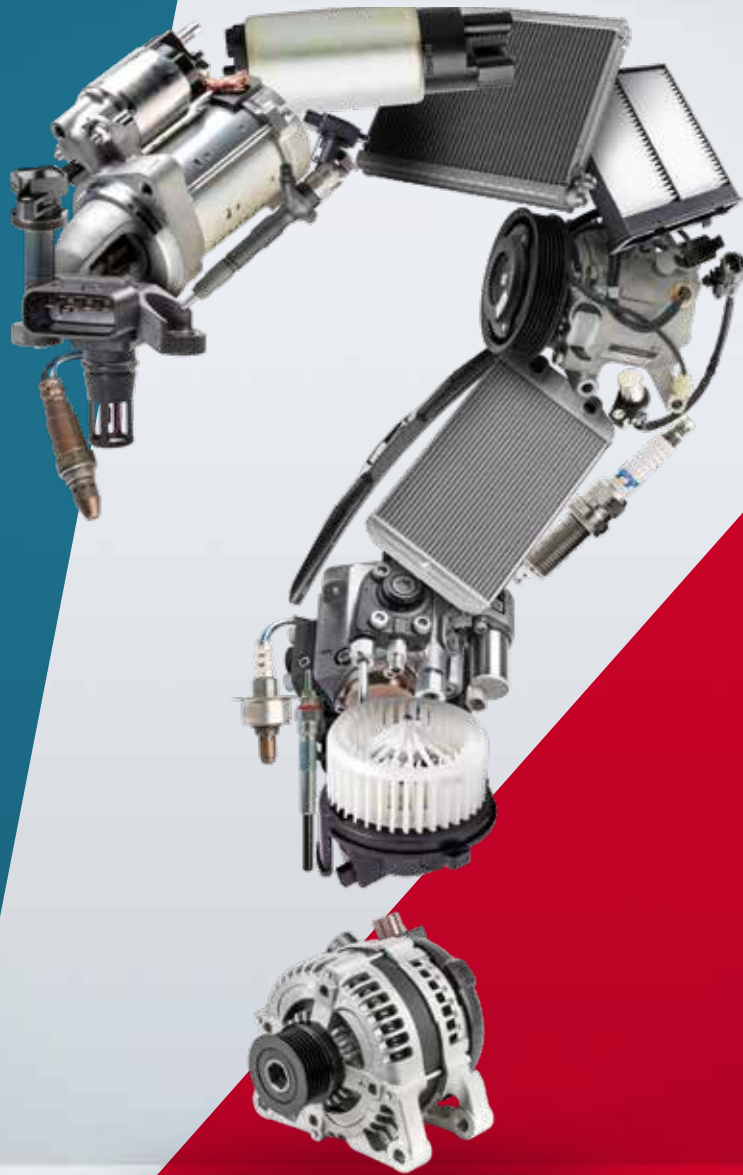


DENSO



Business Insight

Driven by
Quality

Content

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A contribution by:

DENSO

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Editorial

The value of relationships has never been higher than it is today. Businesses can only survive and thrive where connections among stakeholders exist. As a distributor, we at DENSO seek to strengthen existing associations and work more closely with you.

I believe that a strong relationship needs a dialogue of communication; to speak and to listen. And a two-way flow of action; to give and to take. In the context of our customers and DENSO, we use the words 'push' and 'pull'. Let me explain.

'Push' activities are designed to incentivise you – our distributors – to increase the wholesales of DENSO products. Campaign activities are organised by DENSO Regional Sales Teams and aim to support you to extend your DENSO product offerings. Consequently, you will be rewarded for promoting the brand.

The 'pull' element involves DENSO and our distributors working closely to inform you of who we are, what we offer, and how we can do business. Our purpose is to create demand for DENSO products and services by delivering exceptional know-how of our ranges. The result? A healthy cycle of sales and stock replenishment. How? Through a multitude of communication channels; training, product news, and exhibitions.

At DENSO, we are market leaders in what we do, and we are passionate about delivering informative, useful, customised training. We also share product news via the DENSO website, app and printed materials. Exhibitions provide another opportunity for us to engage with the independent aftermarket. To talk and to listen – to do business.

As stakeholders in the independent automotive aftermarket, we would be wise to value each other. To work, adapt and plan together for the future. I speak for the entire team at DENSO when I say that we are fully engaged in collaborating with you through 2020 and well beyond.

Best regards,

Luca Govean
Director of Independent Aftermarket Sales

Luca Govean holds the position of Independent Aftermarket Sales Director at DENSO Europe. His vast experience within the automotive industry has allowed him to expand DENSO's Independent Aftermarket business, since joining the company in 2016.

He leads regional teams across Europe including sales, customer service, product management, product marketing, field service engineers and marketing communications to achieve growth targets. Luca also coordinates Europe International trading groups and is responsible for launches of new DENSO products and services.



Driving aftermarket innovation

DENSO is a world-leading automotive supplier of advanced technology and components for thermal systems, powertrain control, electronics, information and safety.

With headquarters in Japan and local offices throughout Europe, the company is a key supplier for manufacturers, distributors, wholesalers and repairers across the globe.

Few aftermarket suppliers are as future-facing as DENSO. The company pioneered the first electric compressor for hybrid cars and continues to invest in research and development around electric and hybrid vehicles.

In fiscal 2018, DENSO's R&D investment was increased to approximately 4 billion Euros to accelerate the development of new technology that truly reflects society's needs, making it the first in the world in the automotive parts industry in terms of R&D expenditure and 40th in the world overall.

Our 70th anniversary

16th December
1949
saw the inception of
NIPPONDENSO CO. LTD

211
sites



DENSO now employs more than
170,000 brilliant minds

From this point forward,
the company that we now know as



has evolved to lead the way in
advanced automotive technologies

Safer mobility solutions

Sustainable mobility solutions

Together, we draw on past successes and
look forward to a bright future of innovating for a world with...

More connected mobility solutions



The DENSO Creed




The DENSO Creed represents our commitment to the sustainability of society as well as our basic management philosophies and long-term policies.

<p>“Be trustworthy and responsible.”</p> 	 <p>“Cherish modesty, sincerity, and cooperation.”</p>	<p>“Be pioneering, innovative, and creative.”</p> 	 <p>“Provide quality products and services.”</p>
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Sustainability goals

Our vision for 2025 is based around 3 key targets:

 <p>Energy ½</p> <p>To cut CO₂ emissions by half with technologies that resolve global warming, energy, and resource issues.</p>	 <p>Clean x2</p> <p>To reduce the impact of environmentally hazardous substances, emissions, and waste by half, as well as contribute to improved air quality by cutting vehicle emissions.</p>	 <p>Green x2</p> <p>To double our green activities, with programmes such as biofuel research and the creation of green spaces and communities.</p>
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DENSO world-first innovations

Our world-first innovations range from **common rail systems** that dramatically improved diesel engine performance to **night view technology** that detects pedestrians in the dark.

The platinum spark plug in 1988 was the world’s first with a lifespan of up to 100,000 km.

And the **creation of the QR code, originally developed in 1994**, is the machine-readable barcode now used by companies and consumers all over the world.

What is OE quality?

At DENSO, when we say OE quality, we mean it.

The testing process during the OE development phase is centred around making sure the parts meet the highest standards, as defined by vehicle manufacturers, international legislation and DENSO’s own internal specifications.

The OE parts that are tested eventually become part of DENSO’s aftermarket range, meaning that if you choose one of our aftermarket parts, you’ll be choosing a part that has benefited from the same expertise, the same learnings from research and development and the same rigorous testing as the originals. **That’s OE quality.**

One of our engine tests simulates a ‘worst case’ scenario in Death Valley, the hottest place on earth. The test involves a 10-mile uphill drive, towing a trailer, in 40°C. If the parts can handle that, they can handle anything!



Market insights

Nigel Cole, Senior Global ITG Manager, DENSO Corporation, gives his view on the trends affecting the aftermarket.

With over 30 years' experience, Nigel Cole is ideally placed to comment on the changes and challenges that face the aftermarket today.

Cars of the future

"I strongly believe that the car is still king," states Nigel. He goes on to explain, "There are many two-car families across the world, in areas outside of big cities. And for many young people, leaving home is happening late in life. Therefore, having a car provides independence and identity. Cars will be around for a long time."

It's certain that diesel and petrol cars will continue to need aftermarket services for some time. But what is the car of the future? Electric cars will be key, but Nigel cautiously points out there is a risk that the charging infrastructure won't be able to meet demand. "Furthermore, if electricity use increases and leads to a rise in electricity price, the cost of ownership may not be low enough to encourage the rapid growth of electric car ownership as predicted," he says.

That leaves the interesting prospect of hydrogen fuelled cars. It is viable to envisage petrol/diesel forecourts (of which there are 7,000 in the UK alone) offering hydrogen instead of traditional fuel types. It could be less than four years before hydrogen cars are readily available and able to compete with the hybrid and electric vehicles.

"DENSO is fully immersed in future technologies and will continue to be a key supplier to the aftermarket of the future."

Whatever the future car parc looks like, it will certainly have fewer parts and the motors will be totally different to what we see today. Nigel details, "Vehicles will have more electrics, computers and sensors. This is important for the aftermarket to plan for. DENSO is fully immersed in future technologies and will continue to be a key supplier to the aftermarket of the future."

Nigel urges industry players to keep training in trends and technologies. Looking ahead is vital for distributors, independent garages and workshops, all of which could gain and retain new business if they are fully informed about market and vehicle changes.

Consolidation of pricing

"ITGs are now recognised as market driving forces, rather than merely clubs," comments Nigel. "Made up of tens of thousands of members, such groups exert influence in the relationship between supplier and distributor."

Distributors and garages are set to gain from consolidation through an inevitable reduction of parts pricing. Europe is heading towards a common pricing structure, which will follow in other markets.

Nigel is confident that DENSO will remain influential due to their innovation, premium quality products and expertise in OE technology.

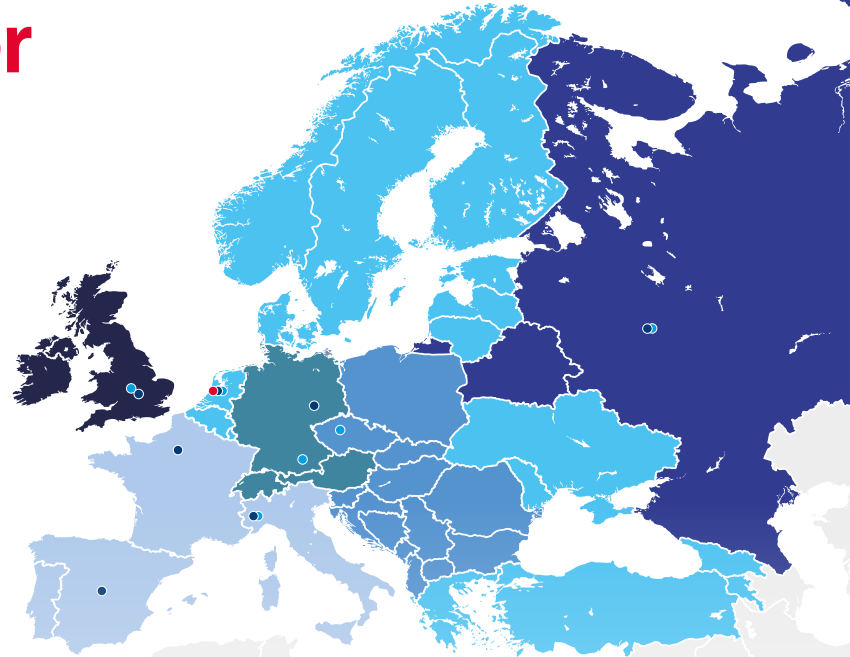
Importance of fleets

Professionally managed fleets are not a new trend, but still a focus for aftermarket garage networks. Formed of company and rental cars, taxis such as Uber or shared vehicles, fleets represent an important sector. Nigel states, "Increasingly, it is people other than the driver of the vehicle who are responsible for maintenance. These intermediaries will want all their fleet serviced by as few suppliers as possible."

Fleet vehicles tend to spend more time on the road, meaning additional wear and tear. Since uptime is of key importance to fleet managers, a cohesive approach from the aftermarket to minimise downtime and ensure competitive total cost of ownership, is required.

Working together

Our sales teams are available to support you with information, technical data and your account settings. We have eight warehouses across the UK, Germany, France, Spain, Italy, the Netherlands and Russia, supplying parts to 46 countries with next day delivery.*



All territories coloured in the map are covered by local Sales offices and/or local Sales Representatives.

● **Sales regions and office locations:**

UK & IRE

- Ireland
- United Kingdom

Contact:
Martin Pring,
Regional Manager,
UK

DACH

- Austria
- Germany
- Switzerland

Contact:
Christian Soethe,
Sales Manager,
DACH

Russia

- Belarus
- Kazakhstan
- Russia

Contact:
Ilya Sokolov,
Regional Manager,
Russia

Eastern Europe

- Poland
- Czech Republic
- Slovakia
- Hungary
- Romania
- Bulgaria
- Albania
- North Macedonia
- Montenegro
- Bosnia & Herzegovina
- Kosovo
- Serbia
- Croatia
- Slovenia

Contact:
Richard Rybáček,
Regional Manager,
Eastern Europe

Export

- Armenia
- Azerbaijan
- Georgia
- Moldova
- Belgium
- Cyprus
- Denmark
- Estonia
- Finland
- Greece
- Iceland
- Israel
- Latvia
- Lithuania
- Luxembourg
- Malta
- Netherlands
- Norway
- Sweden
- Turkey
- Kyrgyzstan
- Uzbekistan
- Ukraine

Contact:
Joep Barendse,
Regional Manager,
Export

South Europe

- Spain
- Portugal

Contact:
Miguel Portolés,
Regional Manager

France

Contact:
Hervé Moreau,
Regional Manager

Italy

Contact:
Paolo Vasone,
Regional Manager

● **European headquarters:**

- North Europe - Weesp,
- The Netherlands
- South Europe - Poirino, Italy

● **Distribution warehouses:**

- Gennevilliers, France
- Leipzig, Germany
- Madrid, Spain
- Milton Keynes, UK
- Moscow, Russia
- Vladivostok, Russia
- Poirino, Italy
- Weesp, The Netherlands

Unprecedented times

The global economic shock of early 2020 has resulted in lower new car sales which I suspect may continue for some time as individuals recover from the financial effects of the Coronavirus. As such, there will be an ageing vehicle car parc out there; more used cars that need servicing and more parts that need maintaining. DENSO Corporation is eager to support all aftermarket stakeholders gain from this larger aftermarket pool through training, innovative digital services and market-leading product ranges.

Nigel Cole, Senior Global ITG Manager, DENSO Corporation

Your DENSO Aftermarket Sales contacts across Europe can be reached via the online form:



*Depending on stock and location.

e-Videns

Workshop customers don't want to spend money on something they don't understand. It makes for an uncomfortable, cynical experience. If workshops are able to 'open up' a formal vehicle inspection, they will establish a much closer relationship between technicians and drivers, and as a result, improve repeat business and recommendations.

In response to this market need, DENSO, in close cooperation with workshops around Europe, has developed e-Videns. An inspection tool, used by the mechanic, e-Videns combines a Driver Interview, System Scan, four different Visual Inspections and a complete Engine Health Check. All this is done using an intuitive digital platform that allows a technician to evaluate the health of a vehicle, objectively.

"The big advantage of e-Videns is that it's easy to use and guides mechanics through the end-to-end health check, so even a less experienced mechanic can use it – larger workshops can deploy a junior mechanic to carry out a test, who can then provide valuable data to the skilled mechanic"

Tereza Čechová,
Marketing Manager Eastern Europe







e-Videns breaks down the barriers between workshop and customers by inviting the motorist to be part of a previously closed-off process, building trust and increasing the likelihood of a swift sign-off on required and advised work.

Customer clarity is further enhanced by the tool's ability to uncover 'hidden' issues with a vehicle that requires attention and pre-empting faults that may be about to occur, saving the car owner both time and money.

For workshops, DENSO e-Videns increases efficiency thanks to its intuitive interface, meaning that a wide range of garage personnel can carry out the inspection of vehicles in a structured method.



Step-by-step guide

	<p>Driver Interview</p>	<p>The user-friendly check begins with an optional short questionnaire for the driver, which quickly assesses the customer complaint – if any.</p>
	<p>Visual Inspection</p>	<p>e-Videns provides four different optional, detailed, checklists, which mechanics can walk around the car, ensuring a thorough visual inspection. The four inspection lists available are, Maintenance, Summer, Winter and Service Acceptance. For a more transparent experience, technicians can invite their customers to join the inspection, to understand the status of their vehicle.</p>
	<p>System Scan</p>	<p>Plugged into the OBD connector, e-Videns will perform a scan of all vehicle systems to detect error codes. Technicians can follow the scan as it communicates to the tablet via Bluetooth.</p>
	<p>Health Check</p>	<p>Using unique reference data, e-Videns monitors and compares live data from the running engine. It identifies problems and pre-empts future issues. The cloud data storage is unique to DENSO and allows remote access to engine reference data – meaning easy retrieval of vehicle archives.</p>
	<p>Reset</p>	<p>In order not to have to change equipment when not necessary, a Reset function is available for resetting the Service Interval and Fault Codes.</p>
	<p>Reporting</p>	<p>On completion, which, for a full Service Reception inspection will take maximum 12 minutes, a simplified report can be shown to the driver; the reports are easily accessible through the cloud.</p>

The workshop customer will enjoy a more transparent experience and an improved customer service, resulting in improved trust, a strong likelihood of return custom and word-of-mouth recommendation.

For more information scan the QR code:



Diesel

Although the recent industry trend shows a move towards electric vehicles, diesel-fuelled vehicles will remain a significant part of the global fleet of vehicles. Innovations from manufacturers, including DENSO, will remain necessary to ensure improved diesel technology performance.

DENSO is one of the world's major suppliers of diesel systems. We have produced injection pumps for diesel engines since 1957 and offer a complete range of products for the engines of today and tomorrow. Our diesel programme gives wholesalers, distributors and workshops access to advanced, original DENSO technologies, as well as delivering guaranteed quality and performance.

DENSO's common rail (CR) system remains one of the most popular across the automotive world. The following CR components are supplied by DENSO to the independent aftermarket:

CR Supply Pumps

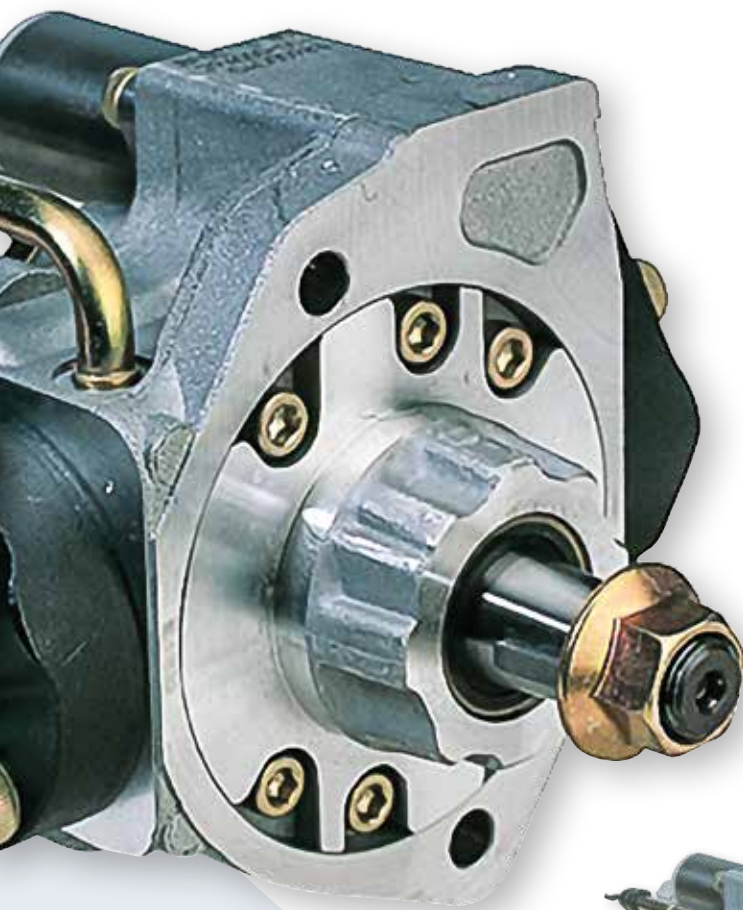
Our CR supply pumps ensure consistently high-pressurised fuel in the rail and fuel supply lines to each injector.

CR Injectors

Our advanced CR diesel fuel injectors are the reliable, powerful solution to provide diesel engines with the precise amount of fuel, at exactly the right time, creating the ideal condition for efficient combustion.

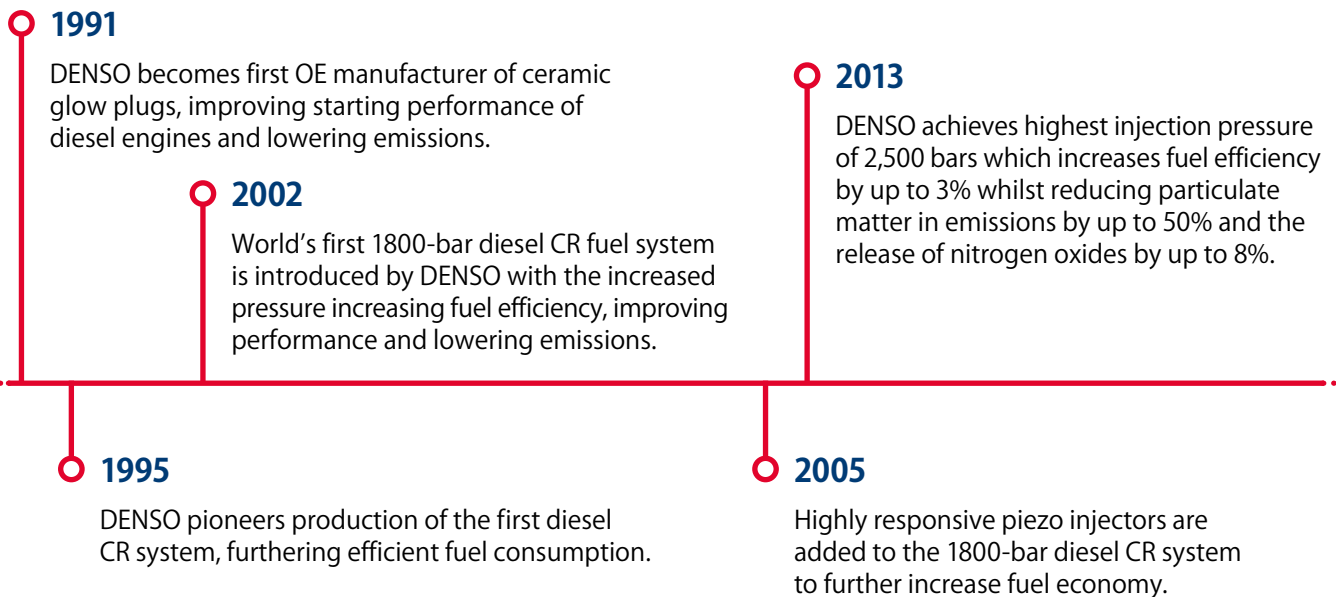
Suction Control Valve Kits

These valve kits ensure the right amount of fuel is fed from the fuel tank, through the fuel filter, into the supply pump. This technology allows a reduction of components in the fuel supply circuit.



Leading the way in diesel development

A number of DENSO industry-first technologies have helped clean up diesel engine emissions, including:



Why choose DENSO diesel products?

- All units are unique to the DENSO range.
- As the products fulfil OE quality level standards, the diesel replacement parts are of the highest quality.
- The system boasts a very low warranty ratio.
- Professional CR-DENSO system diagnostics are possible due to the DENSO diagnostic C-tool.

DENSO'S



'DID YOU KNOW?'

The latest version of DENSO's CR system optimises fuel injection quantity and timing with 100,000th of a second precision – the equivalent amount of time it takes a Formula 1 race car, travelling 300 km/h, to drive one millimetre.

For more information scan the QR code:



Engine Management Systems

Advanced design and the highest OEM quality. These are the exceptional qualities you'll look for in an engine management systems (EMS) range for the aftermarket.

Precision is also vitally important; making sure replacement parts are an exact fit for the vehicle, without the risk of difficult-to-trace electronic malfunctions.

EMS components are usually developed for a specific engine architecture. It is possible for two OE parts to look identical, but to have different functional behaviour. Examples of these invisible, yet crucial, differences are; a different pinout on the connector, different internal components, and other firmware loaded into the electronics.

As one of the world's foremost pioneers and tier-one OE manufacturer of engine management systems, DENSO pays a great deal of attention to optimising parts for specific applications, ensuring better overall performance, efficiency and lifetime (reliability). Such a detailed approach to production means volumes per part are smaller.

In contrast to OEM business, the aftermarket can often be in search of generic products, that are suitable for a range of cars. However, this is a risk. There are many products to be found on the market that fail OE specifications. Sometimes this is noticeable because of poor fitment, or when the part's performance is a bad match for the car. These flaws are known as consolidation mistakes. Sometimes such errors aren't immediately evident, but over time can cause higher fuel consumption, increased exhaust emissions or poor engine performance. These can lead to dangerous situations when an engine stalls suddenly, or only allows "limp-home" driving mode.

Consolidation mistakes derive from suppliers with less experience in producing specific components. Without detailed engineering experience or expert knowledge of the OE product, the quality cannot be premium.



DENSO's OE heritage provides an essential foundation of technical competence and expert engineering information, both of which are utilised in developing and producing an aftermarket EMS range. We have great understanding of car maker's specifications, the integration of functions within EMS systems, and we use state-of-the-art OEM testing facilities. As a result, the independent aftermarket can be assured that the contents of a DENSO aftermarket box comply with the same specifications as the part that was designed and installed into the vehicle when it came off the assembly line.

DENSO's continually expanding EMS aftermarket programme includes:

- Cam and crankshaft position sensors
- Exhaust gas temperature (EGT) sensors
- Exhaust gas recirculation (EGR) valves
- Ignition coils
- Fuel pumps
- Manifold absolute pressure (MAP) sensors
- Mass air flow (MAF) sensors

Why choose DENSO EMS sensors?

- DENSO developed the world's first EGR valve with an integrated air intake throttle valve. This EGR combination valve is half the size of conventional models, reducing weight which is key in the down-sized engines of today.
- We launched the world's first plug-in type Mass Air Flow meter inserted into the intake pipe wall, reducing the size and weight and aiding installation.
- We were also the first to introduce quantitative measurement to our Lambda Sensors, enabling them to sense both if the air/fuel mixture is too lean or too rich, and by how much.
- DENSO EMS products are fitted as original equipment in many of the world's leading vehicle manufacturers.
- The EMS products that we sell to the aftermarket meet the same quality standard as the products that we sell to our OE customers.

DENSO'S



'DID YOU KNOW?'

The maximum temperature range of DENSO EGT Sensors exceeds 1000°C, and they are capable of sensing a sudden change to such temperatures within 7 seconds!

For more information scan the QR code:



Ignition

Successful, fuel-efficient ignition is one of the most important engine functions, yet a common cause of motorist complaint. DENSO has been setting the standard for ignition innovation for 70 years. Our product range covers ignition components for diesel, petrol and hybrid vehicles.

DENSO is the founder of hybrid systems, and with their use becoming more commonplace, the traditional Internal Combustion Engine (ICE) will have a different role in the future. This means that there is also a new future for ignition. The ICE connected to the hybrid system will be switched on and off more often than an ICE in a traditionally-fuelled vehicle, which gives more importance to a non-failure ignition system with worse ignition circumstances.

Currently, the most important areas for improvement in ICEs are the environmental features and operating parameters. In this context, small but mighty products like glow plugs and spark plugs play a very important role in the here-and-now of car production and the aftermarket.

Glow plugs:

Glow plugs have been an essential part of all diesel engines since their invention way back in the early 1900s. In a diesel engine, combustion is achieved by compressing the air in the combustion chamber. The compressed air raises the temperature, fuel is added to initiate the combustion cycle, powering the engine.

During the combustion process, if the combustion cycle does not meet the required temperature, not all of the fuel will be burnt. The unburnt fuel becomes carbon particles, which are released into the atmosphere via the exhaust and are harmful for the environment. In order to avoid this situation, glow plugs are used to heat up the air and ensure the correct temperatures are reached, so all the fuel is burnt and harmful emissions are reduced.

Glow plugs also play another important role in reducing emissions – they provide heat for the diesel particulate filter at regular intervals, as determined by the engine management system.

At DENSO we are proud of our all-makes, high quality glow plug programme. The product range encompasses all current glow plug technologies including single coil, double coil, extended post-heating, ceramic and instant heating.



Why choose DENSO glow plugs?

- Our glow plugs are compatible with manufacturers' specifications and provide long service durability.
- Faster heat-up times and a reliable cold-start.
- Extended post-heat temperatures, meaning lower emissions.
- DENSO's excellent coverage ensures suitability for almost every diesel passenger car engine in Europe and beyond.
- More applications are covered with fewer part references.
- At DENSO, we are experts at developing and manufacturing glow plugs – we have been doing so since 1963. We use the best materials for the best quality.
- DENSO glow plugs meet ISO TS16949, ISO14001 and OHSAS 18001 standards.

DENSO'S



'DID YOU KNOW?'

A world-first innovation; in 1991, DENSO became the first OE manufacturer of ceramic glow plugs.



Spark plugs:

Downsizing, hybrid and start/stop technology bring new dimensions to the role of the spark plug; its size will reduce, its electrodes will slim down, and its materials will be more precious. The 20th Century designed engines equipped with nickel will give way to more effective iridium plugs.

As an engine's coefficient of performance and fuel efficiency increases and as emissions decrease, the temperature in the combustion chamber goes up. But only the very best, most durable ultra-thin electrode can withstand the high temperatures and pressured environment of the combustion chamber. That is why the assembly lines of many car companies have already fully transitioned to the use of iridium spark plugs. As one of the hardest materials with a high melting point, iridium offers the advantage of high density and high corrosion resistance even at a temperature of 2450°C. So compared to regular nickel plugs, iridium spark plugs have much higher capabilities.

Today, we can confidently say that iridium, this master of durability, corrosion resistance and strength, is the perfect material for spark plug electrodes. It is a huge step up compared to platinum.

At DENSO, we offer the aftermarket's best, all-makes spark plug programmes, including our market-leading Iridium TT spark plug (DENSO uses higher grade technology that enables the plug to outperform the less advanced competition).

Why choose DENSO spark plugs?

- DENSO has been selling its patented Twin Tip (TT) spark plug technology for over 10 years.
- Unique to the independent aftermarket, DENSO's TT spark plugs are available in nickel and iridium, offering 87% car parc coverage throughout Europe.
- DENSO spark plugs offer higher margins for distributors compared to competitors.
- The thinner the electrode, the easier the flame growth and more stable the combustion. Many DENSO Spark Plugs have the thinnest centre electrode on the market at only 0.4mm.
- Since the introduction of Nickel TT in 2009 and Iridium TT in 2015, the range has continued to grow in popularity, with its market share increasing 25% year on year over the past six years.
- Our product range includes Nickel with patented U-groove, Double Platinum, Patented Twin Tip (TT), Iridium Power 0.4mm, Iridium Long Life, Iridium Tough 0.4mm, Super Ignition Plug (SIP) and Iridium Racing 0.4mm.
- Many spark plugs featuring DENSO-patented innovations like U-groove on Nickel and Iridium Power, the Twin Tip with protruded ground electrode, and the 0.4mm center electrode size are made from an improved Iridium and Rhodium Alloy.

DENSO'S



'DID YOU KNOW?'

DENSO Iridium TT spark plugs have, for the majority of cars, a life span of 120,000 km. For selected models, they can meet all OE car maintenance requirements for the lifetime of the vehicle. Check TecDoc/MAM for your DENSO TT reference.

For more information about glow plugs scan the QR code:



For more information about spark plugs scan the QR code:



Lambda Sensors

As one of the world's foremost developers and manufacturers of original vehicle parts and systems, DENSO's understanding of lambda (O_2) sensor technology is unrivalled.

Since we first produced them in 1978, DENSO has become one of the leading lambda sensor suppliers in the world, with several hundred million of our devices measuring the air/fuel (A/F) mixture in cars globally. As the automotive industry continues to improve its emission standards, DENSO's engineering advances ensure that our lambda sensors become more advanced – featuring pioneering sensor technologies that help cars to burn fuel more efficiently and produce fewer emissions.

Inside each sensor, there is the element that undertakes the sensing function. From a construction perspective, there are two types of sensor element design:

Thimble type elements, made from Zirconia ceramic. These are supported by a separate heater to reach the operational temperatures quickly. Thimble type sensors are more robust; able to handle high levels of vibrations and pollution.

Planar type elements, which consist of laminated layers of ceramic materials that integrate both the sensing element and heater functions. Planar sensors allow the quickest activation time possible.

Both types are suitable for all diagnostic functions where oxygen concentration detection is crucial. They are traditionally used to detect lean and rich combustion mixtures in order to regulate the engine within the catalyst purification window. Both types can be produced as switching or linear versions.

Switching sensors form the majority of the market. They generate a discrete high-low output signal around stoichiometric exhaust conditions that occur when the air-fuel ratio is 14.7:1 ($\lambda=1$).

DENSO's cutting edge A/F sensor technology is a world-first innovation, offering a sensor with a linear output that helps vehicles to meet the tightening emission regulations. This is done over a very wide range of air-fuel mixtures, enabling the engine computer to compensate in the most efficient way. Both thimble and planar type A/F sensors are available to the aftermarket in direct fit only.





Why choose DENSO lambda sensors?

- DENSO's unique thimble type O₂ sensors have the fastest feedback response time on the market.
- With the planar types of our O₂ sensor, the unique single heater-sensor element guarantees the quickest start-up time possible.
- Due to the rapid start-up time, DENSO planar sensors immediately activate to maintain the operating temperature.
- DENSO lambda sensors boast high tolerance to aggressive fuel types. The unique aluminium oxide double trap layer surrounding the sensor's ceramic element protects it from problem fuel, maintaining its lifespan and efficient performance.
- Hassle-free installation – all DENSO lambda sensors come complete with housing (screw or flange type) so there is no need for add-on adaptors.
- DENSO offers wide coverage and unique applications for Asian and European cars.

DENSO'S



'DID YOU KNOW?'

In 1978 DENSO's ceramic division launched its first lambda sensor. In the same year Sony built a prototype of the first portable stereo, the Walkman.

For more information scan the QR code:



Rotating

Since the 1960s, DENSO has used its world-leading engineering expertise to develop the highest quality starters and alternators programme on the market. Already selected as original equipment by manufacturers worldwide, DENSO's aftermarket range offers the same OE specifications, with entirely new parts and no remanufactured units. Every machine is subjected to our rigorous manufacturing and testing processes, so you can be sure it meets the highest standards of fit and performance.

The DENSO rotating range is comprised of starters and alternators.

Starters

A starter is a device that initiates engine operation. Since a vehicle engine cannot start unaided, an external force is required to provide rotational speed at or above a set value. The starter drives a built-in motor using the vehicle battery as a power source to create power and start the engine. Unlike normal direct current (DC) motors, the starter is only used for a short time (rated at 30 seconds). Thus, the starter is designed to be very small despite producing a large output.

Today, DENSO offers two, advanced types of starter for aftermarket customers:

RA-Starter

Heat resistant electric wire reduces the size and weight of this high-speed motor, whilst a cold-forged spline reduces the size and weight of the magnetic switch. It boasts an improved deceleration.

PS-Starter

A rectangular conductor and surface commutator in the armature, together with a magnet between the main electrodes of the yoke, reduce the size and weight of the starter. The damper unit combined with a high deceleration ratio further reduce starter size and decrease driving noise.



Alternators

An alternator is an important component that generates electricity using the power of the engine and supplies electricity to all the electrical components in a vehicle. The electricity remaining after consumption by the electrical components is sent to a battery for storage.

An alternator is connected to the crankshaft of the engine via a pulley and belt, and generates electricity using engine torque. Improving the power generation efficiency of the alternator reduces the engine torque load and increases the fuel efficiency of the vehicle.

Today, DENSO offers two, advanced types of alternator for aftermarket customers:

Type III Alternator

Optimised stator and rotor sizes improve the magnetic circuit to increase output. A smaller pulley diameter allows a faster rotor. The fan features two blades, integrated with the rotor, to reduce fan noise, size and weight.

SC Alternator

The world's first rectangular conductor in the stator coil increases winding density, reduces weight and increases output. This alternator utilises a one chip integrated circuit (IC) regulator.



Why choose DENSO rotating products?

- DENSO's rotating products come with a two-year warranty service.
- DENSO's products have to comply with the strict DENSO design standard which guarantees long-lasting, efficient performance.
- All DENSO rotating products are 'new in box'. There are no remanufactured units and no core surcharge or returns policy.
- Boasting maximum efficiency, DENSO Starters and Alternators are the smallest and lightest in the world, while delivering the highest outputs.

DENSO'S



'DID YOU KNOW?'

The 1912 Cadillac became the first car to replace the hand crank with an electric starter motor.

For more information scan the QR code:



Thermal

DENSO thermal components ensure the engine of a vehicle operates at the optimal temperature. Furthermore, thermal components ensure effective air conditioning (A/C) operation and heat exchange performance, as well as playing a key role in reducing vehicle fuel consumption and exhaust gas emissions.

Engine Cooling

Fitted as OE to almost 25% of European cars, DENSO's engine cooling technologies are world class. Our continually expanding ranges now bring these advanced, environmentally driven heat exchange technologies direct to the independent aftermarket – including Cooling Radiators, Heater Cores and Intercoolers, Cooling Fans and Cabin Blower Fans.

Cooling Radiators – Braze welding delivers 'closer' contact between tube and fin for more efficient heat transmission. DENSO's use of advanced metals combines high levels of conductivity and low weight to enable even thin surfaces to be machined.

Intercoolers – A heat exchanger that cools the air before being compressed by the turbocharger, making modern engines increasingly efficient. Developed by DENSO in direct cooperation with car makers, these are the highest quality intercoolers the aftermarket can offer.

Heater Cores – DENSO heater cores are designed for optimum performance in the vehicle's heating, ventilation, and air conditioning (HVAC), offering the most efficient heat transfer and maximum comfort inside the vehicle's cabin.

Cooling Fans – Developed for specific cars and engines, DENSO guarantee a perfect match. The cooling fans are only activated when required, to avoid unnecessary fuel consumption.

A/C Components

Drivers and their passengers expect a comfortable environment in the cabin on every journey, in all weathers.

As a world-leading manufacturer of OE thermal system products, DENSO's replacement ranges can offer unique advantages to aftermarket customers. Our OE quality programme includes replacement Air Conditioning (A/C) Compressors, A/C Condensers, Receiver Driers, Expansion Valves and Pressure Switches – each offering independent aftermarket customers a comprehensive, premium quality selection of parts to meet growing demand.

Cabin Blower Fans – Co-developed with air conditioning experts, these fans are able to cope with extreme environmental conditions. The highest quality components and housing ensure performance without unwanted vibrations. They achieve maximum ventilation efficiency whilst reducing noise.



A/C Compressors – The compressor suctions and compresses low-temperature, low-pressure gaseous refrigerant that has been vaporized in the evaporator through the absorption of heat from the passenger compartment. The compressor then discharges the high-temperature, high-pressure gaseous refrigerant to the condenser, where it changes state to liquid by dissipation of heat from the gaseous refrigerant to the outside air. The compressor is driven by the engine via a belt from the engine and a power transmitting device (magnetic clutch or DL pulley). There are also electric and hybrid vehicles equipped with electric compressors that are driven by electric motors. Rotary type compressors and Reciprocating (or piston) type compressors are available.

A/C Subcool Condensers – These integrate seamlessly with the vehicle's original air conditioning system. The premium aluminium construction guarantees a long lifespan and improved heat radiation, due to the additional sub-cooling section. The result is a lower thermal load on the compressor, aiding better fuel economy.

Receiver Driers – The receiver drier stores refrigerant until the evaporator requires it, depending on the cooling load. It separates gaseous refrigerant from liquid refrigerant, ensuring that only liquid refrigerant flows to the expansion valve. It also works to filter and dry the refrigerant.

Expansion Valves – A thermostatic expansion valve controls the evaporation process, inside the evaporator. It reduces the high-pressure, high-temperature liquid refrigerant into a low-pressure, low-temperature mist refrigerant. The expansion valve also adjusts the refrigerant quantity to the evaporator, to maintain optimal cooling performance, depending on the cooling load.

Pressure Switches – Pressure switches (or pressure sensors) are a safety device, which protect the refrigerant cycle components from refrigerant pressure that is too high or too low.

Why choose DENSO thermal products?

- DENSO is the global number one for OE thermal products. This market-leading research, development and technology is applied to DENSO's premium aftermarket thermal product range.
- Easy to install: DENSO cooling units are built for a specific car and its engine specification which guarantees trouble-free installation.
- All DENSO A/C Compressors are new (no remanufactured parts), filled with the right type of oil and delivered as complete assemblies, so no core charge or deposit is required.
- DENSO's thermal range offers distributors and workshops quality products for aging vehicles at a competitive price.
- All DENSO thermal products have to comply to the strict DENSO design standard which guarantees long-lasting, efficient performance. The warranty ratio is extremely low.

DENSO'S



'DID YOU KNOW?'

With a 40% global market share, automotive manufacturers across the world rely on the quality of DENSO's A/C Compressors. DENSO brings the same OE A/C Compressors to the aftermarket.

For more information scan the QR code:



Wiper Blades

Unique design features. Superior quality materials. Made to the strictest OEM standards. These are the exceptional credentials of DENSO's Wiper Blades – providing drivers with a safe, comfortable field of vision whatever the weather.

DENSO Wiper Blades are the choice of leading car makers worldwide and are fitted as original equipment on a host of high-end vehicles. From standard and flat blades to the latest hybrid designs, DENSO Wiper Blades combine intelligent design, top quality materials and accurate manufacture – ensuring they wipe better and last longer. All these advantages are also available for our aftermarket customers.

There are four product types in our wiper blades range:

DENSO Flat Wiper Blades – Flat Wiper Blades hug every windscreen closely and evenly to wipe away rain and debris in even the worst weather conditions. With sleek styling and long life, they offer all-round appeal to every motorist.

DENSO Conventional Blades – Conventional Blades offer a selection of four advanced blade profiles to suit different windscreens and vehicle styles. There are also four different choices of installation systems, and three clip options.

DENSO Hybrid Wiper Blades – Hybrid Wiper Blades are designed with an integrated, fully covered blade and wiper arm. They combine sophisticated design with a low, out-of-view profile. Inside the wiper housing, common-use vertebrae deliver superior surface holding capability; whilst the rigid, graphite-coated rubber blade delivers a smooth, more efficient wiping performance.

DENSO Rear Wiper Blades – Manufactured using high quality, durable, non-corrosive materials, including a natural, high compression rubber which delivers an exceptional wiping edge. Our rear wiper blades' design guarantees an easy fitment.

Why choose DENSO wiper products?

- DENSO's OE technology and quality guarantee outstanding wiping performance.
- Durable, non-corrosive materials, including a natural, high compression rubber wiper, deliver long service life.
- Evenly cut edges ensure an effective wiping edge.
- Low profile inserts provide the perfect wiping angle.
- High coverage of Asian and European vehicle applications offers optimum customer convenience.
- DENSO wiper blades cover 95% of the European car parc.

DENSO'S



'DID YOU KNOW?'

Japanese bullet trains are significant feats of modern engineering, reaching speeds of around 320 km per hour (200 miles per hour). In order to reach these speeds effectively and safely, the bullet train engineers select the highest quality parts to ensure that the trains perform reliably under extreme stress. DENSO Wiper Blades are one of these products.

For more information scan the QR code:



Filtration

Every day, on every journey, every driver needs pure, clean air to breathe; no-one wants the eye and nose irritation, headaches and even breathing problems that can be caused by inhaling air containing road dust, pollutants and allergenic pollens while driving.

Happily, there is an effective solution: DENSO's world class, OE quality, technologically advanced Cabin Air Filter range, developed especially for aftermarket customers.

Trapping even those damaging particles that are far too small to see, our replacement filter ranges draw on DENSO's decades of world-leading OEM expertise, to deliver advanced, easy-fit design, long-life efficiency and complete peace of mind.

We offer two filter types to the aftermarket:

Particle

DENSO Particle Filters offer exceptional protection from dust, soot, pollen and particles. Featuring multi-layer fleece material to efficiently remove dust and solid matter, they also have a large dust-holding capacity and minimise air flow resistance.

Combination

DENSO Combination Filters offer all of the blocking, electrostatic and nanofiber technologies of our particle filters, trapping almost 100% of dust, pollen and solid particles before they can be inhaled. But thanks to an additional, activated charcoal layer located inside the filtration material, our combination filters offer an added advantage. The result is a cabin atmosphere that always stays fresh, pleasant and healthy to breathe.



Why choose DENSO filter products?

- Continuous range development by DENSO ensures the product range boasts the newest market applications.
- DENSO's Cabin Air Filters contain up to five individual layers to trap almost 100% of harmful pollutants and particles.
- Using DENSO products means a very low-pressure drop in HVAC system, ensuring efficient performance without risking damage to other components.
- The DENSO Cabin Air Filter range provides a perfect fit to the vehicle.

DENSO'S



'DID YOU KNOW?'

Without a cabin air filter, the air inside a car could be up to eight times dirtier than the air outside – especially during the first few minutes of switching the engine on.

For more information scan the QR code:



Discover **DENSO**

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