

Fuelsaver

by  matrix
[TELEMATICS]



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What is Fuelsaver?

In today's current economic and environmental climate, there's increasing pressure on companies who run vehicles to reduce cost and their carbon footprint - the question is, **“is it possible to reduce your fuel bill and minimise your company's carbon footprint”?**

It is now; by installing the Matrix Fuelsaver system to your vehicles you will reduce your fuel bills by **10% - 24%**. In addition to these savings, we can provide evidence of your reduced CO2 emissions. We do this by replacing the current program on your vehicles ECU and replace it with a bespoke program that allows the engine to run more efficiently and reduce CO2 emissions.

Whilst this may sound too good to be true, this proven technology has already been put into practice with many companies already reaping the benefits.

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Which vehicles can be fitted with Fuelsaver?

Providing your vehicle has a, “common rail,” diesel engine, it is highly likely we can apply our technology. This type of injection system emerged around 2002 and was quickly adopted by most manufacturers.

Although we are currently focusing on the van market, many passenger vehicles can also currently benefit.

We will be rolling out this service to HGV's in the very near future.

How Does Fuelsaver Work?

All modern vehicles use sophisticated electronic control units (ECU) to manage every aspect of the operation of the vehicle. The ECU controlling the combustion process does so by constantly evaluating data from various sensors and continually tries to optimise the engine's efficiency under any given set of conditions; heavy load, driver style, hot or cold engine condition and most importantly, ambient air temperature, altitude and fuel quality.

Clearly then, some of the conditions which effect fuel economy are universal the world over; engines have to warm up, cope with heavy loads and poor driving styles.

But, ambient air temperature, altitude and fuel quality are regional issues, but the manufacturers have to produce vehicles which work, as standard, in all parts of the world. Clearly then, the set-up of a standard vehicle is a compromise to allow for **ALL** operating conditions throughout the world, where as what we do, is **OPTIMISE** for the country the vehicle actually operates in.

So, because we have EU standard diesel, (minimum cetane level 51) a temperate climate without extremes of heat or cold and no high altitude driving to consider, we can accurately tailor the engine operation to work better and more efficiently here in the UK and Europe.

All our new software is produced and fine tuned on our own rolling road, using the **EU approved**, “drive cycle test,” to fully validate our results. This allows us to bespoke our software, if required, to meet any of our customers varied requirements, then fully test and validate the new software before deploying across the customers fleet.

What is the process from Fuelsaver arriving at the vehicle?

The whole process takes from 40-60 minutes per vehicle. In short, we take a copy of the software that is on the vehicle as standard, so that we can at any time in the future, return it to this state should the customer need to do so prior to disposal. We then pass a copy of this software to our secure central servers where it is verified by one of our head office team.

Our version of this original software, along with any bespoke parameters requested by the customer is then sent to the engineer who then uploads it back to the vehicle ECU. A test drive is then undertaken to ensure the customer is completely happy with the vehicle.



Can you limit the speed on the vehicle and what benefit does that have?

Yes, depending on the age of the vehicle, we have the ability to bespoke software to include speed limits. This policy has already been adopted by many companies, to protect their drivers and help reduce fuel consumption.

Historically the vehicle would have to go back to the dealer for limiting, meaning cost and downtime, but now we can offer that free as part of the Fuelsaver system.

Can you limit the revs on the vehicle and what benefit does that have?

Yes, depending on the age of the vehicle, we can limit the revs on the vehicle. This limit is agreed with the customer and will heed factors like load weights, towing and PTO requirements and driver feedback. This ability to bespoke the Fuelsaver software is one of the unique factors that allow us to stand out from the competition.

What about my vehicle warranty, will the manufacturer allow Fuelsaver?

Although we are modifying your vehicle, manufacturers still have to maintain the vast majority of their warranty, after all, you've paid for it (typically £1500 - £1800 of the vehicle price is to cover the warranty they supply)

After speaking with manufacturers, they have conceded that should, for example, the starter motor fail or the water pump seize, then these sorts of faults have nothing to do with our modification and the manufacturers warranty would still apply. They have of course pointed out that they would no longer cover any failures of any ECU we modify, which is completely understandable and acceptable.

Therefore, to ensure our customers peace of mind, we supply a complete warranty with our technology, underwritten by Norwich Union. So, should any modified ECU fail, it will be replaced under our own warranty. Also, should there be any additional vehicle damage as a result of a modified ECU going faulty, this too will be covered by us.

What we have found more recently is that, far from trying to put customers off Fuelsaver on their vehicles, the manufacturers are now starting to realise this technology is solid, reliable, and does indeed make the savings that we claim, without any detriment to the performance or reliability of their vehicles.

So we are now forming some strategic alliances with the first few manufacturers, so that they can promote in their geographical region, vehicles that will outperform the competitor's equivalent vehicle in that range in terms of fuel economy. Current work in this area is under NDA, but case studies will be out in the next quarter.



What about my insurance, do I need to tell my insurers?

Our technology is not about performance and does therefore not make your vehicle more desirable to thieves, indeed, in a lot of cases, we introduce speed and RPM limits to our customer's requirements, helping them meet their corporate responsibilities. This all means that your insurers have no real grounds for increasing premiums. You must however inform your insurers of the modifications to comply with the terms of your policy.

Will my lease company allow me to install Fuelsaver?

Fuelsaver systems are currently fitted to vehicles supplied by some of the major lease companies. Understandably, several of the lease companies would not allow this until they had carried out their own tests and diligence. However, in the last quarter of 2008 these companies have given the green light to Fuelsaver, and moreover, have now shown an interest in promoting the solution, as one of the major cost reductions they can highlight to their customers. Currently Fuelsaver is accepted by major names like Lex Vehicle Leasing, Arnold Clark Vehicle Management and Peugeot Leasing.

Should I tell my service agent I have Fuelsaver fitted?

Yes, you should make it clear to the garage or the agency you use that Fuelsaver has been fitted; since we may have set certain speed or RPM limits which the garage should be aware of in order to avoid confusion or wasted time. Feel free to advise them to contact us for any detailed information they need. However, tell them not to expect us to tell them how we do it!

Are there any government approved certifications for Fuelsaver technology?

We are in the process of validating a large number of vehicles with EU approved drive cycle tests on our own rolling road and will be submitting these vehicles for the government approved tests using the same cycles very soon. This is to give Fuelsaver customers the peace of mind that our technology has been tested, approved and our fuel reduction claims validated by the same agencies which test the Motor Manufacturers vehicles prior to their launch here in the UK.

The documents we will supply as a result of this validation process will clearly show the reduction in fuel usage and CO2 emissions over a standard vehicle.

Is there any media coverage on Fuelsaver?

Yes, we have appeared on Look North, the BBC regional news show, which highlighted the successful implementation in the Aquaforce Ltd's fleet last year. Follow this link to view the story in the BBC archive:

<http://news.bbc.co.uk/1/hi/england/7560916.stm>



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Why can't manufacturers do it?

Manufacturers operate on a global scale and clearly it is sound economics for the vehicle manufacturer to have engines and ECUs which can operate globally.

So, whilst vehicles supplied to different countries might carry a different name, aside from this they are essentially the same.

This creates a problem for the manufacturer. To ensure that their product operates acceptably in all the various global markets, the software in the ECU must allow for a wide range of ambient temperatures, altitude and of course diesel quality. Factor in that it must be able to meet the strictest emission levels at all times and it is easy to understand why the manufacturers ECU software is a compromise to allow for all situations.

In addition, manufacturers work an average of 5 years ahead and can't react quickly to a changing market place. The enormous development cost of engines and drive-trains means that they must use the existing generation for as long as possible before replacing it with a better one; which in turn, will also have to deal with the problems outlined above.

What about my Carbon Footprint and are there any monetary advantages to reduce my CO2?

The amount of CO2 produced is inextricably linked to the amount of fuel burnt. To understand this better, you must only look how the test houses conduct the EU Drive Cycle Tests used to produce official MPG figures.

A vehicle to be tested is put on a rolling road and, "driven," around a, "course," shown on a computer monitor. The driver of the vehicle is asked to change gear, break and accelerate at specific points, whilst the rolling road intermittently applies load to the drive wheels to mimic driving up hills.

For the duration of this test, the exhaust gases are collected and via a complicated filter system, the various component gases are separated into different bags.

At the end of the test, the bag containing only CO2 is weighed. This figure has a *direct* correlation to the fuel used during the test. It is with this information, not any direct measurement of fuel, that MPG figures are calculated.

Clearly then, by using less fuel, you will produce less CO2.

Fuelsaver are in the process of gaining approval for their system, so that companies can benefit from the Government funding which is available for, "Green Technologies." in addition, companies can then sell or trade their CO2 reduction in the market. More details will follow soon on this.



CRAIG WOOD
Aquaforce Plumbing Solutions

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Why should I not just go for a power / performance product which is available?

There are many companies which have been, “chipping,” cars for years to achieve more BHP and performance. Some of these companies are now advertising these products as a way to save fuel.

The facts are that if you drive a vehicle which has been modified in this way VERY gently, you will see some small improvement in MPG figures, typically 5%. However, ANY other style of driving with these products will see a dramatic worsening of MPG figures! Clearly then unless the driver is the one paying the fuel bill, it is very unlikely a company will make any saving at all.

In addition, NONE of these products can in any way match the fuel savings we achieve; can be made bespoke to match our customer’s needs, or have undergone any validation process to confirm their claims or, as importantly, ensure that the emissions haven’t been altered in such a way as they are now dangerous.

What are these boxes that are advertised that plug into the vehicle’s ECU and claim fuel savings, and how do they differ from Fuelsaver?

The way that these, “plug-in,” boxes work is that they simply raise the pressure of the fuel in the common rail, (This rail holds the fuel which supplies the injectors.) So when the injector opens, more fuel is injected into the cylinder simply because more pressure is behind it pushing it in! More fuel means more power; but lower MPG figures.

Another way some of these boxes operate is to inform the ECU that the outside temperature is very low, typically -10 or more, that way, the system is fooled into constantly over-fuelling the cylinders; again, more fuel equals more power but poorer MPG.

Also, for more information, please see the answer to the question; **Why should I not just go for a power / performance product which is available?**

Why is my MPG worse in winter?

There are two main reasons why the cold has a negative affect on the MPG returned by our vehicle, the first is simply, like us, our vehicles do not like the cold! The second, is down to how modern direct injection engines function and how they are controlled to produce the best combustion model to suit both the requirements to perform the job for which they were built, along with modern environmental emission requirements.

In winter, our vehicles take a much longer period of time to reach full operating temperature, and take this extra time each and every time they are start, even if they have not fully cooled down, “this is known as the warm-up cycle.” Not surprisingly, during the warm-up cycle in winter, the engine can use significantly more fuel than during the warm-up cycle in summer. In addition, all the other fluids, gearbox oil, power steering fluid etc are cold also and are therefore less efficient, causing a greater load on the engine. A greater load naturally requires more fuel.



Modern direct injection engine-management systems are very efficient at optimizing the fuel/air ratio entering the engine. The oxygen sensor monitors the percentage of oxygen in the exhaust, compares this with the percentage of oxygen in the atmosphere, and generates a low-voltage signal that communicates this ratio to the ECU, which then adjusts the pulse-width of the fuel injectors, the precise period of time each injector is open on each injection cycle, to fine-tune the amount of fuel reaching each cylinder to ensure that all the oxygen is burnt.

The system makes this very fine adjustment dozens of times each second, working very hard to reach the optimum air/fuel ratio for any given situation, and at a constant speed, seeks to approach the perfect ratio of 14.7 to 1 (petrol) 15-16 to 1 (diesel) called the Stoichiometric Ratio. The engine is said to be running in a "closed loop" state when using this system, relying upon the oxygen-sensor signal to fine-tune engine operation.

But the engine-management system can seek this optimum air/fuel ratio only when the engine is up to full temperature, NOT during the warm-up cycle. In fact, the ECU does not look for a signal from the oxygen sensor until it approaches full temperature. During the warm-up cycle, the ECU operates on a program combining data including coolant temperature, mass airflow or MAP sensor input of air volume and temperature, throttle position and engine RPM.

This state is known as, "open loop," operation, meaning the ECU is not operating on the feedback from the oxygen sensor. In, "open-loop" operation, the engine requires, and is provided with, a richer air/fuel ratio to ensure good combustion, this naturally uses more fuel. This extra fuel is also required during the warm-up cycle because a percentage of the vaporized fuel delivered into the engine condenses back into liquid fuel on contact with cold internal engine components such as the intake manifold, intake valves, pistons and cylinder; and it is fuel vapor, not liquid, that burns.

The main factor however, in lowered winter MPG figures is air density, defined as, "the number of air molecules per cubic foot of air entering the engine." The optimum, 14.7-1, 15-16 -1 air/fuel ratio mentioned earlier, means 14.7 parts of air are mixed with one part of fuel. However, colder air means denser air, (more molecules per cubic foot) because the engine is always the same size, it always consumes the same number of cubic feet of air, but now this volume of dense air entering the combustion chamber contains more air molecules, so more oxygen.

To compensate, the ECU has to provide more fuel to create and maintain the target air/fuel ratio for the whole time the engine is running.

