds after switching on the ignition.

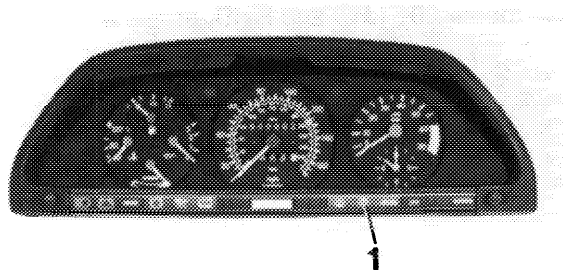


Ale19	Indicator lamp catalytic converter overheating
B 19	Temperature sensor catalytic converter
N 44	Control unit catalytic converter warning system
W 1	Main ground (behind instrument cluster)
a	To the fuse terminal 15

Oxygen sensor failure indication (USA) as of model year 1986

A failure of the oxygen sensor is indicated in the instrument cluster by the control lamp lighting up. The light is controlled by the CIS-E control unit.

The control lamp lights up when switching on the ignition.



During starting, the oxygen sensor failure indication (Ale1 0) lights up briefly.

yes	no

Remove and check control lamp.

Control lamp ok.	Control lamp defective.

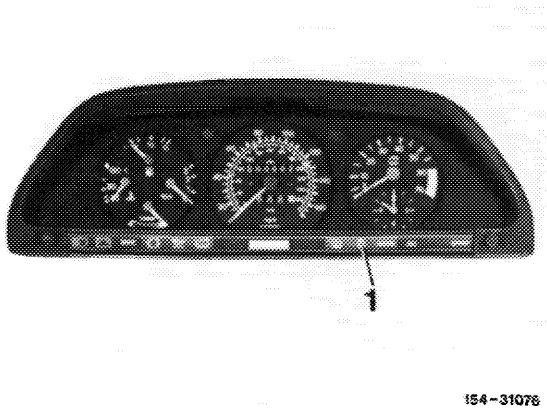
Renew control lamp

Switch on ignition. On oxygen sensor failure indicator A1e1 0, check voltage on wire rt/ge against ground.

Voltage approximately 12 volt

yes	no

Check voltage supply according to circuit diagram



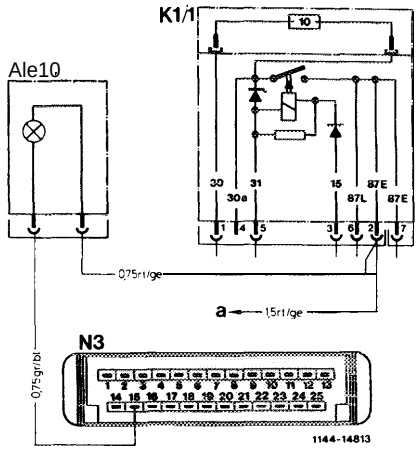
Switch off ignition. Check wire betwen oxygen sensor failure indication and CIS-E control unit (N3), socket 15, for continuity.

Resistance approximately 0 Ω

yes	no

Eliminate interruption according to circuit diagram.

End of test

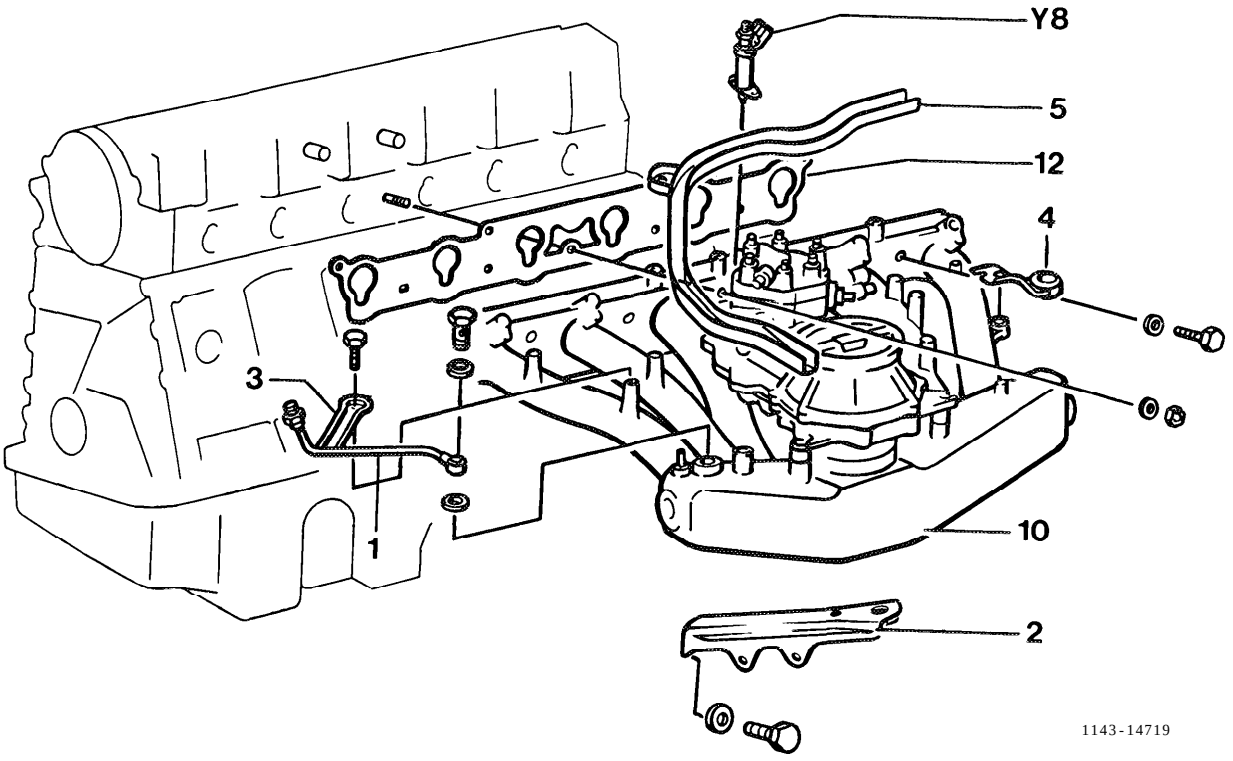


Ale10 Oxygen sensor Indicator lamp
K1/1 Relay overvoltage protection
3 CIS-E control unit
W10 Ground, battery
a To the CIS-E control unit, socket 1

Electric circuit diagrams see repair instructions engine 103 combustion CIS-E injection system 07.3-1 28.

14–450 Removal and installation of intake manifold, replacement of gasket

Job no. of the job texts and work units and standard texts and flat rates respectively 14-0180

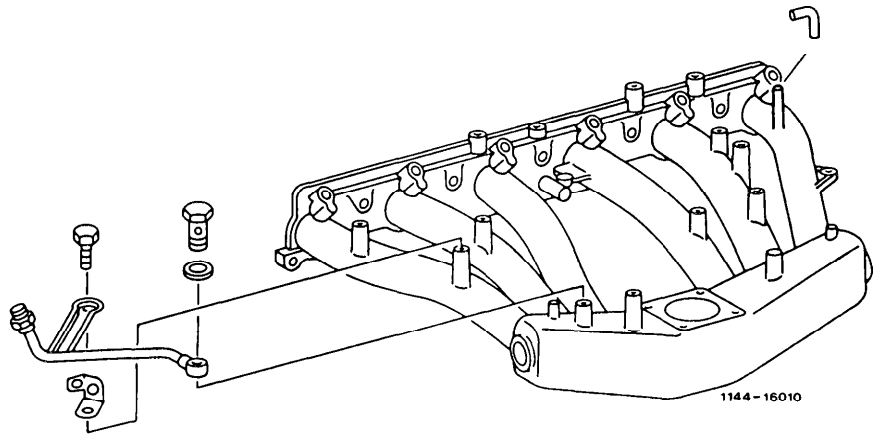


Engine compartment cover	remove, install
Plastic rail (5) for engine electric cable harness	remove, install
Mixture controller with air guide housing	remove, install (07.3225).
Holder (4) for starter cable	unscrew, screw on
Vacuum connections on intake manifold and throttle valve assembly	pull off, fit.
Vacuum line (1) for brake assembly with holder (3)	remove, install.
Starter valve (y8)	remove, install. Electrical connection to the engine, mount.
Bowden cable for control and for automatic transmission	disconnect, connect

Support (2) for intake manifold	unscrew, screw on. Unscrew both supports (on the intake manifold). Loosen on crankcase and, on vehicles with cruise control, unscrew (with cruise control).
Protective cap on ignition coil	remove, mount.
Vehicle with level control	remove suction hose. For this purpose, loosen hose clamp and force hose off the pipe, mount.
All fastening screws and one nut	unscrew, screw on.
Intake manifold (10)	remove, install. Clean, flange surfaces, check with straight edge, machine on straightening plate if necessary.
Intake manifold gasket (12)	renew.
Control linkage	adjust (30-300).
Idling	check, adjust (07.3-I 00).

14–455 Renewal of intake manifold (intake manifold removed)

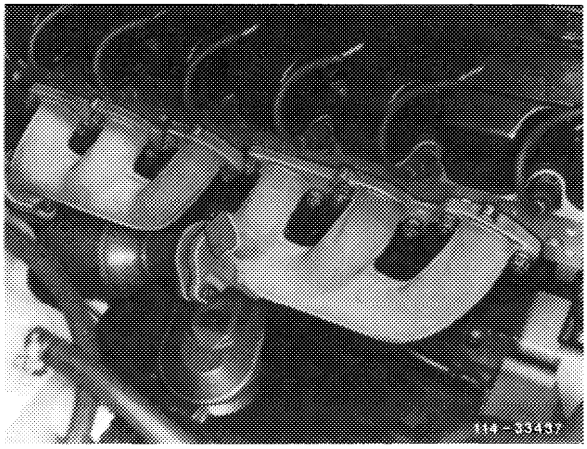
Job no. of the job texts and work units and standard texts and flat rates respectively 14-0205

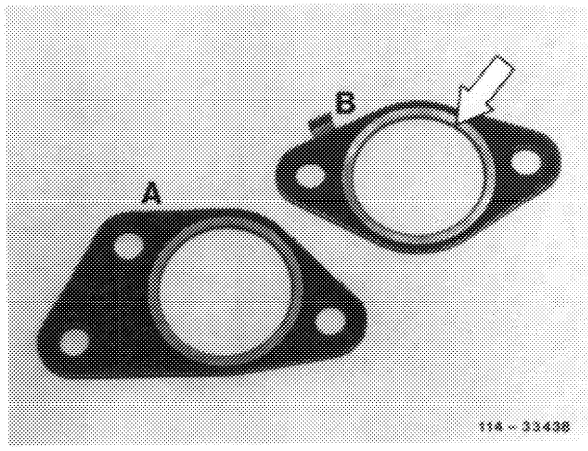


Intake manifold	remove, install (14-1 50)
Mixture controller with air guide housing	remove, install (07.3-225).
Intake manifold removed	unscrew from the removed intake manifold all parts that can be unscrewed and install in new intake manifold with new gaskets.

14–470 Removal and installation of exhaust manifold

Job no. of the job texts and work units and standard texts and fiat rates respectively 14-0350

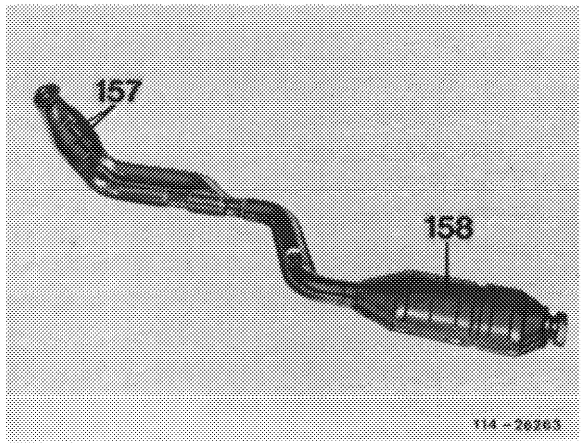




Exhaust system	partly remove and install (49-l 00).
Exhaust nuts	unscrew all exhaust nuts and remove exhaust manifold.
Exhaust manifold with new gaskets	mount. When doing so, observe that the flange (arrow) and the sheet metal lugs are facing the exhaust manifold. For improved stability, the gasket for cylinder 6 (A) has an additional bore. Gaskets for cylinder l-5 (B).

Note

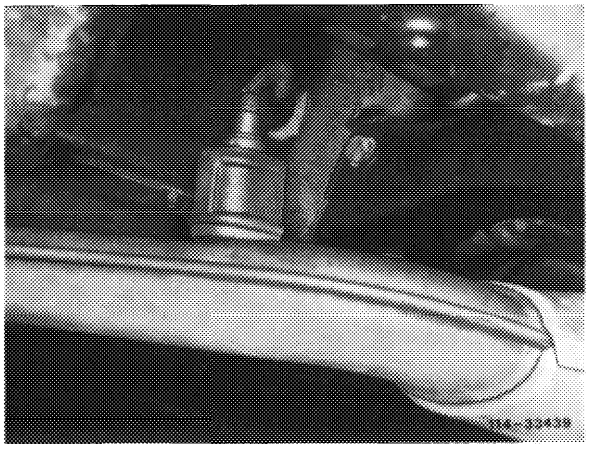
Vehicles with catalytic converters are equipped with pre-catalytic converters and under-floor catalytic converters.

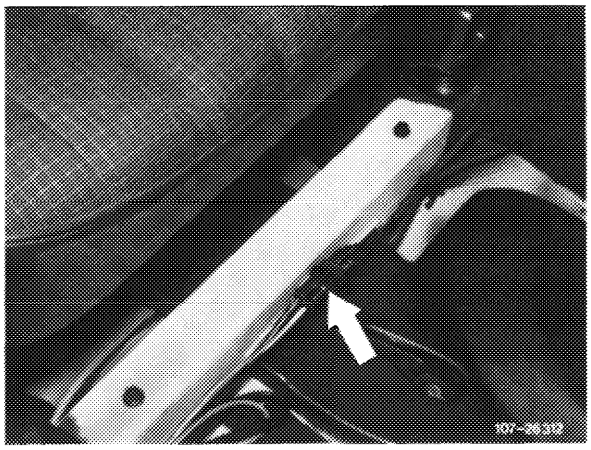


157 Pre-catalytic converter
158 Underfloor catalytic converter

14-480 Renewal of oxygen sensor

Job no. of the job texts and work units and standard texts and flat rates respectively 07-5303





Electric wire for oxygen sensor signal and heater	separate in the vehicle interior
Wire with rubber grommet	press from inside out.
#eat shield	press off. Install so that the opening faces to the back.
Oxygen sensor	unscrew.
Oxygen sensor	mount. Coat thread with paste 000 989 88 51.