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## Don't kill your Cats

Although catalytic converters (CATS) are relatively simple devices, their importance cannot be overstated. They not only convert harmful pollutants from internal combustion engines into less harmful emissions, but they also play an important role in the overall engine management system. Catalytic converters are used on spark ignition petrol, LPG, compressed natural gas (CNG) and diesel engines.

Modern CATS reduce nitrous oxide emissions as well as oxidising carbon monoxide and unburnt hydrocarbons by turning the last two into carbon dioxide – not a happy result for the planet, but substantially less dangerous.

CATS are expensive because the structure and materials are costly. The core, or substrate is usually a ceramic honeycomb or stainless steel foil. This increases the surface area supporting the catalyst. A wash-coat is usually a mixture of silica and alumina, further increases the surface area on which the active catalyst is placed. The latter is usually Platinum, Palladium or rhodium.



Oxygen sensors are integral parts of the control system on petrol engine, but also are part of the diagnostic system. If the air-fuel ratio changes, but the sensor readings do not change, an indicator will warn the driver. Turning off the engine will reset the system but if the warning reappears the problem is recurring. Some more complex systems use a second oxygen sensor allowing the on-board computer to compare the readings. If both sensors give the same output, the catalytic converter is non-functioning, and must be replaced.

### *Common faults & fixes*

Oil from a leaking gasket, an engine depositing soot, or one that misfires may cause burning inside the unit, effectively destroying the CAT's ability to function correctly. Keep your engine correctly tuned and if it has overheated badly, get the problem rectified promptly.

A completely avoidable problem is the use of incorrect fuel – especially leaded fuel, but also by other contaminated fuels. Care must be taken to ensure that any cans used to store fuel are free of lead, silicone or other impurities, also check that any fuel additives are compatible. The unit pictured here has been plugged by the use of incorrect fuel



Avoid parking in long grass where the high temperature of the CATS may start a fire.

Let the exhaust cool down before traversing streams or water holes where the temperature change may cause contraction of the metal shell, damaging the core.

### *Professional servicing & fitting*

Fitting catalytic converters or oxygen sensors is not a job for the amateur. These units are expensive and can easily be damaged by poor fitting technique.

A qualified mechanic will only use the correct exhaust-jointing paste because the wrong ones can harden and break.

Correct location of the CATS and sensors is critical because the units need to reach the correct operating temperature and incorrect location may prevent this.

Interpretation of fault codes is a job for a trained specialist. A professional shop will run a diagnostic test before returning a vehicle that has work performed on the exhaust system. In this way, any problems will be identified and corrected before they can cause further trouble.

### *Performance gains*

One warning – do not even think about eliminating the CATS to gain power because the system will go into “open loop” and will run far too rich. Fitting a HALTECH engine management system will give far better and more cost effective results. However, this is an appropriate place to mention the potential benefits of upgrading the exhaust system on your Land Rover. The original equipment is as good, if not better than is fitted to most vehicles, but when a system nears the end of its useful life, an exhaust system upgrade can add up to 10% additional power and torque.

Options include a full system replacement, including headers, high-flow CATS and muffler, stainless pipes though vehicles from late 90's onwards usually have efficient headers fitted as standard.

