

Around the Benz

Mercedes-Benz offered the world's first passenger car powered by a diesel engine in the mid 1930's with the introduction of the 260D. In addition to its diesel engine, the 260D sported an advanced box section chassis design, and independent front and rear suspension.

Here's a quick rundown of the Benz diesel family tree for cars exported to the United States.

- In the early 1970's Benz diesels become popular here with the introduction of the four cylinder naturally aspirated 220D.
- The 220D model was produced until 1973 when it was replaced by the 240D.
- The five cylinder 300D was introduced in 1975 in the smaller 115 body car.
- The 300SD turbo diesel version of the larger more luxurious 116 body car arrived here in 1978. Both KKK and Garrett turbos were fitted.

- In 1977 the body and chassis of the 240 and 300 models changed to what is known as the 123 car. Earlier versions of the 240 and 300 were discontinued, and a number of advancements followed. Though the diesels still used a series glow plug system, the old pull start disappeared. Under the hood, things were tidied up to improve service access. An improved injection pump was also introduced with an improved priming pump.

- By 1982 all 300D models became turbocharged, and after 1983, the unthinkable happened as the popular 240D became history in this country. And let's not forget the 190 Baby Benz which was offered in 1984 with an all new four cylinder diesel.

- The larger 116 car remained the only turbo equipped car, and didn't change much until it was replaced by the new 126 car in 1981.

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- One important improvement was the replacement of the old series circuit glow plug system with a parallel circuit in 1980. The differences between the two systems are major ones. The parallel circuit is more efficient and requires much less maintenance than the old system.

- In 1986 the 123 line was discontinued and replaced by the 124 series which came with a new six cylinder diesel engine in a newly designed body. Improvements to the new engine included hydraulic tappets, a new

injection pump, and an aluminum cylinder head. The 1986 Benz also offered the world's first particulate emission system with its exhaust trap oxidizer.

All in all, many of those stories you've heard about Benz diesels with 500,000 miles on them are true. When properly maintained, these engines run a long, long time.

Valve adjusting tools in our last two captions are available from Baum Tools, Circle No. 219.

—By Paul Airoidi

GETTING READY FOR WINTER

One of the most frequent hard starting complaints you'll hear about these engines occurs in cold weather areas on extremely cold mornings. But most of the problems are generally due to improper maintenance and inspection before the onset of cold temperatures. Later versions (from 1981 on) are especially reliable under these conditions, but they must be inspected and maintained to work properly.

Here are a few guidelines which will help you keep your Benz customers happy when things get frosty.

Battery Check

The first, and most important thing is a battery inspection. Make sure the battery is the correct battery (88 amp or better). Load test the battery, and check all connections to make sure they're clean and tight.

Charging System

Keep that load tester out for a few more minutes and check for proper alternator output and regulation. Even this larger, recommended battery must stay fully charged to get the diesel up and running on cold mornings. Check for a key/off battery drain, and inspect belt tension and condition.

Oil and Filter Change

Oil changes are important on any car, but more

important on a diesel. Use a lighter weight oil in cold weather. 10W30 is great for this. Used oil from older diesels will come out the drain hole looking a lot like India ink, but that's to be expected. Later models aren't quite as bad as long as proper oil change intervals are observed.

Fuel Filter Change/Fall Tune Up

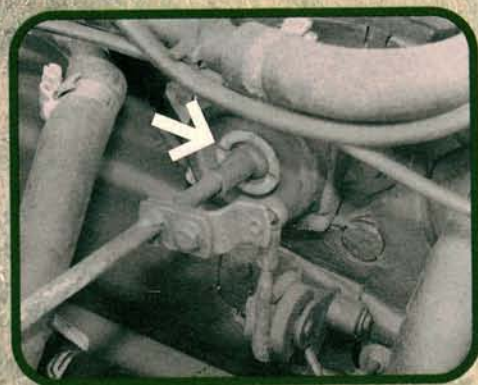
At the very least, both fuel filters should be replaced as part of a winter "tune up." If the vehicle hasn't been serviced in 15,000 miles or more, do a full service including valve adjustment.

Glow Plug System Check

Check and inspect the operation of the glow plug system.

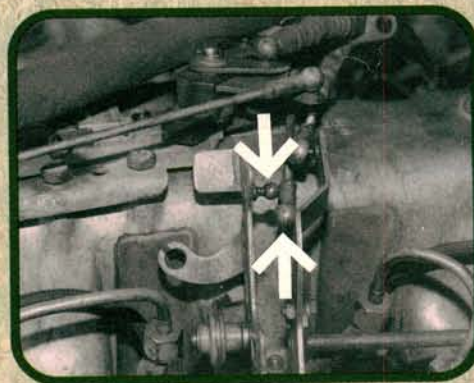
Miscellaneous Cold Start Tips

- Use only good quality fuel.
- Use a good quality fuel additive on a regular basis. Remember that water and paraffin are enemies of a diesel fuel system. Encourage your customers to carry additive in the trunk, and use it often. Using an additive at every other fill up helps prevent problems in the very coldest months.
- Use the block heater (if so equipped) when temperatures are consistently below 10-20 degrees F.



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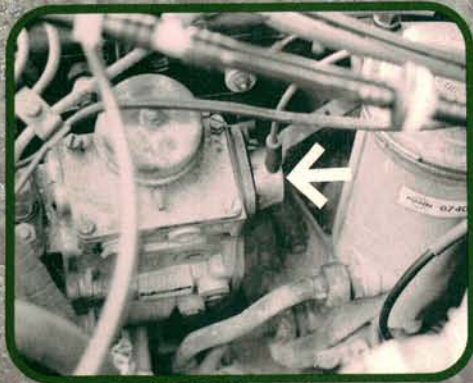
Check the throttle shaft pivot at the firewall at each inspection on all mid sized 1977-81 Benz models. As they wear, the neoprene center sections can fall out of the outer rubber mount. When this happens, full throttle response will be a fraction of what it was. Talk about a lack of power.



2

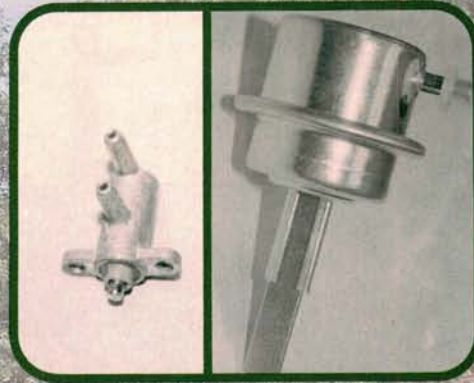
Throttle lubrication is essential. Benz uses ball and socket pivot joints which will bind if not kept clean and well lubed. Pop the joints apart with a needle nose pliers and lube the balls and sockets with a few drops of light engine oil or ATF. Do not grease the joints! Make sure the ball and socket are securely reconnected.

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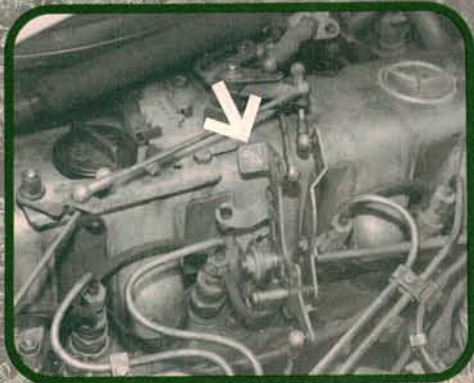
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A vacuum diaphragm shuts off the fuel to the engine when the ignition is turned OFF. Check the diaphragm with a vacuum pump, but install a see through fuel filter in the line in case the diaphragm is bad. If the diaphragm is ruptured, you'll suck oil into your vacuum pump.



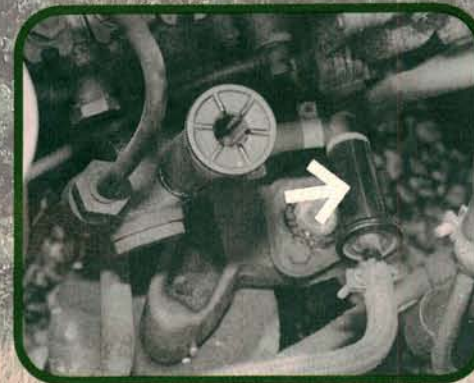
4

A small vacuum switch at the ignition switch controls vacuum to the fuel shutoff diaphragm (photo left). The right photo shows a typical replacement diaphragm. Make sure you properly attach the hooked end of the diaphragm inside the pump. Improper installation can result in a runaway engine, so be careful.



5

The Benz system also includes a manual fuel shutoff attached by a linkage to the injection pump. If a fuel shutoff system problem lets the car keep running after the key is shut off, simply press the STOP lever to stop the engine. The word STOP is printed in large letters on a red background so you can't miss it.



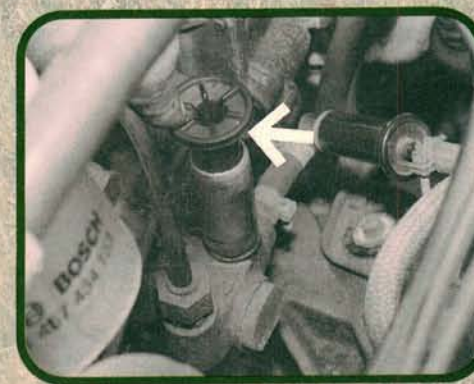
6

Proper fuel filter replacement intervals are very important on diesels. There are two filters: an inline filter at the fuel injection pump, and a canister type filter. Don't use any old inline filter. The wrong type paper filter can clog rapidly. The correct filter has a screen in it.



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A cartridge type fuel filter is located in full view at the top left front corner of the engine on all Benz diesels. Earlier versions had a canister filter. It's not a bad idea to fill the new filter with clean fuel before installation, but it's not essential. You'll need to prime the system anyhow or the engine won't start.



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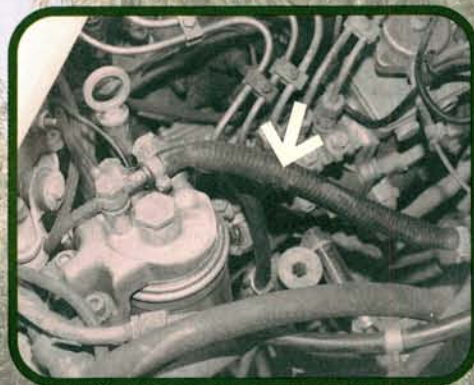
Manual priming pumps can be located in one of two places. Early cars had a pump near the filter canister. Later models use an improved pump which is mounted to the injection pump near the inline filter. Unscrew the pump cap, pump up the system, and screw the cap back in place. Start the engine and check for leaks.

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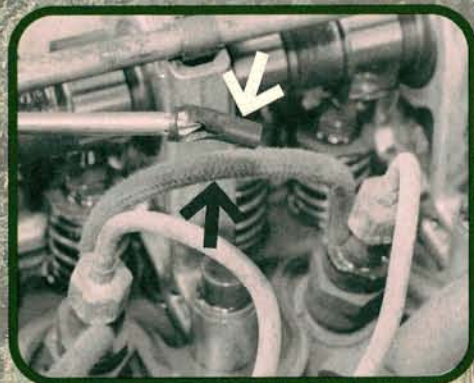
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This small knob on the dash of naturally aspirated 300 diesels from 1977-81 and all 240D's is a manual, cable operated idle adjustment. Its main purpose is to supply a slightly enriched mixture and fast idle when the engine is cold. It can be used at any time, however, to smooth out a slightly rough idle.



10

The pulse return hose dampens fuel pulses caused by high diesel fuel pressures in the return line. In fact, if you hold the line with the engine running, it'll feel like a human pulse. There are two sizes used, a short and a long hose. These will leak over time. Standard fuel hose can be used as a replacement in a pinch.



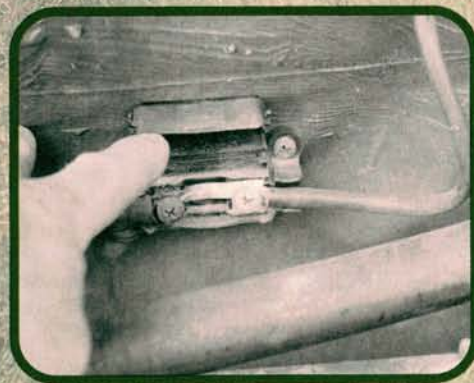
11

Injector return lines and end caps can leak. Later design end caps last longer than the original rubber ones. Use only a high quality replacement braided line. Be careful not to break the injector nipples when removing old hose. Slit the old hose with a razor blade to free it. No clamps are used on the lines.



12

Block heater retrofits are a good idea in bitterly cold climates. Our photo shows the block heater kit. To install the element in the block, you'll also need a tool like the one at the bottom of our photo to remove the threaded plug from the block before installing the block heater.



13

Early glow plug systems were wired in series. This system became extinct in 1980. Note the connection box (arrow) on the firewall. It's the 50 amp fuse for the glow plug system. Always check it. Even if it's not blown, it may be oxidized to the point where high resistance causes a massive voltage drop.



14

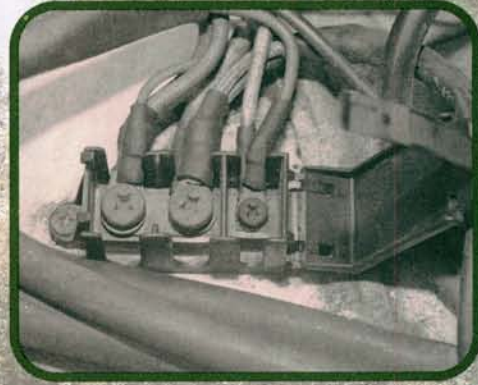
The pre-glow time relay is important on glow plugs wired in parallel. You'll find the relay on the left front inner fender. Pop off the dust cover and you'll find two connectors: one goes to the glow plugs, the other is for control functions. The main connection to the 80 amp fuse should be battery hot at all times.

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Benz uses either an 88 or a 92 amp battery in all their diesels. Never use a replacement with a lower rating. OE batteries had black rubber pieces below the fill caps. Don't remove them. Fill a low battery by adding distilled water over these pieces. Watch the "see through" battery case for the correct fill level.



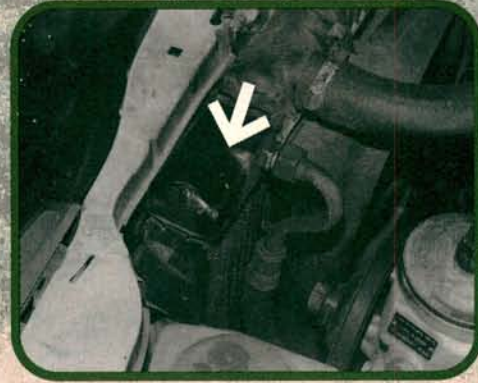
16

This electrical box has been used under the hoods of Benz cars for decades. It's special to you because it gives you quick access to both battery positive and the starter solenoid wiring. (Starter wires are always purple.) If you want to hook up your remote starter switch, this is the place to do it.



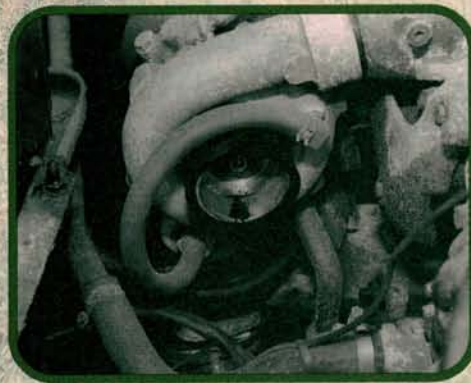
17

Oil filters are a cartridge type located at the left rear of the engine. Unbolt the canister cover and replace the old cartridge. Use a new o-ring between the cover and canister. Metal gaskets in the filter kit are not for the nuts on the cover. They are assorted drain plug rings for different applications.



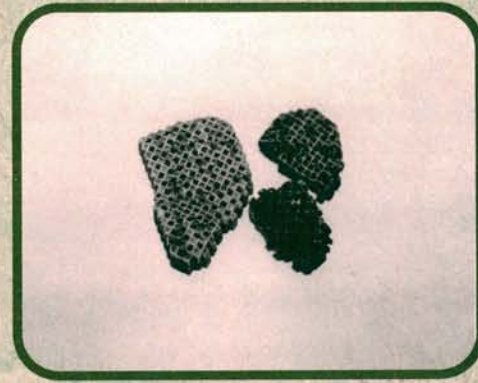
18

Benz diesels use an oil cooler which is located to the left of the radiator. Normally, these pose few problems, but can be the source of leaks when road hazards poke a hole in them. This is an oil-to-air cooler so there's no coolant inside, just oil under pressure flowing through finned tubes.



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See the oil in the turbo compressor throat? Some oil here is normal. The small amount of side play in the rotor shaft and high intake air volume will pull a small amount of oil past the seal. Benz issued a tech bulletin on this subject many years ago due to the unnecessary replacement of good turbos.



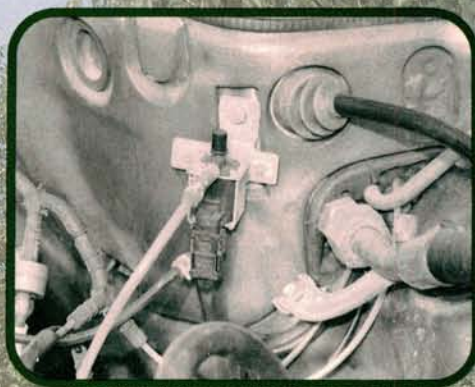
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A lack of power in cars with a trap oxidizer may be caused when the trap fails, sending small pieces of the oxidizer into the turbine wheel. Remove the intake boot from the turbo and see if it spins freely. If you catch one of these early on, you may be able to partially disassemble and clean the turbo. Replace the trap.



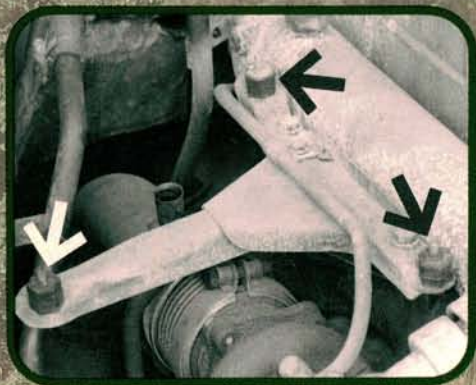
21

The turbo wastegate hose can be found cracked or broken on occasion. Replacement with a quality braided fuel line works well. The customer may never know that the hose is bad unless he notices more whine from the turbo. Acceleration will still be modest, even with a broken wastegate hose.



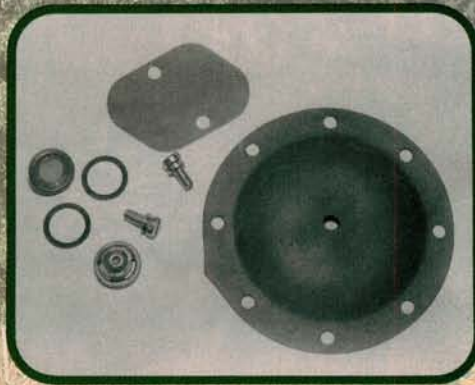
22

Turbo diesels are equipped with an overboost control system. If this solenoid or its related plumbing becomes clogged with soot from the intake, the engine may suffer a noticeable loss of power. So don't just check the solenoid. Check everything from the intake manifold to the injection pump for signs of blockage.



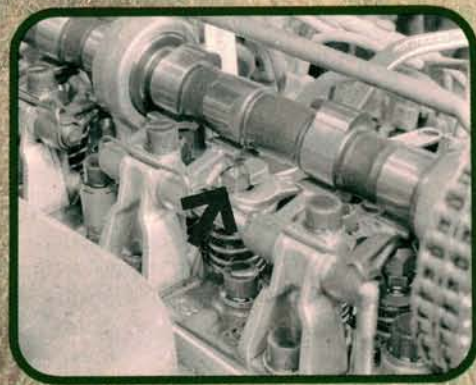
23

Three rubber mounts (arrows) hold the air cleaner in place. When you do a routine maintenance, grab the air cleaner and try to move it side to side. If it moves, one or maybe all of the mounts are broken. If one is bad, replacing all three is a good idea. Broken mounts (arrows) will cause an annoying rattle.



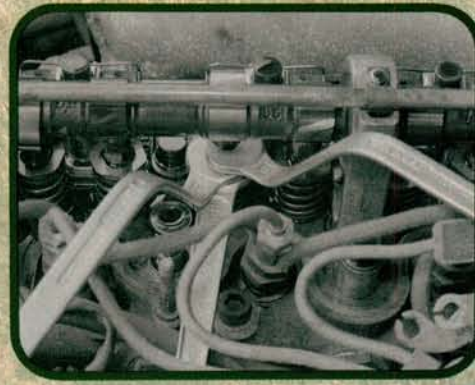
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You're probably aware that diesels don't generate vacuum like gas engines do. To produce vacuum for power door locks, power brakes, and the vacuum shutoff for the injection pump, Benz uses an auxiliary vacuum pump. Rebuild kits include a new diaphragm and check valves. The pump is an easy rebuild.



25

Valve lash adjustments must be done correctly, using the proper tools. Lash adjustment is made by turning a ball headed cap nut threaded to the end of the valve stem. But be careful here. The valve spring retainer is threaded to the stem as well. If you don't hold the retainer still, you may unscrew the retainer.



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To adjust lash, turn the cam lobe so the heel of the cam faces the adjusting ball. Check clearance with a feeler gauge. (Valve lash specs are on the metal plate riveted to the radiator support.) Hold the valve spring retainer, loosen the jam nut below the ball nut, and screw the ball nut up or down to adjust lash.