

Note

Engine speed characteristics

The specific engine speed characteristics are described below in order to facilitate fault diagnosis.

1. Engine speed "After starting"

Since September 1989 KAT vehicles run at a fast idling speed (1000 – 1200 rpm) for up to max. 1 minute after starting or up to a coolant temperature of 30 °C. This "heating speed" enables the catalytic converter to reach its operating temperature faster.

2. Engine speed "Vehicle moving"

Engines with CIS-E control units to which the road speed signal is supplied have an idling speed which is 50 – 200 rpm higher when the vehicle is moving.

3. Engine speed "In deceleration mode"

Deceleration fuel cutoff is activated as soon as the driver's foot is released from the accelerator.

Note

Only on vehicles with automatic transmission, engine speed increases briefly by 100 – 300 rpm when combustion is restored in the deceleration mode. The vehicle speed does not increase as a result of this, however.

Complaint:

Engine misfires above 4000 rpm in position "D", vibrates (only vehicles with automatic transmission).

Cause

Transmission overload protection not operating.

Remedy

Test transmission overload protection (see Diagnosis Manual Engine, Volume 2, Index 5.1, Test step 8.0 – 9.2, and also Volume 4, Wiring Diagrams).

Complaint:

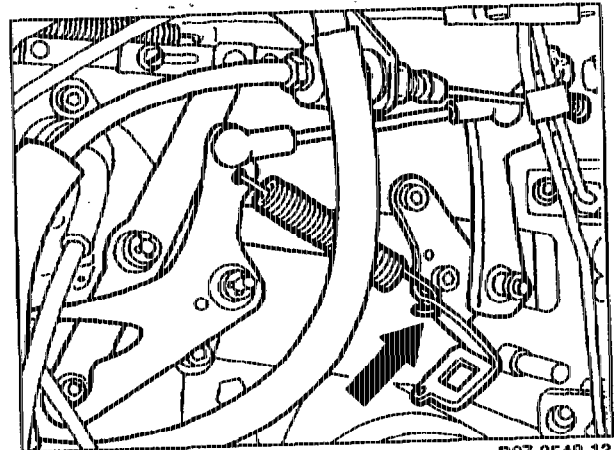
Idling occasionally > 1100 rpm (engine at operating temperature)

Cause

1. Return spring wrongly attached at fulcrum lever.
2. Throttle valve idle speed contact (S29/2) is not operated.

Remedy

1. Attach return spring correctly at fulcrum lever (see Fig.)
2. Test idle speed contact at throttle valve switch (see Diagnosis Manual Engine, Volume 2, Index 2).



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Complaint:

Engine cuts out when air conditioner operating in deceleration mode when clutch is depressed, but can be started again immediately

Cause

Insufficient idle speed air in deceleration mode.

Remedy

Replace CIS-E control unit.

The control units have been modified as from production date 172 (December 91).

Complaint:

Poor throttle response, occasional misfiring, poor idling, engine backfires into intake manifold

Cause

Distributor finger sparks over or has cracks.

Remedy

Replace distributor finger.

Complaint:

Engine difficult to start (long starting time)

Cause/Remedy

A starting time of up to 4 seconds with the CIS-E fuel injection system is system-related and should be regarded as normal. When starting engine, ensure **that the throttle is not depressed**.

Complaint:

Engine does not fire on all cylinders (rough)

Cause

1. Injection valves leaking.
2. Zero position of air flow sensor plate not in order, fuel distributor.

Remedy

1. Check injection valves, replace if necessary.
 2. Check zero position of air flow sensor plate (see 07.3-1612).
Unbolt all the fuel injection lines at the injection valves and at the fuel distributor. Remove fuel pump relay and bridge two terminals 30 and 87. When the air flow sensor plate is in the zero position, no fuel must flow out at the pressure outlets; test fuel distributor and replace, if necessary.
When the air flow sensor plate is deflected, fuel must flow out simultaneously at all the pressure outlets of the fuel distributor; replace fuel distributor if necessary.
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Complaint:

Engine cuts out suddenly and starts again after a short time

Cause/Remedy

As it is very difficult to determine the cause of this complaint, perform the following checks:

- Check the connections at the ignition coil.
 - Test cable terminal TD for occasional short to ground, e. g. at diagnostic socket, at tachometer, at connection of fuel pump/AC compressor cutoff relay.
 - Check the contacts of the connectors of the fuel pump relay, overvoltage protection with a gauge (e. g. individual pin of plug); press together widened contacts. Check the connectors of the fuel pump/AC compressor cutoff relay for signs of moisture and corrosion. Clean connector if necessary and replace relay.
 - Check position sensor for open circuit by moving the cable at the sensor or at the plug connection; replace if necessary.
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Complaint:

Engine cuts out when driving, can no longer be started

Cause

Cable of oxygen sensor occasionally touching propeller shaft resulting in short to ground.
Conductor path in fuel pump relay burnt through.

Remedy

Replace oxygen sensor.
Ensure that the cable is correctly routed.
Replace fuel pump relay.

Complaint:

Engine cuts out when decelerating

Cause

1. Electrohydraulic actuator.
2. No road speed signal from speedometer to CIS-E control unit.

Remedy

1. Test electrohydraulic actuator, replace if necessary.
2. Connect multimeter to connector of CIS-E control unit, contact 29 and ground.
Switch on ignition. Move car forward and back. Specification 0 – 12 V without electrical components, 0 – 9 V with electrical components such as cruise control, temperature display.
Check whether Hall sender on rear of speedometer is installed. Check cable routing from Hall sender to connector (X26), contact 11. Test plug connection (X53/5) (loose contact), install Hall sender if necessary, Part No. 007 542 29 17 as of production date 06/88.
Check cable routing from Hall sender to fuse 5, e. g. cable shoe not connected at fuse 5.

Manual transmission model 124

Remedy (only vehicles up to end 04/90)

Detach cable from pin 28 CIS-E control unit connector to plug connection (X26) pin 10, at plug connection (X26) and connect to ground.

On vehicles as of 05/90 the cable from the CIS-E control unit to plug connection (X26) is no longer fitted.



Use ohmmeter to check that the cable to the CIS-E control unit pin 28 is connected to ground and not the cable to the ignition starter switch (S2/1) otherwise this will result in a short circuit.

Complaint:

Engine sometimes does not start, or cuts out

Cause

Position sensor for activating the ignition system has occasionally open circuit or short circuit to ground.

Remedy

Test position sensor, replace if necessary (see 15–2133 or Diagnosis Manual Engine, Volume 2).

Complaint:

Poor hot starting

Cause

Fuel accumulator with insufficient holding pressure installed.

Remedy

Check part no. of fuel accumulator, correct part no. is 000 476 09 21 or 10 21. If part no. is not correct, replace fuel accumulator and fuel pipe 129 470 05 64.

Complaint:

**Vehicle occasionally vibrates between 140 km/h and 160 km/h
(only brief misfiring for about 0.3 s)**

Cause

CIS-E control unit. Only on vehicles with the vehicle ident end no. as listed below:

124.031 1B 473 729

124.051 1B 469 543

124.091 1F 180 767

129.061 1F 032 455

Remedy

Install latest version of CIS-E control unit, recognisable from part nos. which begin with 011

Complaint:

Poor output (engine at operating temperature)

Cause

EZL/AKR resistance trimming coupling, possibly wrong resistor installed.

Remedy

Check resistances of EZL/AKR resistance trimming coupling from table; if difference exists, replace resistance trimming coupling.

Resistance trimming coupling Part No.	Resistance ohms
015 545 67 28 (with KAT)	2400
015 545 68 28 (ALS version)	1300
015 545 70 28 (without KAT)	470

Complaint:

Occasionally poor output when starting off and at outside temperatures > +30 °C

Cause

Ignition control unit, sharp retardation of ignition at outside temperatures > +30 °C.

Only vehicles affected up to vehicle ident end no. listed below:

124.031 1B 473 729

124.051 1B 469 543

124.091 1F 180 767

129.061 1F 032 455

Remedy

Install ignition control unit Part No. 010 545 95 32 as of production date 068.

Complaint:

Poor output when starting off at altitudes above 2000 meters

Cause

EZL/AKR ignition control unit.

EZL/AKR ignition control unit

Engine

Part No.

104.981

010 545 95 32

Remedy

Replace Bosch EZL/AKR ignition control unit with Part No. 010 545 39 32 up to production date 946.

Read fault memory in CIS-E control unit and erase, if necessary.

Engine running complaints

In particular sporadic cutting out of engine may be caused by different factors. The following test catalog enables faults in the different operating states to be specifically detected and rectified. The operating state in which the engine cuts out is particularly important for determining the remedial measure to be taken.

The test steps should be conducted in the order stated.

Perform the tests as specified in the Diagnosis Manual **before** working with the test catalog.

Complaint	Remedy
A. Engine cuts out when idling:	<ol style="list-style-type: none"> 1. Contacts at connector of air flow sensor position indicator widened. Press contacts together, replace socket Part No. 003 545 26 26. 2. If knocking lightly on overvoltage protection causes engine to cut out or misfire, replace overvoltage protection. 3. Check whether 4 mm contact of cable to crankshaft position sensor is widened, press together if necessary. 4. Idle speed adjuster modified as of production date 951; up to 950 test internal resistance. $R = 7.5 - 10 \Omega$ and measure current at idling $I = 600 \pm 50 \text{ mA}$.
B. Engine cuts out after decelerating:	<ol style="list-style-type: none"> 1. Ground cable at intake manifold and/or suspension dome loose or corroded. Unbolt cable, clean and bolt on. 2. No road speed signal at CIS-E control unit, pin 29. For remedy see Diagnosis Manual Engine, Volume 2. 3. If battery voltage exists at pin 28 of CIS-E control unit when starting (only model 124 with manual transmission), separate plug connection (X26) violet cable and connect to ground. 4. Idle speed contact or deceleration fuel cutoff microswitch occasionally not closed in idle speed position. Adjust throttle control. 5. Contacts of terminals 15, 30, 31 or 87 at overvoltage protection widened. Press together contacts. 6. Check whether 4 mm contact of cable to crankshaft position sensor is widened, press together if necessary. 7. Move cable of crankshaft position sensor to EZL ignition control unit. If engine cuts out when this is done, replace position sensor. 8. Test electrohydraulic actuator, replace if necessary.

Complaint	Remedy
C. Engine cuts out when driving at a constant speed:	<ol style="list-style-type: none"> 1. Ground cable at fuel pump loose. Attach ground cable properly. 2. Cables of terminals 1 and 15 at ignition coil loose. Tighten cables. 3. Move cable from crankshaft position sensor to EZL ignition control unit. If engine cuts out when this is done, replace position sensor. 4. Check whether 4 mm contact of cable to crankshaft position sensor is widened, press together if necessary. 5. Test EZL ignition control unit, replace if necessary.
D. engine cuts out when accelerating:	<ol style="list-style-type: none"> 1. Ground cable at fuel pump loose. Attach ground cable properly. 2. Contacts of terminals 15, 30, 31 or 87 at overvoltage protection relay widened. Press together contacts. 3. Cables of terminals 1 and 15 at ignition coil loose. Tighten cables. 4. Move cable from crankshaft position sensor to EZL ignition control unit. If engine cuts out when this is done, replace position sensor. 5. Check whether 4 mm contact of cable to crankshaft position sensor is widened. Press together if necessary. 6. Test EZL ignition control unit, replace if necessary.

Complaint:

Combustion noises (except )

Cause/Remedy

Since April 1991 an EZL ignition control unit with a modified ignition map and a modified CIS-E control unit for the adjustment range of the inlet camshaft have been installed as part of further engineering developments with the aim of reducing combustion noises (see Notes 15-2093 and 07.3-1698). Replace EZI ignition control unit and CIS-E control unit. The CIS-E control unit must be installed only with the relevant EZL ignition control unit.

Complaint:

Fuel pump loud

Note

In dealing with the complaint "Fuel pump loud" it is important to distinguish between whether a buzzing sound or a clinking noise is heard.

Remedy

a) Buzzing sound inside car (transmission of structure-borne sound)

1. Check whether the fuel pipe is in proper condition and is laid free of kinks.
2. Check whether the strainer in the feed connection of the fuel distributor is fouled (high backpressure increases noise level).
3. Install Knecht fuel filter (if not already fitted).
4. Replace fuel pump. As of production date 642 with shaped track.

b) Clinking noise

1. Replace fuel pump (worn).
 2. If this does not bring about a remedy, check drainplug and filter in fuel tank for signs of fouling.
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Complaint:

Determining faulty input signals in CIS-E control unit

Cause

Faulty input signals at CIS-E control unit.

Remedy

Use Lambda tester to determine faulty input signals by measuring On/Off ratio. Then, perform test program (see Diagnosis Manual Engine, Volume 2).

Complaint:

On/Off ratio cannot be set

Sudden increase in fuel consumption (about 2 – 3 liters)

Note

There must not be any leaks in the exhaust system.

Cause

1. Occasional or constant failure of oxygen sensor when driving.
2. Screened cable from oxygen sensor connector (G3/2x2) to control unit pin 8 has short to ground.
3. Loose contact or occasional open circuit at connector sleeve Z (soldered connector in wiring harness from coupling of CIS-E control unit).

Remedy

1. Test Lambda control when engine idling (see Repair Instructions Engine Combustion, or Diagnosis Manual Engine) and on the dynamometer in upper load range or when driving (readout must fluctuate). If the readout on the Lambda control tester moves slowly against the stop on the right in the closed-loop mode, the oxygen sensor must be replaced.
 2. Separate plug connection (G3/2x2) for oxygen sensor signal and also unplug coupling at CIS-E control unit and measure resistance of contact 7 to contact 8.
Specification: $\infty \Omega$ ($> 10 \text{ k}\Omega$)
If continuity exists ($< 1 \Omega$), replace engine wiring harness.
 3. Open coupling of CIS-E control unit (N3) and **re-solder** connector sleeve Z (soldered connector in harness) at contact 7 (cold solder point).
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Complaint:

Diagnosis with fault storage (pulse readout at CIS-E control unit, engine systems control unit EZL/AKR ignition control unit)

Cause/Remedy

Note

The pulse readouts stated in the table are stored faults although no faults are present in the systems. They should therefore be ignored.



The engine must be conditioned first of all in order to read the fault memory of the EZL/AKR control unit. See Diagnosis Manual Engine, Volume 2, Engines 104, 119 CIS-E in the column "Pulse readout".

Engine	CIS-E control unit (pulse readout)	Engine systems control unit (MAS) ¹⁾ (pulse readout)	EZL/AKR ignition control unit (pulse readout)
104	22 ²⁾	2 und 3	14 ³⁾
	8		

¹⁾ MAS can be diagnosed as of standard installation calendar week 27/89, in order as of part no.

Engine	Part no. w/o AC compressor	Part no. with AC compressor
104	011 545 82 32	011 545 83 32
119	011 545 84 32	011 545 85 32

²⁾ Only with engine systems control unit 007 545 59 32 and 007 545 60 32 and only with version "without KAT".

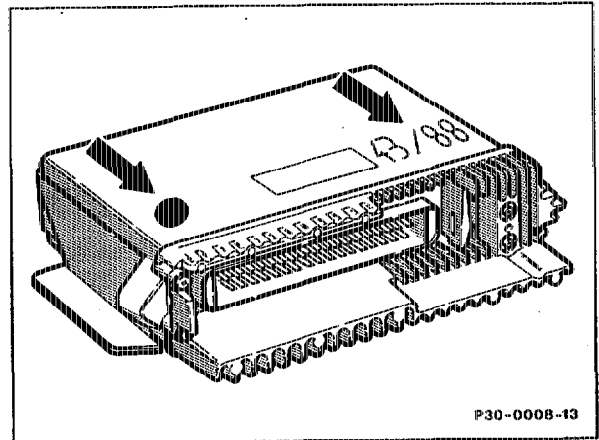
³⁾ Bosch ignition control unit 007 545 70 32 in order as of production 946, Siemens ignition control unit 007 545 71 32 as of production date 27/89.

Complaint:

ASR indicator lamp lights up when driving and electronic accelerator pedal moves into emergency running mode (difficult to depress after short idle travel)

Cause/Remedy

1. Check production date of control unit
(see Fig.)
Control units with production dates from 16/88 up to 43/88 must be replaced with a control unit as of production date 44/88 (identification: yellow dot) if this fault occurs.
2. Check throttle control linkage, adjust
(see 30-1010, Section "B").
3. Replace potentiometer (R25).



Complaint:

Engine misfires around reserve fuel quantity and when cornering

Cause/Remedy

Model 124 Sedan, Coupé.
Install new fuel tank.

Complaint:

Klicking noises. Fuel leaking (smell of fuel), compressed. Only with fuel evaporation system

Cause/Remedy

Insufficient ventilation of fuel tank through fuel evaporation system.

1st Cause

Poor routing of hoses in left front wheelhouse (kinked, crimped).

Remedy

Remove bulkhead at left front wheelhouse. Check visibly and also whether hoses blocked (not with compressed air). Rectify fault.

2nd Cause

Activated charcoal filter is blocked or has insufficient clear passage.

Remedy

Blow through 10 mm Ø connection to 8 mm Ø connection at activated charcoal filter (not with compressed air). At the same time hold 6 mm Ø connection closed. Compare with new activated charcoal filter, if necessary. If insufficient clear passage, replace activated charcoal filter.

Note

Check fuel evaporation system (see Diagnosis Manual Engine, Volume 2).

Complaint:

Irregular, loud clicking or rustling after switching off engine after driving fast

Cause

Because of the twin-shell design of the front muffler and the high temperatures, stresses are produced when the muffler cools down which results in this noise. A further cause is the high level of heat radiated from the front muffler to the shield.

Remedy

A remedy is not possible on the basis of current state of engineering. The fault has no effect on the life of the exhaust system.

Complaint:

Catalytic converter makes noises, monolith in KAT loose

Remedy

Install catalytic converter system 124 490 95 19 (LHD) or 124 490 14 20 (RHD), respectively.

Complaint:

Front passenger footwell heats up because of catalytic converter

Remedy

1. Check clearance of heatshield (above catalytic converter) to underfloor of car.
Specification: 8 – 10 mm; adjust clearance if necessary.
2. Lay glass fiber matting, Part No. 000 989 18 10 below footmat (only available in square meter sizes).

Note

Model 124 RÜF/KAT: Glass fiber matting in front passenger footwell fitted as standard since 07/88.

Production breakpoint as of vehicle ident end no. A 798379
 B 082239

Complaint:

Trunk floor heats up in the area of the left wheelwell

Remedy

- Check clearance from tailmuffler to heatshield (specification about 25 mm) and from heatshield to underfloor of car (specification approx. 10 mm); adjust if necessary.
 - Modified insulation matting in left side of trunk (Part No. 129 680 09 25).
Production breakpoint 02.03.90.
 - Floor covering of trunk (part no. as previously) with insulation liner on underside.
Production breakpoint 01.02.90.
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