All about ignition coils

Technical Information No. 07

Perfection built in BERU®

FEDERAL-MOGUL MOTORPARTS

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Introduction

Fewer emissions, lower fuel consumption, higher ignition voltage, restricted space in the drive unit and engine compartment: The design demands on modern ignition coils are constantly increasing. Although the task of spark-ignition engines remains the same: the fuel / air mixture must be ignited at the right time with the optimum ignition energy so that complete combustion occurs. To reduce fuel consumption and emissions and to increase the efficiency, engine technologies are constantly developed further – and thus also the BERU ignition systems.

In particular, the company runs its own R&D departments at its Ludwigsburg, Germany headquarters and in Asia, in which ignition technologies are driven forward in cooperation with the international automotive industry. Thus BERU ignition coils are being precisely adapted to the requirements of modern spark-ignition engines such as turbocharging, downsizing, direct injection, lean mix, high exhaust gas recirculation rates etc. In the process, the company is able to fall back on a whole century of valuable experience as an ignition technology expert.

BERU ignition coils are produced in state-of-the-art facilities at its own production plants in Ludwigsburg and Muggendorf, Germany, as well as in Asia. BERU supplies OEM's with ignition coils for nearly all significant European volume applications. The company currently offers a range of over 400 ignition coils to the maintenance and repair markets – needless to say in original equipment quality. Today the market penetration of the range in VW vehicles is 99%, in BMW Group vehicles 80%, in the VW Group as a whole 95% – and today the range is being continuously extended in accordance with market requirements.

The spark-ignition engine

Operation of ignition coils in the spark-ignition engine

Optimum ignition of the compressed fuel / air mixture has been one of the greatest challenges for designers since the early days of engine construction. In the case of ignited sparked engines, this conventionally occurs in sequence with the compression cycle by an electrical spark from the spark plug. So that the voltage can make the jump between the electrodes, a charge must first be accumulated by the vehicles' low voltage electrical system, then stored and finally discharged at the spark plug at the ignition timing. This is the job of the ignition coil as an integral part of the ignition system.

An ignition coil must be exactly attuned to the respective ignition system. The required parameters include:

- The spark energy, which is available to the spark plug
- The spark current at the time of the spark discharge
- The combustion duration of the spark at the ignition plug
- The ignition voltage under all operating conditions
- The spark count at all speeds

Spark-ignition engines with turbocharger or direct fuel injection require higher spark energies. The high voltage connection between ignition coil and spark plug must be functional and safe. This is where BERU comes in with high-quality ignition cables with suitable contacts or high-voltage ignition coil connectors.

Demands on modern ignition coils

Ignition coils in the ignition systems of modern cars generate voltages of up to 45,000 V. It is essential that misfiring – and as a consequence incomplete combustion – is avoided. It is not only that the vehicles' catalytic converter could be damaged. Incomplete combustion also increases emissions and thus environmental pollution.

Ignition coils are – regardless of the system (static high voltage distribution, rotating high voltage distribution, double spark coil, single spark coil) – electrically, mechanically and chemically highly stressed components of the spark-ignition engines. They must perform faultlessly under a wide variety of installation conditions (on the body, engine block or directly on the spark plug in the cylinder head) over a long service life.

Plug shaft ignition coils are mounted deep in the engine compartment and must withstand extreme thermal loads.

Ignition coils: electrical, mechanical, thermal, electrochemical requirements

- Temperature range -40 °C to +180 °C
- Secondary voltage to 45,000 V
- Primary current 6 to 20 A
- Spark energy 10 mJ up to approx. 100 mJ (at present) or 200 mJ (future)
- Vibration range to 55 g
- Resistance to gasoline, oil, brake fluid

Ignition coils – design and mode of operation

Ignition coils work on the transformer principle. They basically consist of a primary winding, a secondary winding, the iron core and a housing with isolation material, nowadays two-component epoxy resin.

On the iron core of individual thin steel sheets two coil elements are applied e.g.:

- The primary winding is made of thick copper wire with approx. 200 windings (diameter approx. 0.75 mm^2),
- The secondary winding is made of thin copper wire with approx. 20,000 windings (diameter approx. 0.063 mm^2)

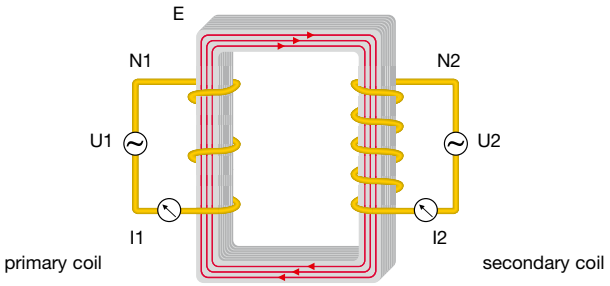
Ignition coils – design and mode of operation

As soon as the primary coil circuit closes, a magnetic field is generated in the coil. Induced voltage is generated in the coil by self induction. At the time of ignition, the coil current is switched off by the ignition output stage. The instantaneously collapsing magnetic field generates a high induction voltage in the primary winding. This is transformed on the secondary side of the coil and converted in the ratio of "number of secondary windings to primary windings". A high voltage flashover occurs at the spark plug, which in turn leads to ionization of the sparking distance and thus to a flow of current. This continues until the saved energy has been discharged. As it jumps, the spark in turn ignites the fuel / air mixture.

The maximum voltage depends on:

- The ratio of the number of windings from the secondary winding to primary winding
- The quality of the iron core
- The magnetic field

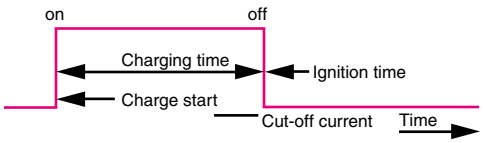
Schematic diagram: structure of an ignition coil



E = Laminated iron core (magnetic)
N1 = Windings primary side 100–250 windings
N2 = Windings secondary side 10,000–25,000 windings
U1 = Primary voltage (battery voltage) 12–14.7 V
U2 = Secondary voltage 25,000–45,000 V
I1 = Primary current 6–20 A
I2 = Secondary current 80–120 mA

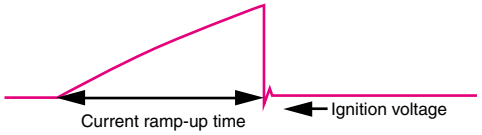
Ignition technology terminology

CONTROL



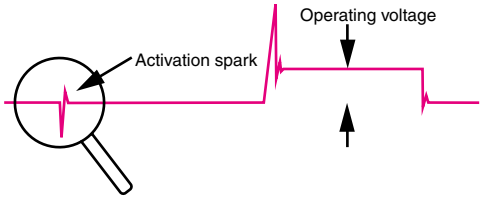
Energy storage: During current supply to the coil, energy is being stored in the magnetic field. Power on, coil is charged (primary circuit is closed, secondary circuit is open). At a specified ignition point the current is interrupted.

PRIMARY CURRENT



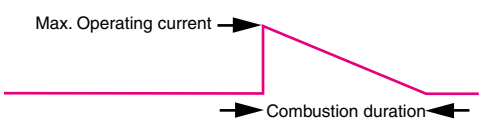
Induced voltage: Every change in current in an inductance (coil) induces (creates) a voltage. Secondary high voltage builds up.

SECONDARY VOLTAGE



High voltage: As in a transformer, the achievable voltage is proportional to the primary / secondary winding ratio. The spark flashover occurs when the ignition voltage has been reached (breakthrough).

SECONDARY CURRENT



Ignition spark: After the high voltage flashover on the spark plug, the stored energy is discharged in the spark channel (primary circuit is open, secondary circuit is closed).

Ignition coils – design and mode of operation

Spark energy

An important performance criterion for ignition coils is their spark energy. This determines the spark current and the spark combustion duration at the spark plug electrodes. The spark energy of modern BERU ignition coils is 50 to 100 millijoules (mJ). 1 millijoule = 10^{-3} J = 1.000 micro-joules. Ignition coils of the latest generation have spark energies of up to 200 mJ. This means that there is a risk of fatal injuries from touching these high voltage parts! Please note the safety regulations of the respective vehicle manufacturer.

How many ignition sparks does an engine need?

$$\text{Spark count F} = \frac{\text{rpm} \times \text{number of cylinders}}{2}$$

For example: 4-cyl. 4-stroke engine, speed 3,000 rpm

$$\text{Spark count} = \frac{3{,}000 \times 4}{2} = 6{,}000 \text{ sparks / min}$$

For a driven distance of 30,000 km with an average engine speed of 3.000 rpm and an average speed of 60 km/h, that works out at 45.000,000 sparks per ignition plug!

Ignition coil specifications / characteristics

I_1	Primary current	6–20 A
T_1	Charging time	1.5–4.0 ms
U_2	Secondary voltage	25–45 kV
T_{Fu}	Spark duration	1.3–2.0 ms
W_{Fu}	Spark energy	10–60 mJ for "normal" engines, up to 140 mJ for "DI" engines
I_{FU}	Spark current	80–115 mA
R_1	Resistance primary winding	0,3–0,6 Ohm
R_2	Resistance secondary winding	5–20 kOhm
N_1	Number of primary windings	100–250
N_2	Number of secondary windings	10.000–25.000

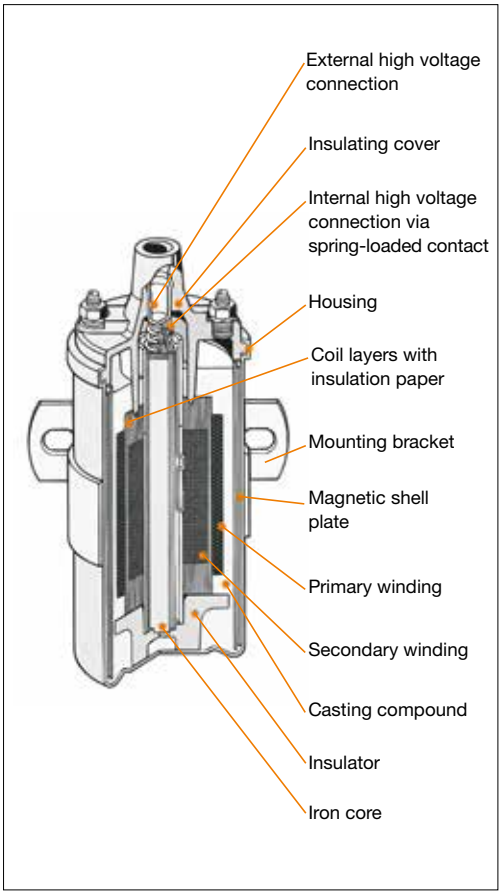
Ignition coils – design and mode of operation

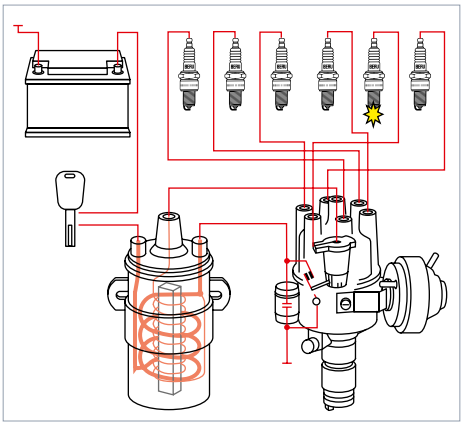
Ignition coils – types and systems

The range of ignition coils from BERU embraces over 400 ignition coil types for all current technologies: from the canister-type coils for older cars through ignition coils with integrated electronics for cars with mechanical ignition distributors and double-spark ignition coils (for Fiat, Ford, Mercedes-Benz, Renault, VW and others) to rod or pencil-coil ignition coils (plug-shaft ignition coils), which are directly mounted on the spark plug. In the case of the VW brand, the market penetration of BERU ignition coils reaches 99 per cent. Moreover, the company produces complete ignition coil rails in which several individual ignition coils are combined in a common casing (rail).

Canister-type ignition coils

Nowadays canister-type ignition coils are only installed in classic cars. These are for vehicles with rotating high voltage distribution and contact breaker control.





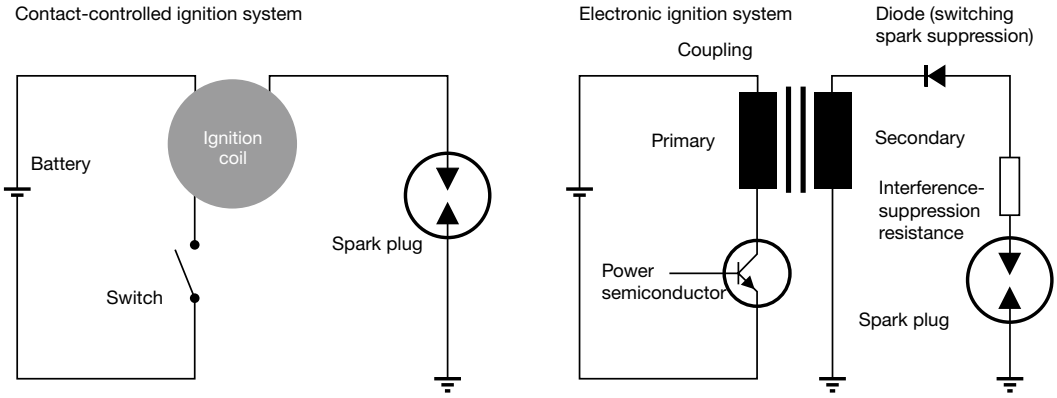
Triggering by contact breaker. In this case the voltage is centrally generated by an ignition coil and is mechanically distributed by an ignition distributor to the individual spark plugs. This kind of voltage distribution is no longer used in modern motor management systems.

Ignition coils – design and mode of operation

CONTACT-CONTROLLED AND ELECTRONIC IGNITION SYSTEMS

Closing time
In a contact-controlled ignition system, the closing time is the time in which the contact breaker is closed.

In an electronically controlled ignition system, the closing time is the time in which the primary current is switched on.



Electronic distributor ignition coils

In older ignition systems, the output stage was mounted as a separate component in the engine compartment on the vehicle body or – in the case of rotating high voltage distribution – in or on the ignition distributor. The introduction of static high-voltage distribution and the development of microelectronics made it possible to integrate the output stage into the ignition coil. This results in numerous advantages:

- Diagnostic possibilities
- Ion current signal
- Interference suppression
- Power cut-off
- Current limitation
- Thermal cut-off
- Short circuit recognition
- High voltage stabilization

BERU distributor ignition coil with built-on output stage for vehicles with mechanical ignition distributor.

Double spark ignition coils

Double spark ignition coils produce for every two spark plugs / two cylinders each an optimum ignition voltage in different cylinders. The voltage is distributed so that

- The air / fuel mixture of a cylinder is ignited at the end of a compression stroke (ignition time) (primary sparks - powerful ignition spark),
- The other cylinder's ignition spark jumps in the discharge stroke (secondary sparks – low energy).

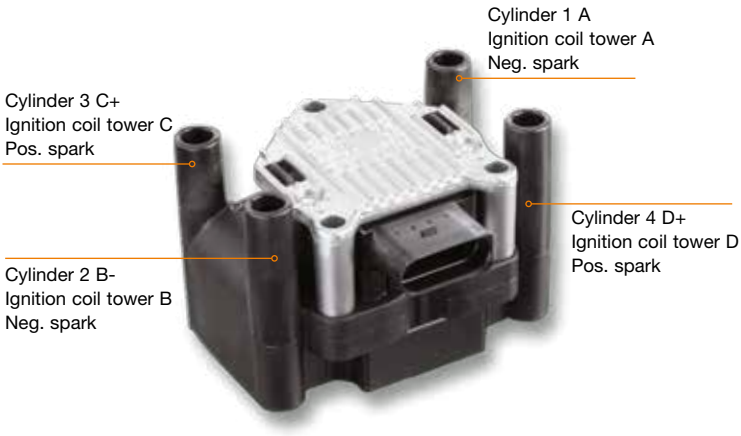
Double spark ignition coils generate two sparks per crankshaft rotation (primary and secondary spark). No synchronization with the camshaft is required. However, double spark ignition coils are only suitable for engines with even numbers of cylinders. Thus in vehicles with four cylinders and six cylinders, two and three double spark ignition coils respectively are installed.

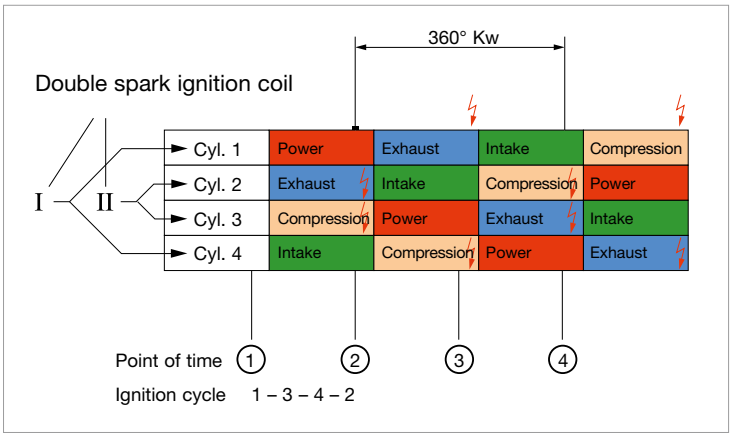
Double spark ignition coil.

Ignition coils – design and mode of operation

DOUBLE SPARK IGNITION COILS 2 X 2 FOR FOUR CYLINDERS

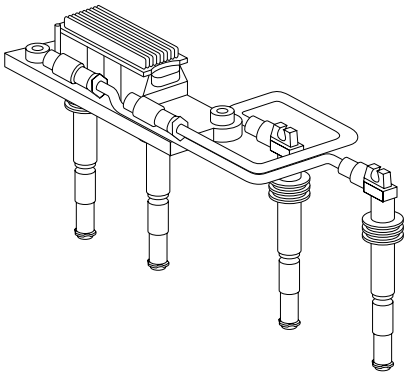
Double spark ignition coil for 2 x 2 spark plugs. For example, for: Volkswagen, Audi.





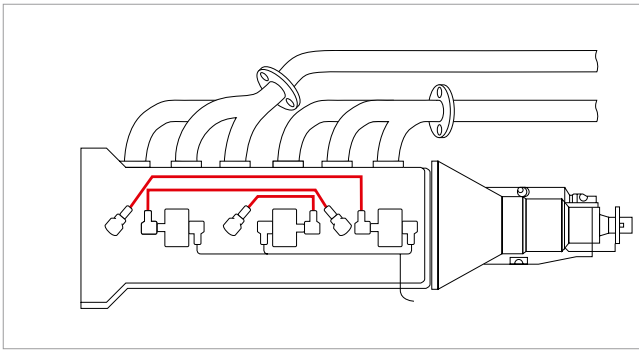
DOUBLE SPARK IGNITION COILS 2 X 2 FOR FOUR CYLINDERS

Static high-voltage distribution: ignition cable set consisting of two cables with spark plug connectors. The ignition coil is mounted on the other two spark plugs.



DOUBLE SPARK IGNITION COILS 3 X 2 FOR SIX CYLINDERS

Ignition coils are mounted on the spark plugs for cylinders 2, 4 and 6. For example, for: Mercedes-Benz M104.



Ignition coils – design and mode of operation

Ignition coil rails

In an ignition coil rail (ignition module), multiple ignition coils – depending on number of cylinders – are arrayed in a common housing (rail). However, these coils are functionally independent and operate like single spark ignition coils. The design advantage is that fewer connecting cables are required. One compact plug connection is sufficient. Moreover, the modularity of the ignition coil rail helps make the entire engine compartment more 'elegant', more clearly arranged and uncluttered.

Ignition coil rails or ignition rails are commonly used in 3- or 4-cylinder engines.

Plug shaft / plug / smart plug top coil ignition coils

Single spark ignition coils – also known as plug shaft/connector ignition coils, rod or pencil coil or smart plug top coil ignition coils – are directly mounted on the spark plug. Normally no ignition cables are required for this (with the exception of double spark ignition coils), whereby high-voltage connectors are required. In this design, each spark plug has its own ignition coil, which is located directly above the spark plug insulator. This design enables particularly filigree dimensions.

Modular, compact, light smart plug top coil ignition coils of the latest generation are especially suited with their space-saving geometry for modern downsized engines. Even though they are more compact than larger ignition coils, they generate greater combustion energy and higher ignition voltage. Innovative plastics and the extremely safe connection technology of the components inside the ignition coil body also ensure an even greater reliability and durability.

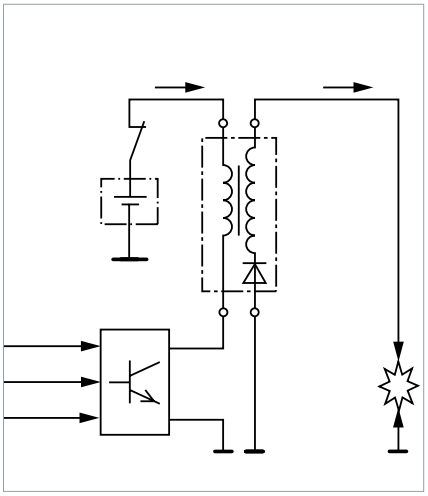
Single spark ignition coils can be used in engines with both even and uneven numbers of cylinders. However, the system must be synchronized via a camshaft sensor. Single spark ignition coils generate one ignition spark per power stroke. Ignition voltage losses are the lowest of all ignition systems due to the compact design of the single spark coil / spark plug unit and the absence of ignition cables. Single spark coils enable the largest possible range of ignition angle adjustment. The single ignition coil system supports monitoring of misfiring in the ignition system on both the primary and secondary side. Any problems that occur can thus be saved in the control unit, rapidly read out in the workshop via OBD and specifically rectified.

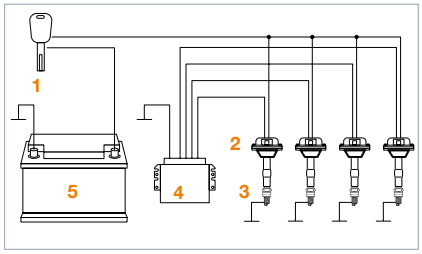
Space-saving and highly efficient BERU ignition system: double platinum spark plug with Plug-Top ignition coil. The internal pressure spring ‘bowl’ connector on the new double platinum spark plug prevents insulator flashovers.

Ignition coils – design and mode of operation

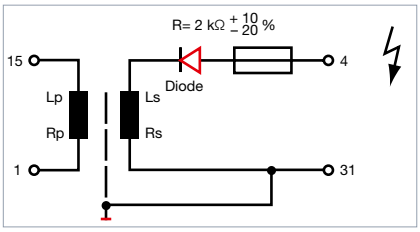
WIRING DIAGRAM FOR SINGLE SPARK IGNITION COIL

For activation of spark suppression in the secondary circuit, single spark ignition coils require a high-voltage diode.



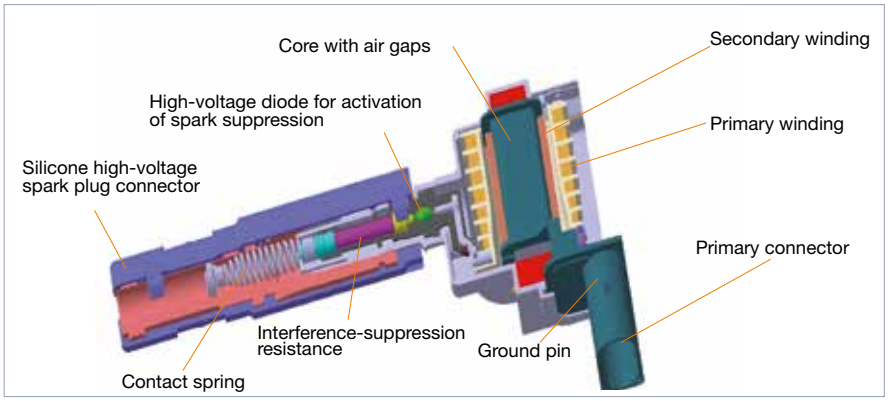


1 Ignition lock
2 Ignition coils
3 Spark plugs
4 Control unit
5 Battery



DESIGN OF SINGLE SPARK IGNITION COIL

Single spark ignition coils generate one ignition spark per power stroke; therefore they must be synchronized with the camshaft.



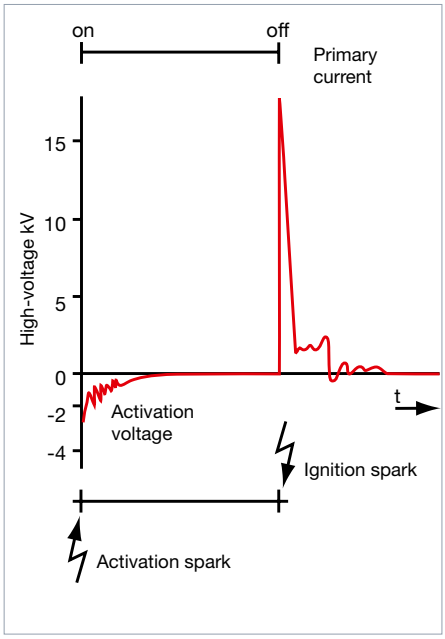
Single spark ignition coils, for example for Audi, Porsche, VW.

When the primary circuit is activated, a magnetic field builds up around the primary coil. This increase in magnetic field strength is sufficient to induce the undesired activation voltage of around 1.5 kW in the secondary winding. This can enable a weak activation spark to jump the ignition electrodes, which under some circumstances can result in the fuel / air mixture igniting at a completely incorrect time.

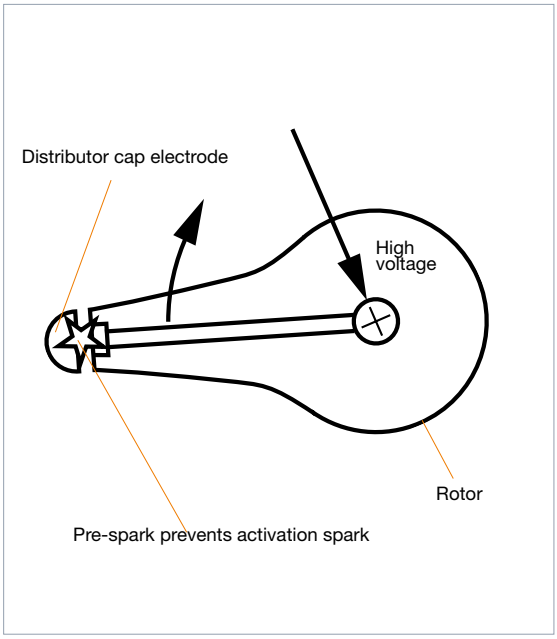
The activation spark is suppressed in all 3 systems (rotating high-voltage distribution, double ignition coil, single ignition coil):

No special measures are required in rotating high-voltage distribution systems: The sparking distance between the distributor rotor and the dome electrode of the distributor cap automatically suppresses activation sparks.

Activation spark



Rotating high-voltage distribution

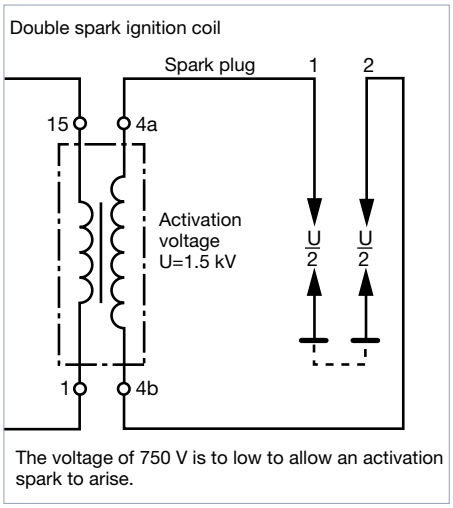


Ignition coils – design and mode of operation

In the case of static **high-voltage distribution with double spark ignition coils,** the spark plugs are connected in series,that is the activation spark must jump the electrodes of both spark plugs. Only half of the activation voltage (1.5 kV: 2 = 0.75 kV) of the secondary winding is applied across each spark plug – a voltage which is too low to generate an activation spark.

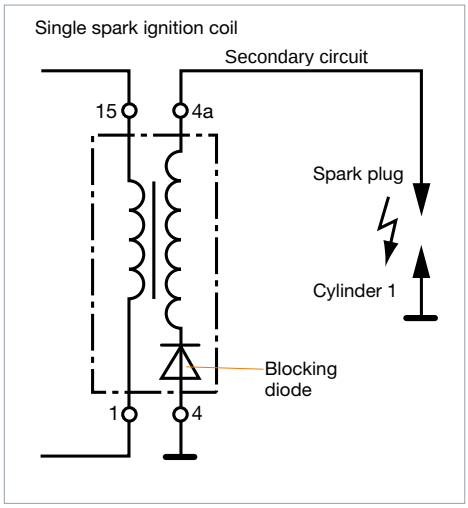
In the case of **static high-voltage distribution with single spark ignition coils,** no activation spark is produced as the high voltage diode in the secondary circuit blocks the discharge of the activation voltage. Note: the polarities of terminals 1 and 15 may not be reversed as otherwise the high-voltage diode will be destroyed.

Static high-voltage distribution with double spark ignition coil



The voltage of 750 V is to low to allow an activation spark to arise.

Static high-voltage distribution with single spark ignition coil



Dual coil ignition coils

With its new dual coil technology, BERU has added an intelligent double coil ignition system to its range, which improves combustion performance and reduces emissions. The innovative system consists of two coils in the same housing and is directly connected to a respective spark plug per cylinder. The dual coil ignition system reduces ignition delays and enables more precise ignition timing at different engine speeds / different load ranges. Furthermore, it is in a position to control individual sparks as required. In combination with an especially erosion-resistant spark plug – it enables more precise adjustment of ignition to the constantly changing operating conditions inside the combustion chamber and is perfectly designed for the latest generation of BERU spark plugs, already fulfilling tomorrow's requirements in relation to leaner burning and increased exhaust gas recirculation (EGR).

In comparison with conventional coils, the new ignition technology from BERU offers a significantly shorter ignition lag and better combustion stability over the entire combustion cycle; especially, however, in the partial load range and when idling. The integrated electronics enables seamlessly sequential charging and discharging of the coils as well as variable adjustment of the ignition energy. The advantage is minimum energy consumption over the entire running cycle.

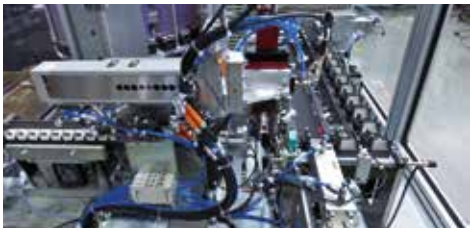
Similar to a plug-top ignition coil, the new dual coil system is directly connected to every spark plug of each cylinder, improving ignition management. Other advantages include the possibility of extending a single spark when needed and work in multi-spark mode. Furthermore, the new dual coil ignition system offers great flexibility with fluctuating ignition values and tolerates large volumes of internally re-circulated exhaust gas. It is able to optimally address market requirements, BERU is planning to offer the new technology in two versions: one version for 12 V operation and another for 40 - 50 V operation.

Ignition coil – production

The new BERU high-tech production system for plug-top ignition coils

Every year several million ignition coils, developed in partnership with the automotive industry, roll off computer-controlled, sophisticated production lines in BERU production facilities.

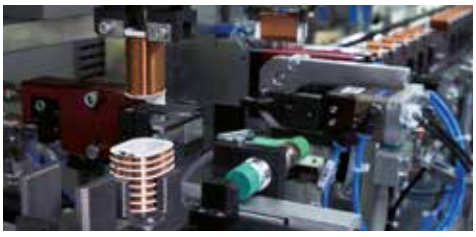
The new BERU ignition coil production line in Ludwigsburg.



The individual components are channeled into the line at the respective stations.

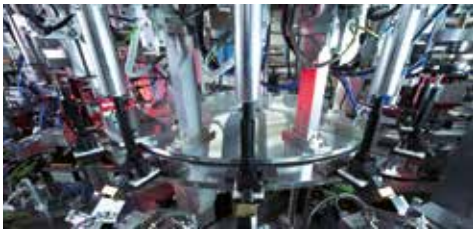
The winding of primary and secondary coils ...

... is executed and monitored by computers.



This is where the primary and secondary coils are fully automatically assembled.

The secondary wire is embedded in the casting resin by vacuum casting.



One of the most important steps in the production sequence: final inspection of the ignition coil.

Ignition coil – production

Tested quality

BERU ignition coils meet the highest quality standards and ensure operational safety even under the most extreme operating conditions. In addition, even during the development phase and of course during production, the coils undergo numerous QA tests, which are indispensable for ensuring long-term function and performance.

Already in the development phase, BERU engineers precisely modify coils for the specific vehicle application in close cooperation with the vehicle manufacturers. They pay special attention to electromagnetic compatibility, which is the subject of exhaustive test series in the company R&D center in Ludwigsburg, Germany, in order to exclude a priori faults or restrictions of communication and safety systems in the vehicle.

When the development phase is completed, the BERU ignition coils are then produced according to the highest standards – and once more undergo numerous QA test. All the company's production facilities are DIN ISO 9001 certified. In addition, all BERU production facilities in Germany are certified according to QS 9000, VDA 6.1 and ISO TS 16949 and according to the ISO 14001 environment certificate. BERU applies the most stringent quality standards in its selection of suppliers.

Genuine articles and fakes

Copies of ignition coils are often cheap – but they are also cheaply made. For reasons of costs and due to a lack of know-how, manufacturers of such cheap products cannot match the quality standards, which BERU offers.

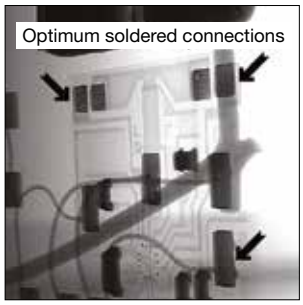
Most copies are made of low-quality materials and are cobbled together from a large number of individual components. They do not have the electrical properties and thermal load capacity of original ignition coils. Specifically in the case of coils with integrated electronics, copies only work properly in a few engine versions. Furthermore, they are often produced without reliable quality checks. For this reason, if such counterfeit goods are installed, costly sequential damage is to be expected.

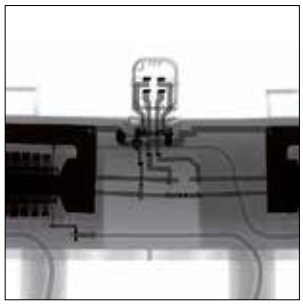
What is so dangerous about this is that even specialists cannot easily detect such defects with the naked eye. For this reason BERU has closely examined original and bogus parts below.

Ignition coil – production

In focus: solder connection, contacts, power transmission

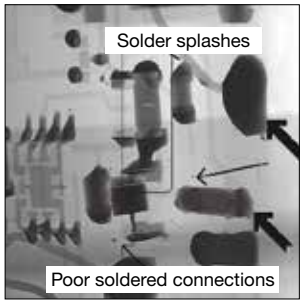
Original: Printed circuit board with bus bar connections enables automated production processes and optimum process control and, thus, consistent quality.

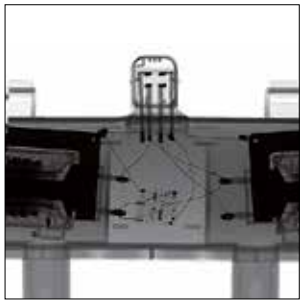




Original: Exactly placed and welded bus bars and components fixed straight into the housing in the original BERU part – a sign of quality and durability.

Cheap copy: There are various foreign bodies in the coil (see arrow tips), which is evidence of questionable production quality. Depending the location, material and thickness, these may subsequently result in short circuits and coil failure. Also noticeable: a slipped or incorrectly inserted component.

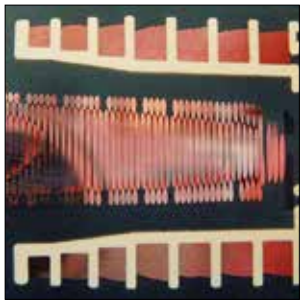




Copy: Wires running in every which way, distorted contact fields in the high-voltage connection, crooked coil bodies and boards: premature failure of the ignition coil is only a matter of time.

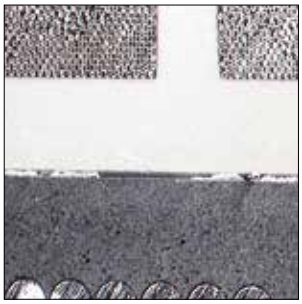
In focus: casting compound and impregnation quality

Original: BERU ignition coil with even casting compound. The filling material has been poured into the ignition coil housing under vacuum, thus preventing the formation of air bubbles.



Copy: The high-voltage cable and iron core must have a secure distance from the high voltage. In this case the high-voltage cable is too close to the iron core. Possible consequences are high voltage flashover and thus total failure of the ignition coil.

Copy: Ignition coil housing and high-voltage cable have been filled with gravel to save on expensive casting compound. Air bubbles have formed in the gaps, the impregnation quality suffers, especially in the high-voltage section: If air collects in the secondary winding, it will become ionized – this means the air becomes conductive and in effect corrodes the coil housing until a ground potential is reached. This will result in a short circuit or flash-over and failure of the ignition coil.



Copy: Separation between primary and secondary coil bodies due to unoptimized material pairings. This can result in leakage currents and disruptive discharge at the primary coil and thus lead to failure of the ignition coil.

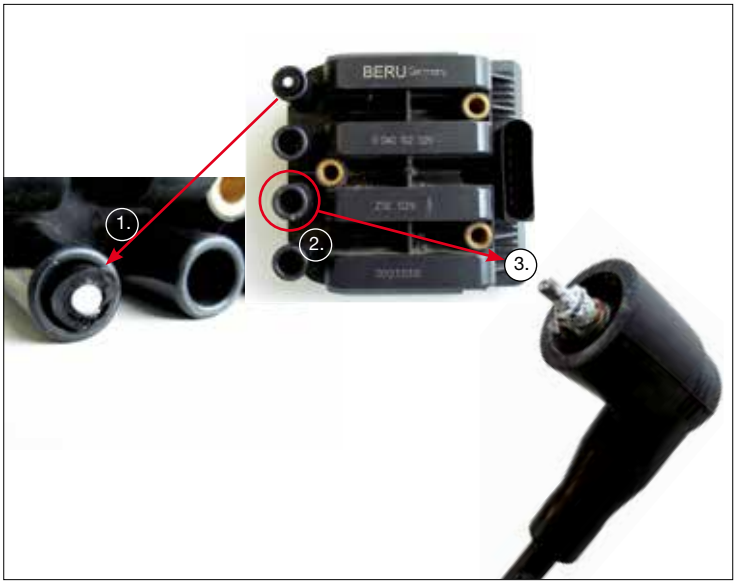
Workshop tips

BERU ignition coils are designed to last for a car's entire life cycle. Notwithstanding this, there is always a need for replacements in practice. Usually this is not due to the ignition coils themselves but to problems in adjacent components or to improper installation / removal.

Reasons for replacement

Old or subsequently installed substandard ignition coils or spark plug connectors often turn out to be responsible for supposed ignition coil defects:

DEFECT IGNITION CABLES / IGNITION COIL CONNECTORS



1. The plug of the retrofitted, low quality ignition cable has broken due to clearly visible material faults (massive cavities / air inclusions).
2. Ignition coil that is no longer functional due to adjacent substandard components. It was sent in to BERU for examination.
3. Corroded ignition coil connection that was ripped out of the coil housing when the ignition cable plug was removed. The cause was a badly fitting, low quality plug that led to corrosion and hence to fusion with the ignition coil.

CONTAMINATED SURROUNDINGS

Ignition coils, which due to their installation position frequently come into contact with spray water or road salt are especially at risk. This exposure is exacerbated by the use of engine cleaning with high pressure sprays. As a result seals can be destroyed and contacts corroded.

Ignition coils that are directly mounted on the bulkhead are especially exposed. The possible consequence is oxidation of the contacts.

Workshop tips

Plug-shaft ignition coils are mounted deep in the engine compartment and must withstand extreme thermal loads.

Coils in the immediate vicinity of the catalytic converter or exhaust manifold / cylinder head are exposed to high thermal loads. The same problem arises with plug-shaft ignition coils: The installation space is extremely limited and offers hardly any engine cooling. These extreme loads can in the long-term mean that even the best quality ignition coil can fail under certain circumstances.

Proper removal / installation

In order to ensure that the transmission of high voltage is safe and reliable, the plug-shaft ignition coils are very firmly attached to the spark plugs. Due to the resulting high temperatures, there is a risk of the spark plug fusing with the ignition coils' silicone plug. It is therefore essential that BERU plug grease (order no. 0 890 300 029 with 10g or 0 890 300 045 with 50g) is used when a spark plug is changed. This ensures that plugs are also easily removed.

Important: special tool for ignition coil replacement

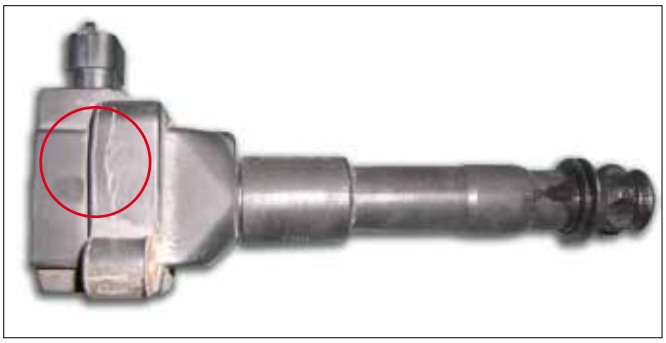
Only the spark plug was to be exchanged. Because of the wrong removal tool, now the coil has to be replaced as well.

Because the plug-shaft ignition coils, are mounted on the spark plugs due to the slim built, it is very difficult to remove them because of the firm attachment of the SAE contact and the shield of the hexagon of the spark plug. Practical experience shows that when incorrectly removed, the ignition coil frequently breaks in two.

BERU offers workshop professional three special ignition coil pullers for Volkswagen Group applications that are especially adapted to the geometry of ignition coil heads. Depending on the respective design, the ignition coil housing may be flat, square or oval.
The ignition coil pullers not only make it possible to extract current ignition coils but also previous models with similar head forms.

Prevent ignition coil damage: BERU special tools from left to right: ZSA 044 (order no. 0 890 300 044), ZSA 043 (order no. 0 890 300 043), ZSA 042 (order no. 0 890 300 042).

Workshop tips



Formation of longitudinal cracks on coil body due to incorrect and excessive tightening torque of 15 Nm instead of the correct 6 Nm.

Crack formation on the ignition coil insulation due to strain during installation.

Spark plug connector grease

THE PROBLEM

After replacing the spark plugs, misfiring occurs intermittently – across the entire speed range. The cause is voltage flash-overs at the spark plug neck, caused by a leaking, damaged or embrittled spark plug connector.

THE SOLUTION

Before the spark plug is installed, apply a thin layer of BERU connector grease (order no. 0 890 300 029 with 10g or 0 890 300 045 with 50g) to the (smooth or fluted) spark plug neck.

Important: always check the spark plug connector and, if required, replace. Especially in the case of single and double spark ignition coils with mounted connectors, it is recommended to replace the connector along with the spark plugs – as the latter often become embrittled in the sealing area of the spark plug and thus become leaky.

The hairline cracks are clearly visibly by pressing the spark plug connector.

Scorch marks on the spark plug neck – a sign of misfiring.

Grease for spark plug adaptors - protects against brittleness and thus against high voltage flashovers.

Workshop tips

Testing and checking

Irregular engine running, lack of power: The reason for the fault could lie with the ignition coil. A glance in the engine compartment of the Fiat Punto shows: the ZS 283 double spark ignition coil is installed there.

The use of a stroboscopic lamp is recommended for primary diagnosis of the cause of the fault. It is connected to each cylinder in turn with the engine running. If there is an irregular flashing frequency at one or more cylinders, there is a fault in the ignition system or the ignition coil.

The following remedies may be considered:

- Examine spark plugs and replace, if necessary,
- Test ignition cable resistance with multimeter. If necessary replace cables,
- Test the rated resistance of primary and secondary circuits of the ignition coil as per manufacturer specifications. In event of anomalies, replace ignition coil.

Primary resistance test

1

Test of the primary resistance: rated resistance of the primary circuit at 20 °C = 0.5 7Ω ±0.05.

Secondary resistance test

2

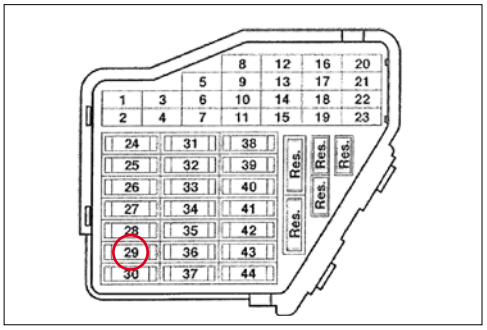
Test of the secondary resistance: rated resistance for the secondary circuit at 20 °C = 7.33 KΩ ±0.5.

Ignition coil ZS 283 installed, for example, in the Fiat Punto, Panda or Tipo.

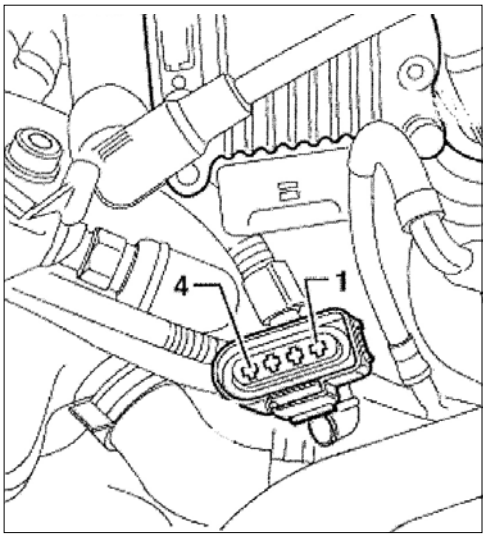
Workshop tips

Step-by-step fault isolation

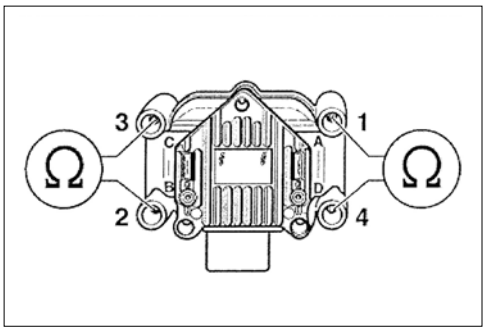
Test conditions: battery voltage at least 11.5 V.
Sensor for engine speed: OK.
Hall sensor: OK.



Testing the double spark ignition coil taking the ZSE 003 for VW / Audi as an example: The fuse must be OK (in this case: no. 29).



Switch off the ignition. Remove four pole plug from the ignition coil. Switch on the ignition. A voltage of at least 11.5 V must be present between contacts 1 and 4 of the removed plug. Switch off the ignition.



Measure secondary resistances of the ignition coils with ohmmeter at the high-voltage output. Outputs cylinders 1+4 / outputs cylinders 2+3. At 20 degrees Celsius, the nominal resistance must be 4.0–6.0 kΩ. If the values are not reached, the ignition coil must be replaced.

Self test

1. Which coil wire is thicker?

- ☐ *A. Coil wire on primary winding*
- ☐ *B. Coil wire on secondary winding*

2. How high is the ignition voltage in a modern single spark ignition coil?

- ☐ *A. 20,000 V*
- ☐ *B. 25,000 V*
- ☐ *C. 45,000 V*

3. On which physical law is the ignition coil based?

- ☐ *A. current law*
- ☐ *B. induction law*
- ☐ *C. voltage law*

4. What does the term "closing time" mean?

- ☐ *A. time in which the primary current flows*
- ☐ *A. time in which the high voltage flows*

5. Which ignition coil energy form is measured in millijoule (mJ)?

- ☐ *A. spark energy*
- ☐ *B. ignition voltage*

6. For which ignition coil system is synchronization by means of a sensor on the camshaft required?

- ☐ *A. double spark ignition coils*
- ☐ *B. canister-type ignition coils*
- ☐ *C. single spark ignition coils*

7. What number of cylinders is suited for double spark ignition coils?

- ☐ *A. even number of cylinders*
- ☐ *B. odd number of cylinders*

Self test

8. Why is a high-voltage diode in the secondary circuit required for single spark ignition coils?

- ☐ A. For activation of spark suppression
- ☐ B. To increase voltage
- ☐ C. To protect the coil from overloads

9. How high is the spark energy in the latest BERU ignition coils?

- ☐ A. 5 mJ
- ☐ B. 10 mJ
- ☐ C. ca. 100 mJ

10. Why must the coil connector be pre-greased with BERU grease for spark plug adaptors?

- ☐ A. That the connector moves smoothly onto the plug
- ☐ B. As a moisture barrier
- ☐ C. As a precaution for voltage flash-over

BERU NEWSLETTER

Rely on our OE pedigree!

BERU Coils in OE.

BERU is a trusted development partner to all leading automobile manufacturers. Wherever the cars of the future are being created, BERU is in demand as an expert in ignition technology.

Perfection built in BERU®

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BERU, The OE reference for Ignition Technology

Mercedes C-Class T-Model

Fiat 500L B&D

Skoda Yeti (FL)

Fiat 500 Facelift

Mercedes CLS Facelift

Porsche 911 Turbo Cabrio / S (P)

Our tag line and goal is ‘Perfection built in’. We strive for perfection and respond to customer needs in the evolving global car manufacturer markets. The international automotive industry equips its new vehicles with BERU components and systems. Here are just a few examples from the long list of series production launches.

Increased market coverage

We constantly grow in the market!

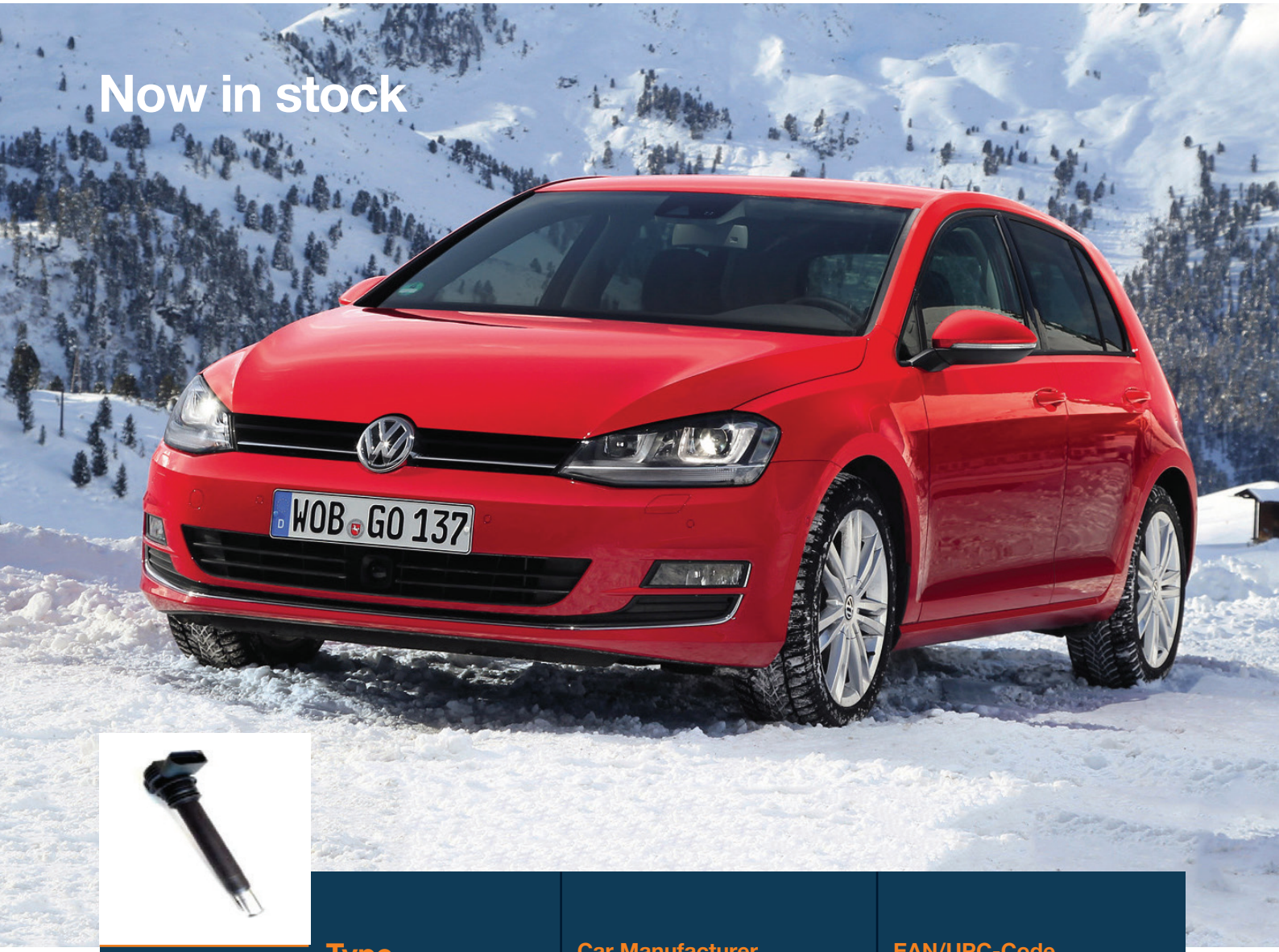
	Relative growth	absolute figures
Austria	5,45%	118.082
Belgium	6,09%	137.128
France	7,01%	956.511
Germany	6,95%	2.185.600
Great-Britain	7,98%	1.779.813
Italy	4,26%	833.711
Netherlands	7,06%	441.925
Poland	2,40%	285.318
Spain	5,32%	590.210
Russia	2,38%	633.619

BERU

Perfection built in

- True innovator
- Impressive OE – Pedigree
- Global no. 1 in glow plug technology
- Complete range with excellent coverage
- Made in Germany

Now in stock



Type
ZSE142

Reference
0040102142

Car Manufacturer
VW/ AUDI/ SEAT/ SKODA

Main Application
Golf V 2,0 ltr. • from 10.2004

Cross reference
VW/ AUDI 06H 905 115 B
VW/ AUDI 06H 905 115 A

EAN/UPC-Code (MOQ 1 pcs)
4014427140429

Gross weight (kg)
0,293

Net weight (kg)
0,230

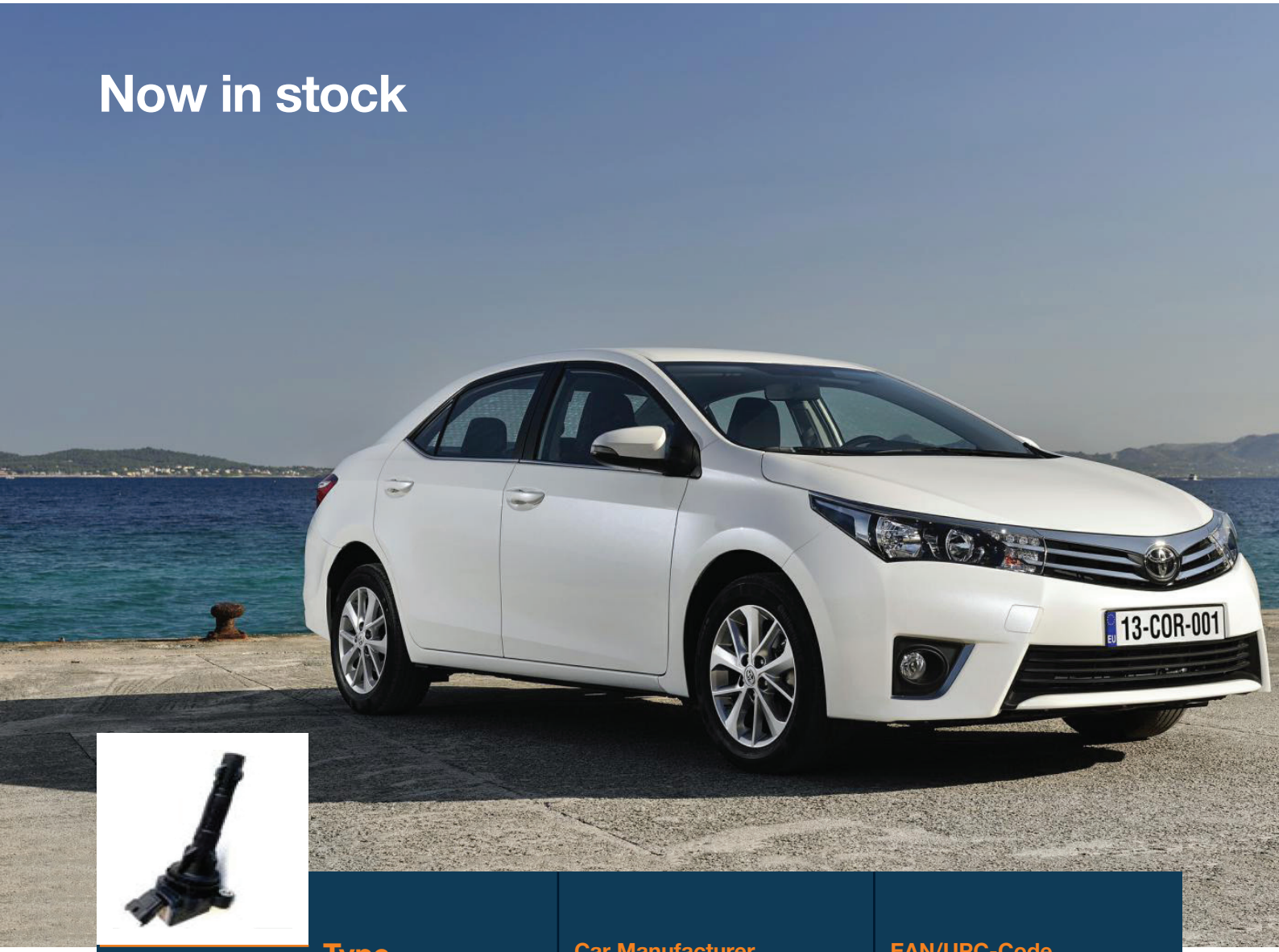
Length (mm)
210

Width (mm)
100

Height (mm)
70

Perfection built in BERU®

Now in stock



Type
ZS449

Reference
0040100449

Car Manufacturer
Toyota

Main Application
Corolla 1,4 ltr. • 07.01 - 01.02

Cross reference
Toyota 90080 1901700

EAN/UPC-Code (MOQ 1 pcs)
4014427140399

Gross weight (kg)
0,298

Net weight (kg)
0,234

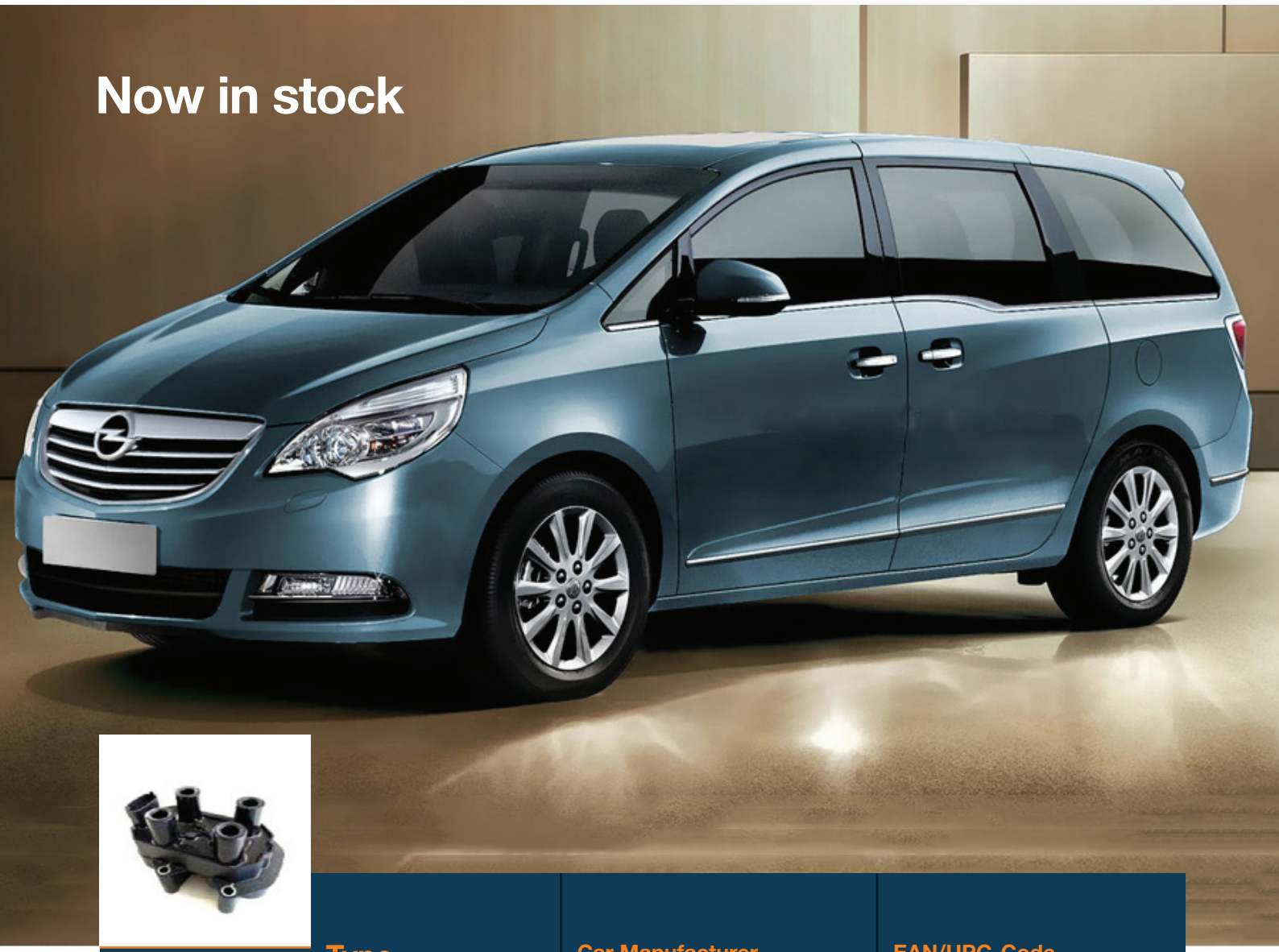
Length (mm)
210

Width (mm)
100

Height (mm)
70

Perfection built in BERU®

Now in stock



Type
ZS450

Reference
0040100450

Car Manufacturer
OPEL

Main Application
Sintra 2,2 ltr. • 11.96 - 04.99

Cross reference
GM/ OPEL 90 506 102
GM/ OPEL 12 08 076

EAN/UPC-Code (MOQ 1 pcs)
4014427140405

Gross weight (kg)
0,993

Net weight (kg)
0,917

Length (mm)
210

Width (mm)
100

Height (mm)
90

Perfection built in BERU®

Now in stock

Type
ZS451

Reference
0040100451

Car Manufacturer
OPEL

Main Application
Omega B 2,5 V6 ltr. • 03.94 - 09.00

Cross reference
GM/ OPEL 90 492 255
GM/ OPEL 90 511 450
GM/ OPEL 12 08 007

EAN/UPC-Code (MOQ 1 pcs)
4014427140412

Gross weight (kg)
1,464

Net weight (kg)
1,380

Length (mm)
205

Width (mm)
105

Height (mm)
105

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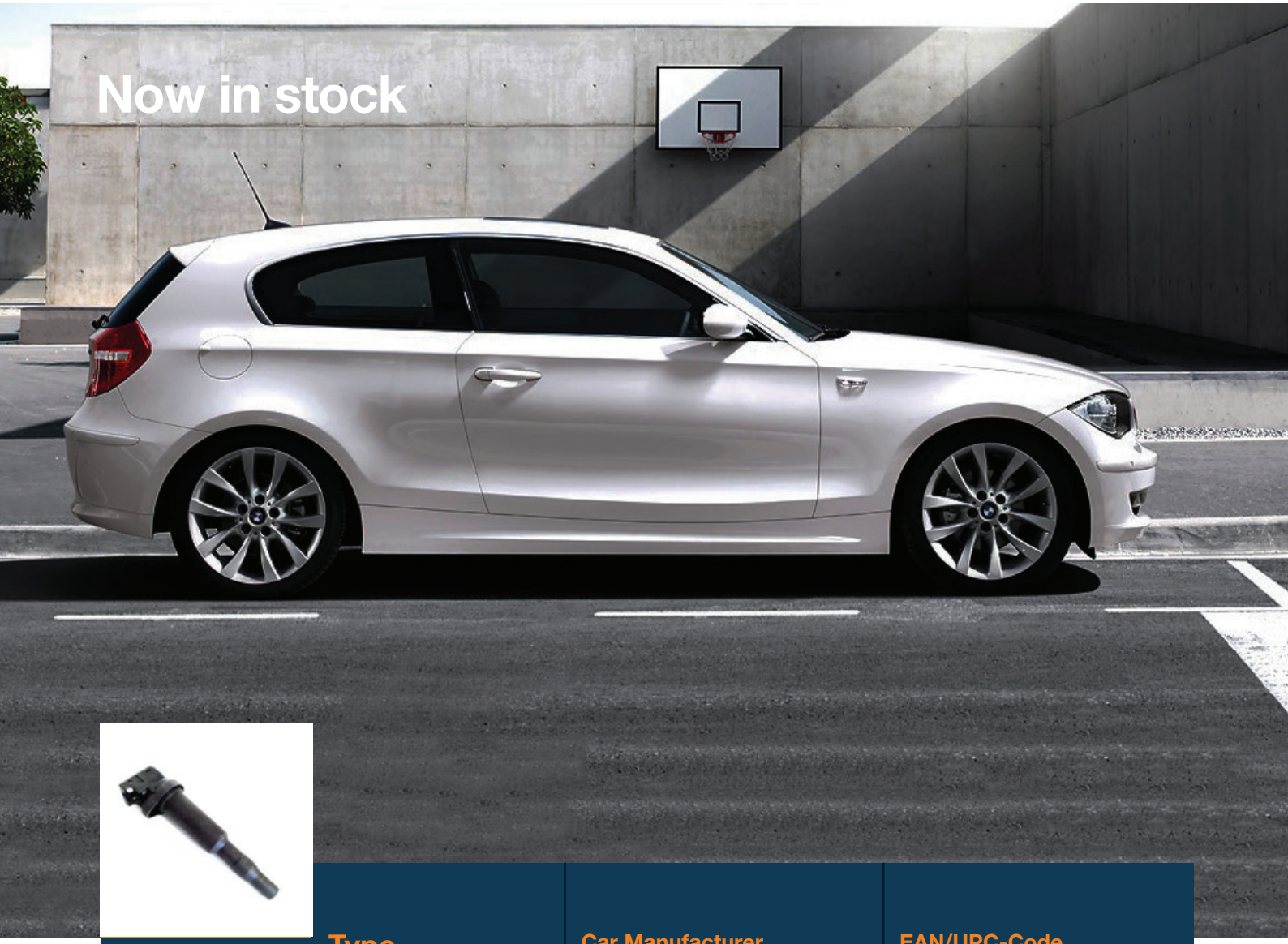
Now in stock



Type
ZSE143

Reference
0040102143

Car Manufacturer
BMW/ Citroen/ Peugeot

Main Application
1er 130i • 3,0 ltr. • 09.09 - 12.11

Cross reference
BMW/ MINI 12 13 7 594 937 • 7 594 937
BMW/ MINI 12 13 7 571 643 • 7 571 643
BMW 12 13 7 562 744 • 7 562 744
BMW 12 13 7 551 049 • 7 551 049
Citroen/Peugeot V7 594 93780
Citroen/Peugeot V7 571 64380
Citroen/Peugeot V7 562 74480
Citroen/Peugeot 5970.64

EAN/UPC-Code (MOQ 1 pcs)
4014427140436

Gross weight (kg)
0,294

Net weight (kg)
0,230

Length (mm)
210

Width (mm)
100

Height (mm)
70

Perfection built in BERU®

Now in stock

Type
ZSE144

Reference
0040102144

Car Manufacturer
BMW

Main Application
1 • 3 • 5 • from 2007

Cross reference
BMW XX XX 7 562 745 • 7 562 745
BMW 12 13 7 571 644 • 7 571 644
BMW 12 13 7 582 627 • 7 582 627
BMW 12 13 7 594 935 • 7 594 935
BMW 12 13 7 638 477 • 7 638 477

EAN/UPC-Code (MOQ 1 pcs)
4014427140443

Gross weight (kg)
0,293

Net weight (kg)
0,229

Length (mm)
210

Width (mm)
100

Height (mm)
70

Perfection built in BERU®

Now in stock

Type
ZSE145

Reference
0040102145

Car Manufacturer
BMW

Main Application
1 • 3 • 5 • Z4 • till 2005

Cross reference
BMW 12 13 7 594 936 • 7 594 936
12 13 7 548 553 • 7 548 553
12 13 7 523 345 • 7 523 345

EAN/UPC-Code (MOQ 1 pcs)
4014427140450

Gross weight (kg)
0,293

Net weight (kg)
0,230

Length (mm)
210

Width (mm)
100

Height (mm)
70

Perfection built in

BERU®

Now in stock

Type
ZSE146

Reference
0040102146

Car Manufacturer
Mercedes

Main Application
A-Class;
Vaneo • 1,4-2,0ltr. • from 07.97

Cross reference
Mercedes (A) 000 150 1380
Mercedes (A) 000 150 1280
Mercedes (A) 000 150 0780

EAN/UPC-Code (MOQ 1 pcs)
4014427140467

Gross weight (kg)
1,410

Net weight (kg)
1,330

Length (mm)
340

Width (mm)
320

Height (mm)
100

Perfection built in BERU®

Now in stock

Type
ZSE147

Reference
0040102147

Car Manufacturer
OPEL

Main Application
Agila • Astra C • Corsa B • Corsa C 98-04

Cross reference
GM/ OPEL 90 543 253
GM/ OPEL 12 08 012

EAN/UPC-Code (MOQ 1 pcs)
4014427140474

Gross weight (kg)
1,367

Net weight (kg)
1,090

Length (mm)
340

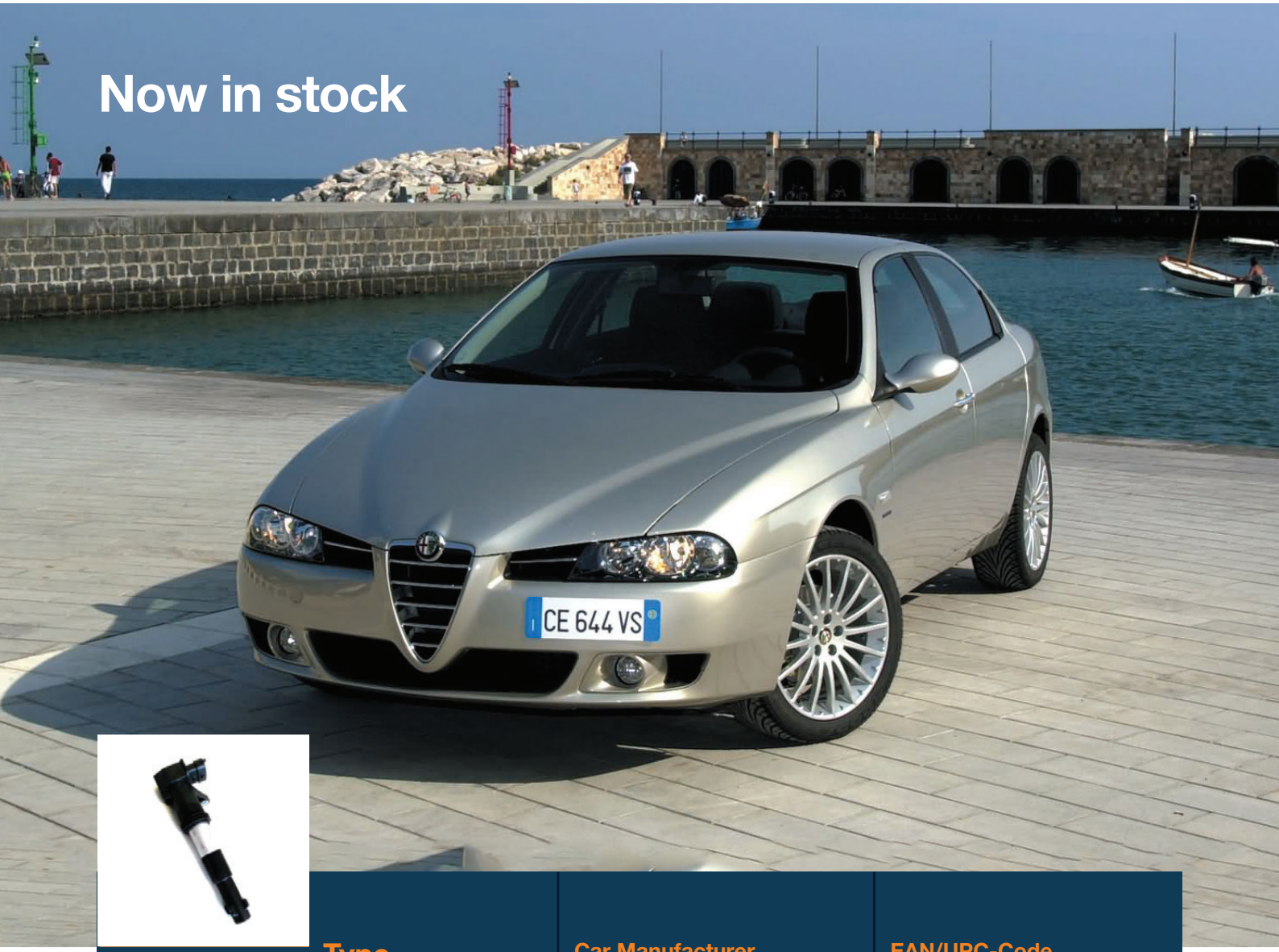
Width (mm)
320

Height (mm)
100

FEDERAL MOGUL

Perfection built in BERU®

Now in stock



Type
ZSE148

Reference
0040102148

Car Manufacturer
Alfa Romeo

Main Application
Alfa 156 • 2,0ltr. • from 03.02

Cross reference
FIAT/ ALFA 46 794 782

EAN/UPC-Code (MOQ 1 pcs)
4014427140481

Gross weight (kg)
0,272

Net weight (kg)
0,208

Length (mm)
210

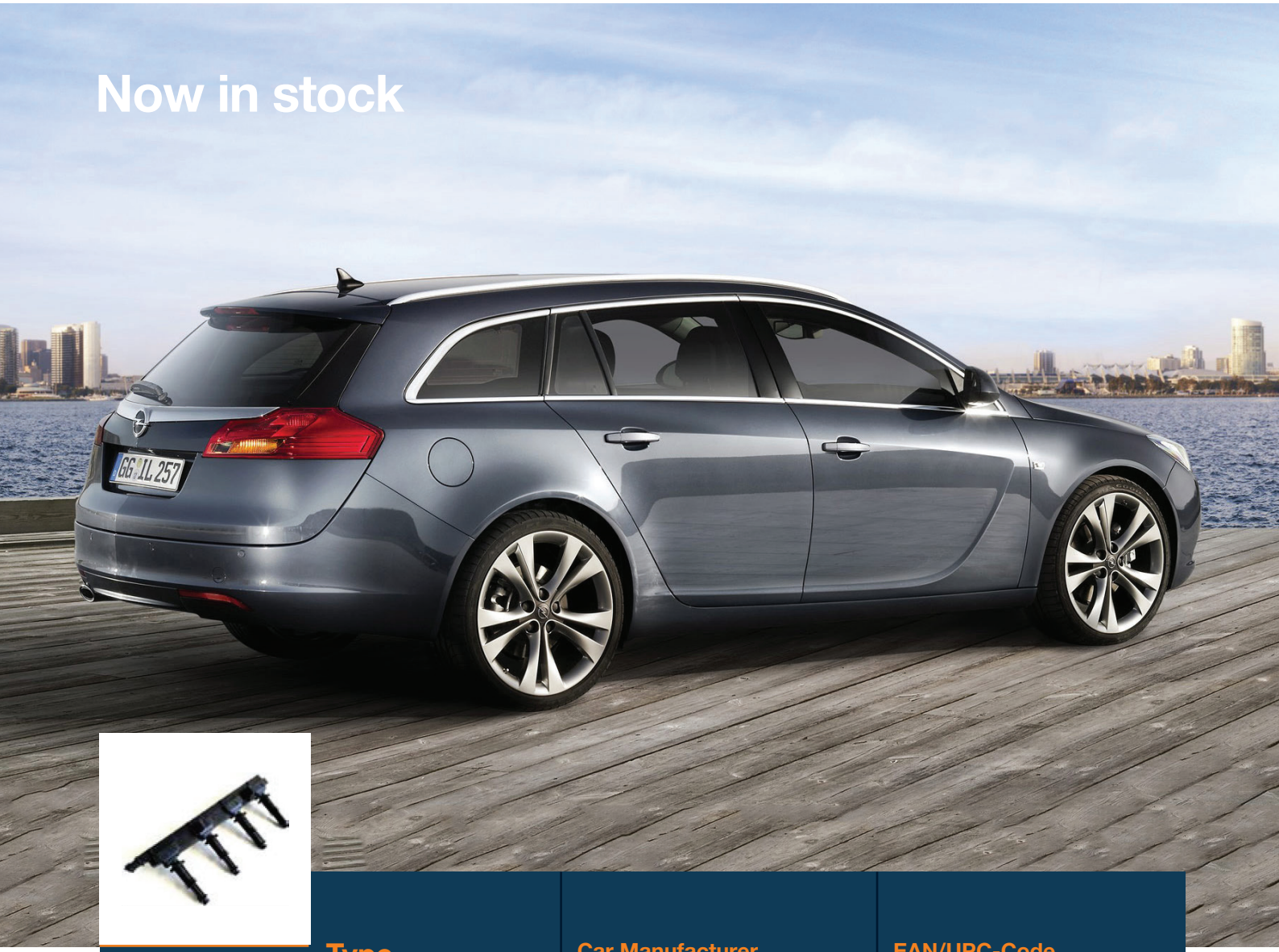
Width (mm)
100

Height (mm)
70

FEDERAL MOGUL

Perfection built in BERU®

Now in stock



Type
ZSE149

Reference
0040102149

Car Manufacturer
OPEL

Main Application
Signum • Vectra C • Zafira • from 2003 -.

Cross reference
GM/ OPEL 93 172 030
GM/ OPEL 62 351 24

EAN/UPC-Code (MOQ 1 pcs)
4014427140498

Gross weight (kg)
1,710

Net weight (kg)
1,389

Length (mm)
440

Width (mm)
200

Height (mm)
100

FEDERAL MOGUL

Perfection built in BERU®

Now in stock

Type
ZSE150

Reference
0040102150

Car Manufacturer
OPEL

Main Application
Omega B • 99-03

Cross reference
GM/ OPEL 09 195 819
GM/ OPEL 12 08 213

EAN/UPC-Code (MOQ 1 pcs)
4014427140504

Gross weight (kg)
1,475

Net weight (kg)
1,200

Length (mm)
340

Width (mm)
320

Height (mm)
100

FEDERAL MOGUL

Perfection built in BERU®

Now in stock

Type
ZSE151

Reference
0040102151

Car Manufacturer
OPEL

Main Application
Astra G, H • Zafira • from 2002 -.

Cross reference
GM/ OPEL 09 198 834
GM/ OPEL 62 35 037

EAN/UPC-Code (MOQ 1 pcs)
4014427140511

Gross weight (kg)
1,475

Net weight (kg)
1,196

Length (mm)
340

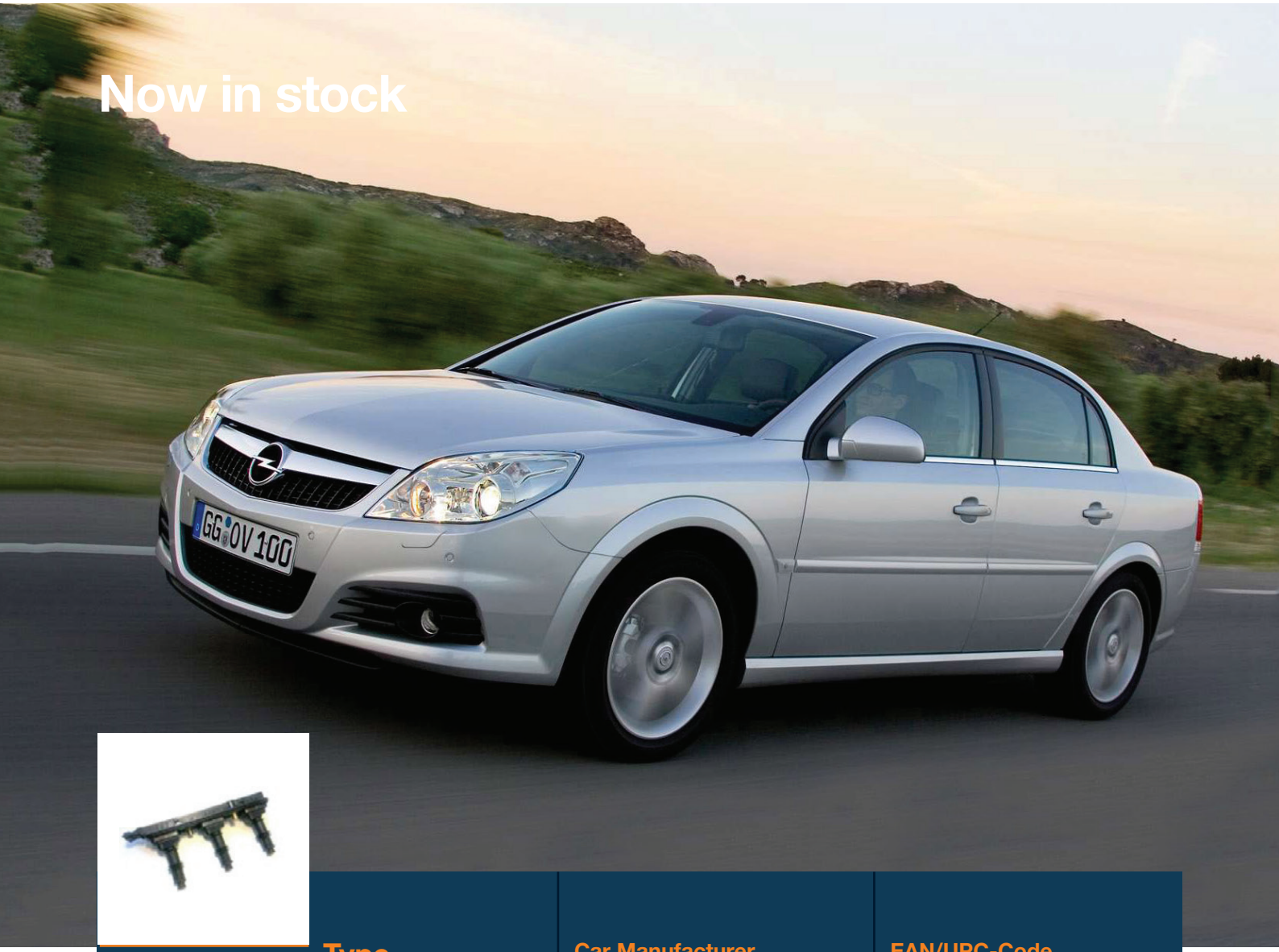
Width (mm)
320

Height (mm)
100

FEDERAL MOGUL

Perfection built in BERU®

Now in stock



Type
ZSE152

Reference
0040102152

Car Manufacturer
OPEL

Main Application
6-cyl. Omega,Vectra • from 2000
(Mounting side cylinder 1,3,5.
Combined with ZSE 153)

Cross reference
GM/ OPEL 09 118 114
GM/ OPEL 12 08 209

EAN/UPC-Code (MOQ 1 pcs)
4014427140528

Gross weight (kg)
1,143

Net weight (kg)
0,890

Length (mm)
320

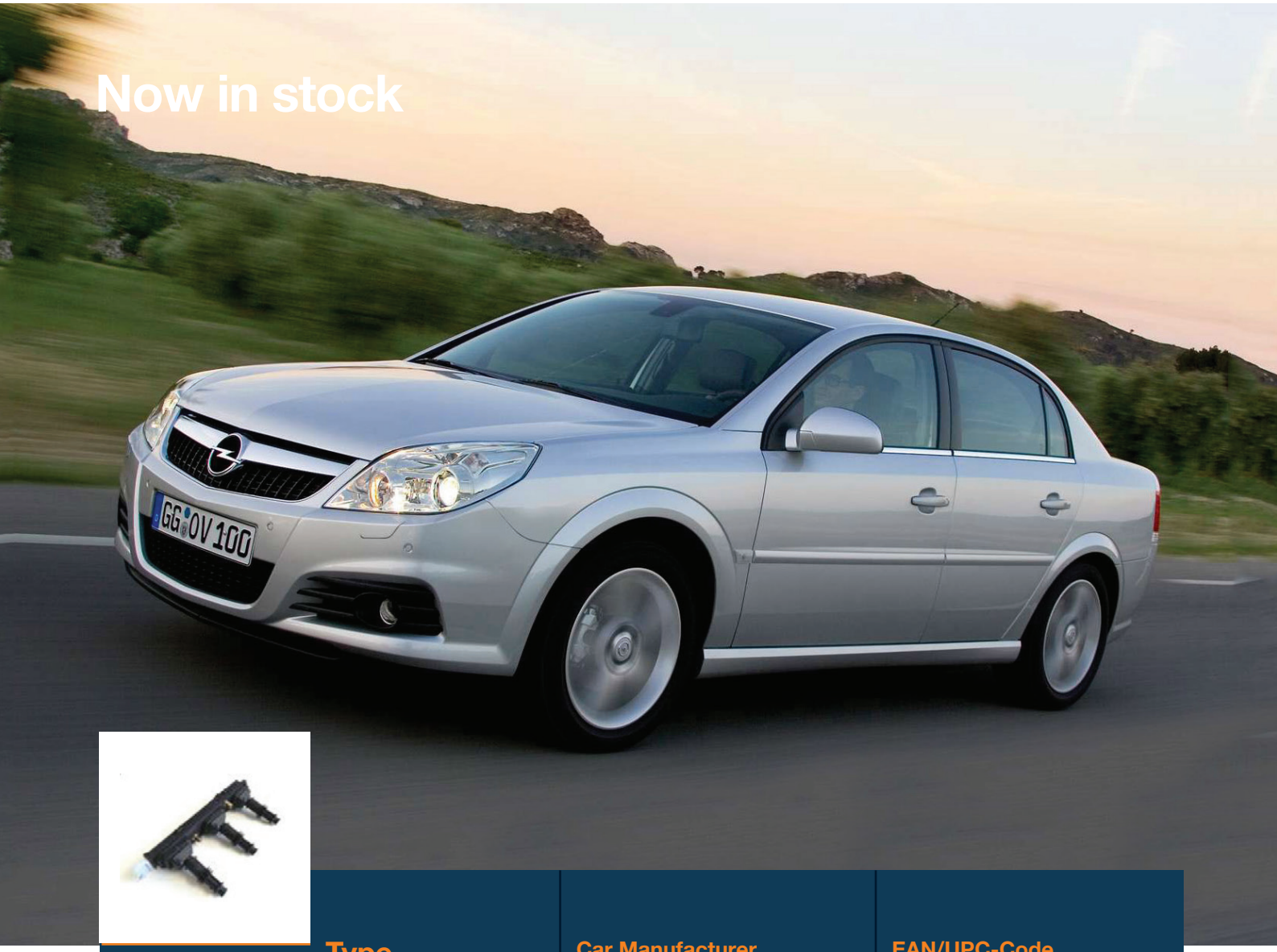
Width (mm)
170

Height (mm)
140

FEDERAL MOGUL

Perfection built in BERU®

Now in stock



Type
ZSE153

Reference
0040102153

Car Manufacturer
OPEL

Main Application
6-cyl. Omega,Vectra • from 2000
(Mounting side cylinder 2,4,6.
Combined with ZSE 152)

Cross reference
GM/ OPEL 09 118 115
GM/ OPEL 12 08 210

EAN/UPC-Code (MOQ 1 pcs)
4014427140535

Gross weight (kg)
1,143

Net weight (kg)
0,890

Length (mm)
320

Width (mm)
170

Height (mm)
140

FEDERAL MOGUL

Perfection built in BERU®

Coming Soon

Type
ZS454
Reference
0040100454

Main Application
Renault Clio II, Kangoo, Twingo 1,2 Ltr. 16V

Cross Reference
8200084401

Type
ZS445
Reference
0040100445

Main Application
Lexus, Toyota, VW

Cross reference
9091902197

Type
ZS446
Reference
0040100446

Main Application
Volvo

Cross reference
1275971

Type
ZS447A
Reference
0040100447

Main Application
Chevrolet

Cross reference
25182496 • 4819329

Type
ZS452
Reference
0040100452

Main Application
Jeep

Cross reference
00K56041476AB

Coming Soon

Type
ZS453
Reference
0040100453

Main Application
Dodge, Fiat

Cross reference
00K04606869AD

Type
ZS455
Reference
0040100455

Main Application
Chrysler, Jeep

Cross reference
00K56032520AF

Type
ZS456
Reference
0040100456

Main Application
Chrysler, Dodge

Cross reference
00K56029098AB

Type
ZS469
Reference
0040100456

Main Application
Chrysler, Dodge

Cross reference
00K56029098AB

Type
ZS470
Reference
0040100470

Main Application
Chrysler, Dodge

Cross reference
00K4609140AC NEC100630

Type
ZSE155
Reference
0040102155

Main Application
VW Fox, Golf Trend, Voyage

Cross reference
030 905 110B

Only for Export – South America

BERU Ignition Coils

As versatile as our customer's cars

You don't become market leader by chance.
But rather through trusted first-class quality.

BERU supplies over 400 ignition coil types - for more than 6.800 different vehicle models.

Distributor Ignition Coils
(Single Ended Coils)

Applications:
VW, Audi

Pencil Coils / Plug Top Coils

Applications: BMW, Fiat, Mercedes-Benz, Porsche, Renault, VW

Block Ignition Coils

Applications:
BMW, Fiat, Renault, VW

Ignition Coil Rails

Applications:
VW, Opel, Peugeot, Citroën, Škoda

BERU NEWSLETTER #3

BERU OE-quality Ignition Coils for Asian applications.

23 New BERU Ignition Coils for the Aftermarket

BERU is a trusted development partner to all leading automobile manufacturers. Wherever the cars of the future are being created, BERU is in demand as an expert in Ignition technology.

Perfection built in BERU®

FEDERAL-MOGUL MOTORPARTS

A WIDE AND COMPLETE PRODUCT RANGE THAT MEETS **OE** STANDARDS

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®

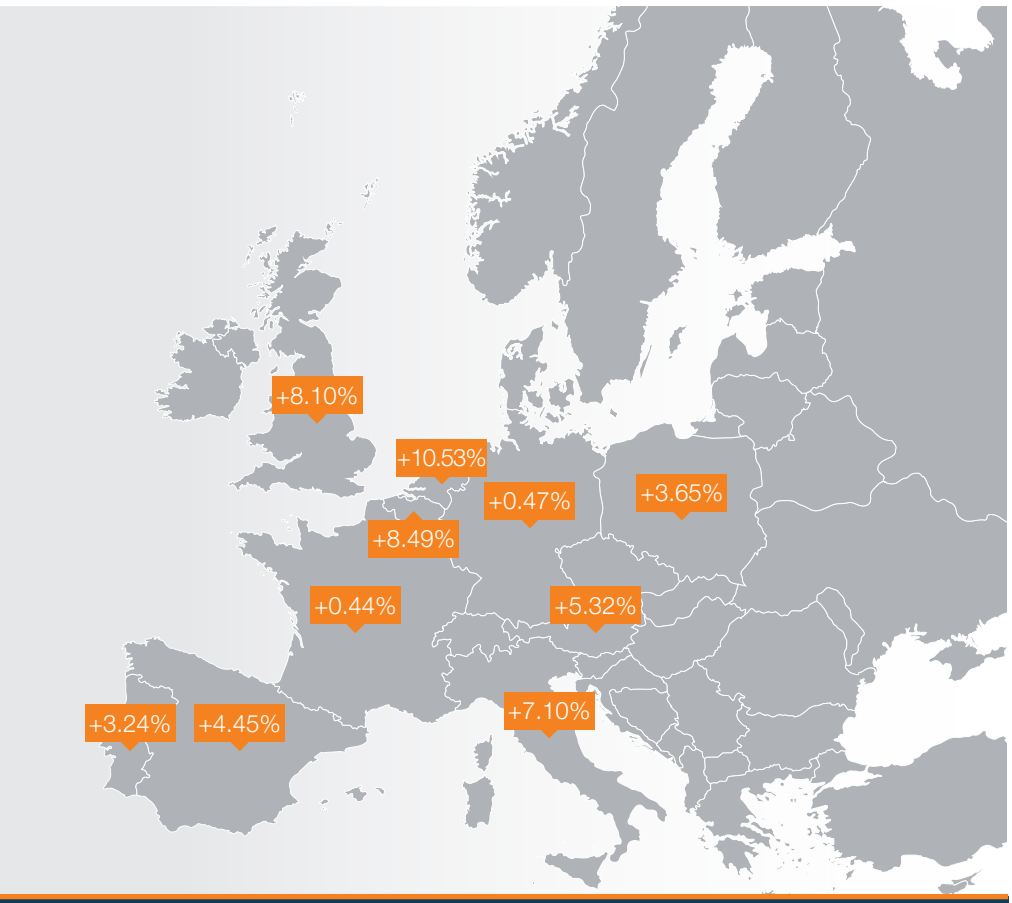
Over 400 **IGNITION COIL** types for more than 7,750 different vehicle types.

A full OE range of glow plugs, including ceramic **GLOW PLUGS**, Instant Start System technology and the exclusive BERU Pressure Sensor Glow Plug technology.

OE standard **SPARK PLUGS** leading the way for both older and modern downsized engines.

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®



Increased market coverage

We constantly grow in the market!

	Relative growth	absolute figures
Austria	5.32%	105.543
Belgium	8.49%	175.543
France	0.44%	52.081
Germany	0.47%	143.616
Great-Britain	8.10%	1.724.358
Italy	7.10%	1.230.453
Netherlands	10.53%	629.286
Poland	3.65%	305.500
Portugal	3.24%	104.093
Spain	4.45%	448.190
Total coverage Asian applications in Europe		15.769.585

BERU

Perfection built in

- True innovator
- Impressive OE – Pedigree
- Global no. 1 in glow plug technology
- Complete range with excellent coverage
- Made in Germany

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®

Now in stock

Trade Number
ZS474

OE Reference
27301-2B000

Main Application
Hyundai i30
Kia CEE'D

EAN/UPC-Code
4044197766888

Dimension (mm)
133 x 70 x 28

Gross Weight (kg)
0,225

Net Weight (kg)
0,185

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®

Now in stock

Trade Number
ZSE164

OE Reference
90919-02262

Main Application
Citroen C1
Peugeot 107
Toyota: AVENSIS, AYGO, COROLLA, IQ, MR 2, RAV 4, VERSO, YARIS

EAN/UPC-Code
4044197766895

Dimension (mm)
149 x 60 x 50

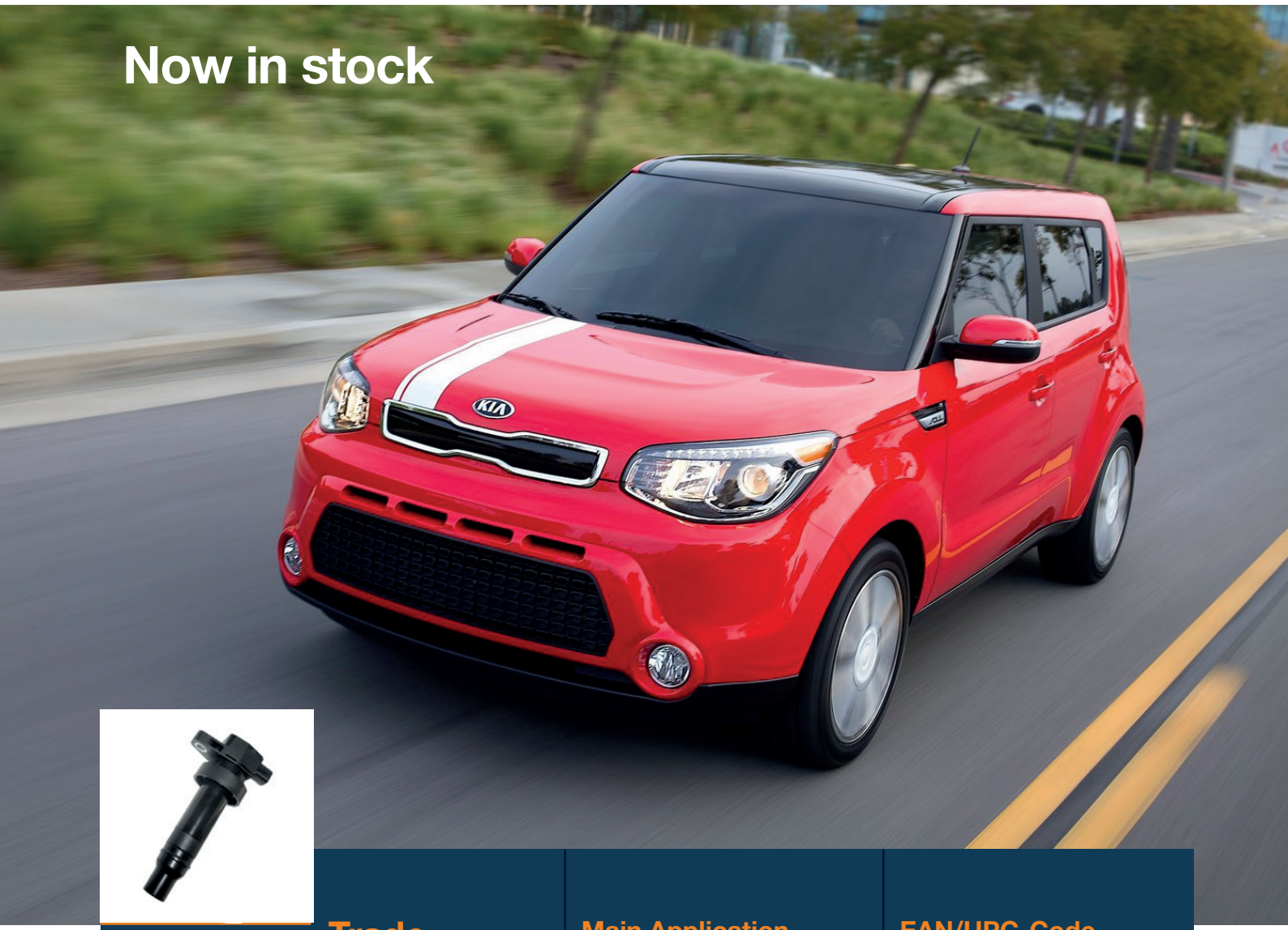
Gross Weight (kg)
0,253

Net Weight (kg)
0,213

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®

Now in stock



Trade Number
ZS475

OE Reference
27301-2B010

Main Application
Hyundai i30
Kia: CARENS, CERATO, SOUL

EAN/UPC-Code
4044197766901

Dimension (mm)
133 x 70 x 28

Gross Weight (kg)
0,249

Net Weight (kg)
0,209

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®

Now in stock

Trade Number
ZSE165

OE Reference
90919-02265

Main Application
Toyota: PRIUS, YARIS

EAN/UPC-Code
4044197766918

Dimension (mm)
150 x 77 x 45

Gross Weight (kg)
0,252

Net Weight (kg)
0,212

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®

Now in stock

Trade Number
ZSE166

OE Reference
30520-RCA-A02

Main Application
Honda: ACCORD, CIVIC, FR-V, LEGEND, STREAM

EAN/UPC-Code
4044197766925

Dimension (mm)
154 x 69 x 69

Gross Weight (kg)
0,249

Net Weight (kg)
0,209

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®

Now in stock

Trade Number
ZS476

OE Reference
27301-04000

Main Application
Kia PICANTO

EAN/UPC-Code
4044197766932

Dimension (mm)
151 x 69 x 57

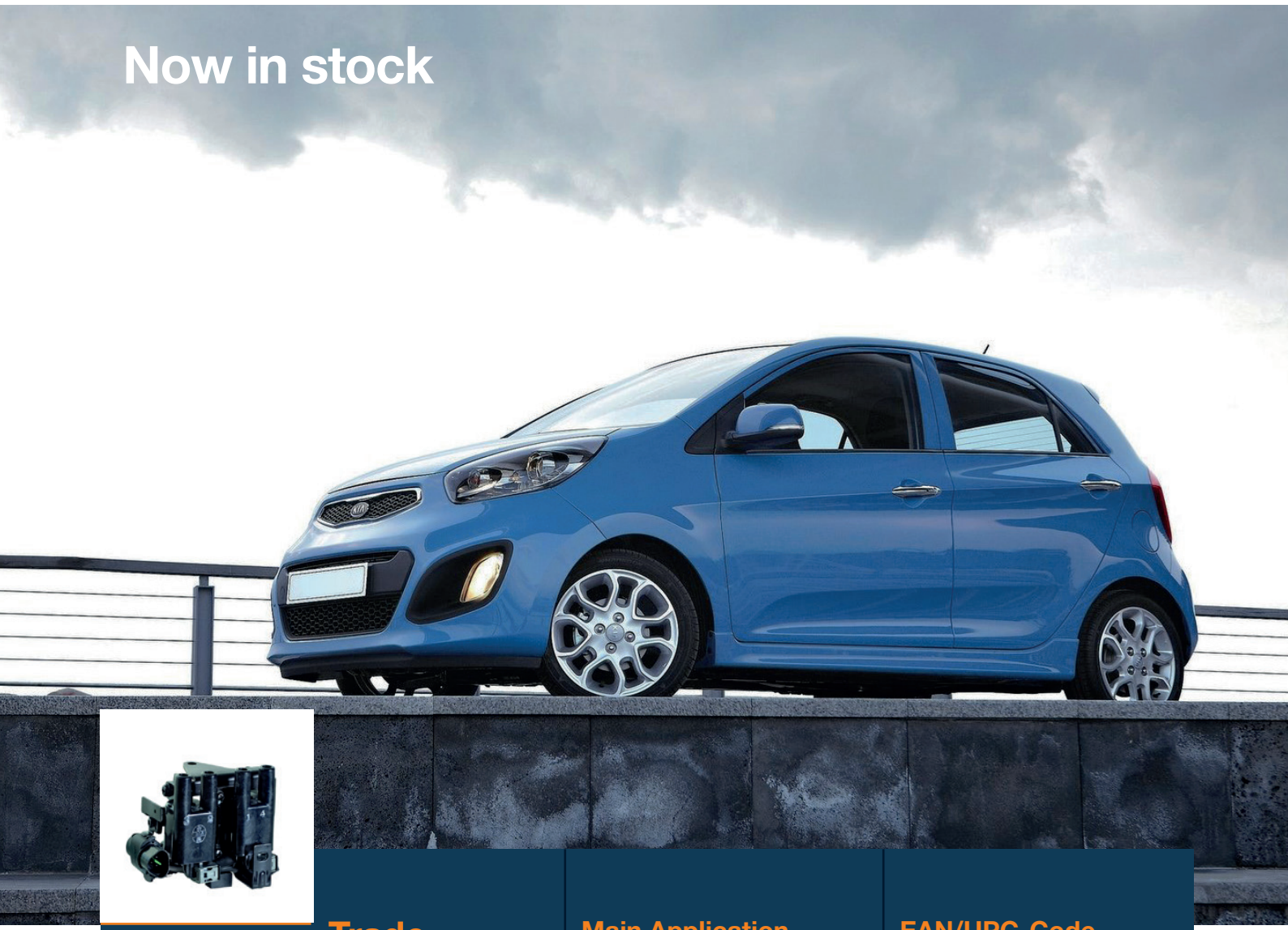
Gross Weight (kg)
0,232

Net Weight (kg)
0,192

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®

Now in stock



Trade Number
ZS477

OE Reference
27301-02700

Main Application
Kia PICANTO

EAN/UPC-Code
4044197766949

Dimension (mm)
170 x 120 x 120

Gross Weight (kg)
0,967

Net Weight (kg)
0,927

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®

Now in stock

Trade Number
ZS478

OE Reference
27301-03110

Main Application
Hyundai: i10, i20
Kia PICANTO

EAN/UPC-Code
4044197766956

Dimension (mm)
151 x 69 x 43

Gross Weight (kg)
0,236

Net Weight (kg)
0,196

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®

Now in stock

Trade Number
ZS479

OE Reference
27301-22600

Main Application
Hyundai: ACCENT, GETZ

EAN/UPC-Code
4044197766963

Dimension (mm)
200 x 150 x 130

Gross Weight (kg)
0,886

Net Weight (kg)
0,846

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®

Now in stock

Trade Number
ZS480

OE Reference
27301-02100

Main Application
Hyundai: GETZ

EAN/UPC-Code
4044197766970

Dimension (mm)
200 x 150 x 100

Gross Weight (kg)
1,060

Net Weight (kg)
1,02

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®

Now in stock

Trade Number
ZS481

OE Reference
27301-26640

Main Application
Hyundai: ACCENT, GETZ
Kia: CERATO, RIO

EAN/UPC-Code
4044197766987

Dimension (mm)
151 x 58 x 43

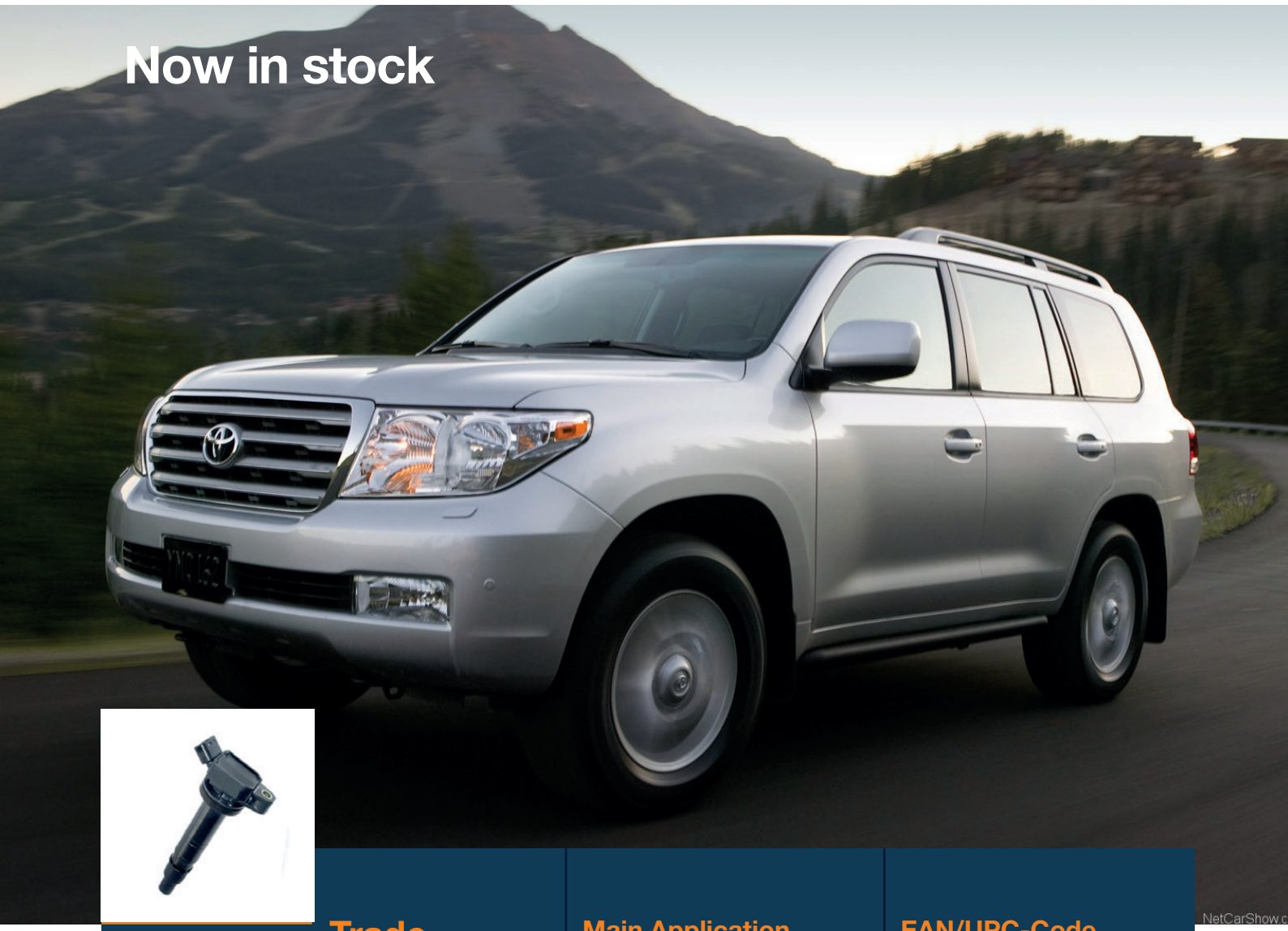
Gross Weight (kg)
0,222

Net Weight (kg)
0,182

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®

Now in stock



Trade Number
ZSE167

OE Reference
90919-02248

Main Application
Lexus: IS
Toyota: AVENSIS, LAND CRUISER

EAN/UPC-Code
4044197766994

Dimension (mm)
169 x 77 x 42

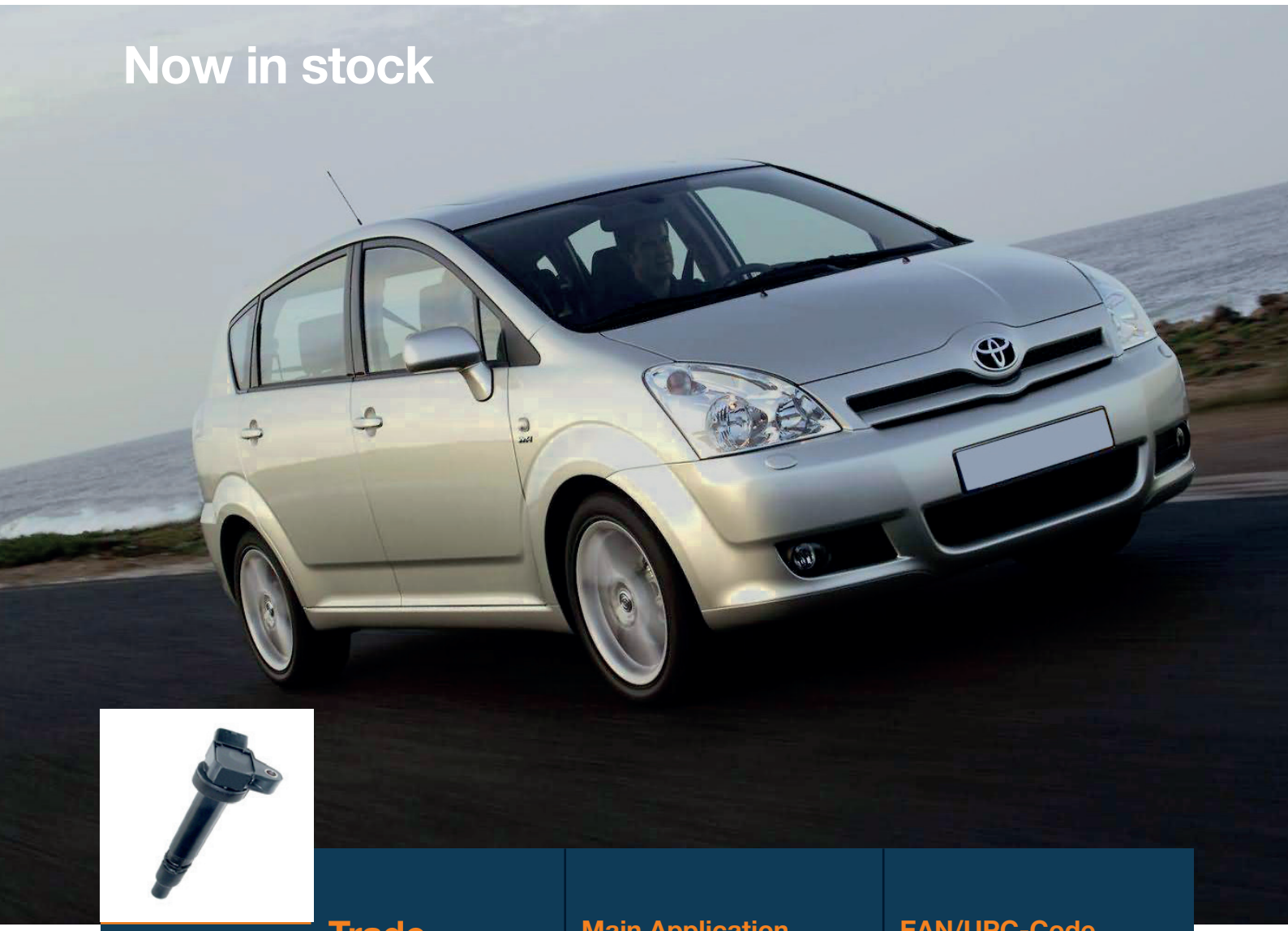
Gross Weight (kg)
0,260

Net Weight (kg)
0,220

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®

Now in stock



Trade Number
ZSE168

OE Reference
90919-02238

Main Application
Toyota: CELICA, COROLLA

EAN/UPC-Code
4044197767007

Dimension (mm)
168 x 59 x 58

Gross Weight (kg)
0,255

Net Weight (kg)
0,215

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®

Now in stock

Trade Number
ZSE169

OE Reference
30520-RRA-007

Main Application
Honda: ACCORD, CIVIC, CR-V, FR-V, STREAM

EAN/UPC-Code
4044197767014

Dimension (mm)
170 x 40 x 76

Gross Weight (kg)
0,242

Net Weight (kg)
0,202

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®

Now in stock

Trade Number
ZS482

OE Reference
27301-23700

Main Application
Hyundai: COUPE, ELANTRA, i30, MATRIX, TRAJET, TUCSON
Kia: CARENS, CEE'D, CERATO, PRO CEE'D, SPORTAGE

EAN/UPC-Code
4044197767021

Dimension (mm)
170 x 110 x 160

Gross Weight (kg)
1,236

Net Weight (kg)
1,196

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®

Now in stock

Trade Number
ZS483

OE Reference
27301-26600

Main Application
Kia: CERATO, RIO

EAN/UPC-Code
4044197767038

Dimension (mm)
190 x 165 x 90

Gross Weight (kg)
0,898

Net Weight (kg)
0,858

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®

Now in stock

Trade Number
ZS485

OE Reference
27301-37120

Main Application
Hyundai: SANTA FÉ

EAN/UPC-Code
4044197767052

Dimension (mm)
260 x 140 x 130

Gross Weight (kg)
1,373

Net Weight (kg)
1,333

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®

Now in stock

Trade Number
ZS486

OE Reference
0K30E-18-10X

Main Application
Kia: CARENS, RIO

EAN/UPC-Code
4044197767069

Dimension (mm)
200 x 150 x 120

Gross Weight (kg)
1,236

Net Weight (kg)
1,196

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®

Now in stock

Trade Number
ZSE170

OE Reference
30520-PVJ-A01

Main Application
Honda CIVIC

EAN/UPC-Code
4044197767076

Dimension (mm)
152 x 63 x 63

Gross Weight (kg)
0,247

Net Weight (kg)
0,207

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®

Now in stock

Trade Number
ZSE171

OE Reference
90919-02266

Main Application
Toyota: AVENSIS, CAMRY, PREVIA, RAV 4

EAN/UPC-Code
4044197767083

Dimension (mm)
150 x 45 x 78

Gross Weight (kg)
0,253

Net Weight (kg)
0,213

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®

Now in stock

Trade Number
ZS487

OE Reference
0K9BV-18-10X

Main Application
Kia CARNIVAL

EAN/UPC-Code
4044197767090

Dimension (mm)
300 x 90 x 60

Gross Weight (kg)
1,844

Net Weight (kg)
1,804

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®

Now in stock

Trade Number
ZSE172

OE Reference
90919-02230

Main Application
Lexus: GS, IS, LS, CS
Toyota: YARIS, LAND CRUISER

EAN/UPC-Code
4044197767106

Dimension (mm)
151 x 59 x 62

Gross Weight (kg)
0,246

Net Weight (kg)
0,206

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®

Now in stock

Trade Number
ZSE173

OE Reference
90919-02234

Main Application
Lexus: RX
Toyota: CAMRY

EAN/UPC-Code
4044197767113

Dimension (mm)
160 x 41 x 78

Gross Weight (kg)
0,247

Net Weight (kg)
0,207

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®

BERU Ignition Coils

As versatile as our customer's cars

You don't become market leader by chance.
But rather through trusted first-class quality.

BERU supplies over 400 ignition coil types - for more than 7.750 different vehicle models.

Distributor Ignition Coils
(Single Ended Coils)

Pencil Coils / Plug Top Coils

Block Ignition Coils

Ignition Coil Rails

BERU NEWSLETTER #4

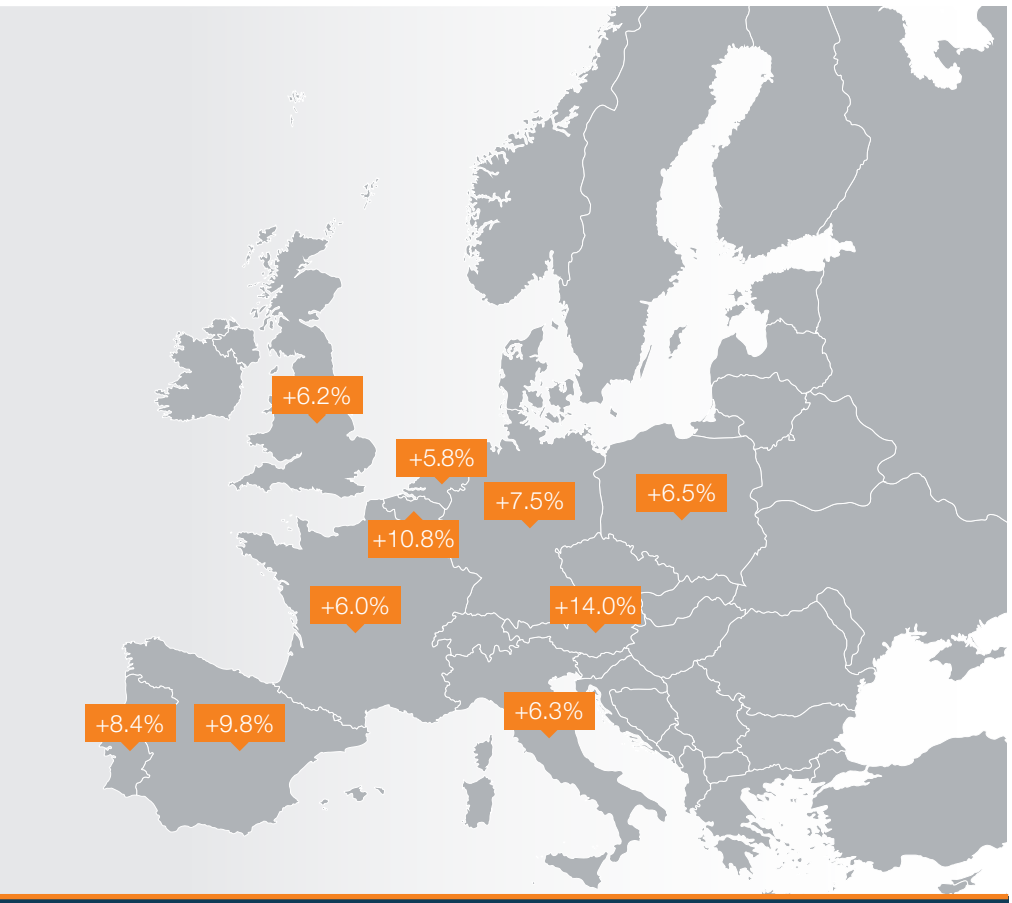
Rely on our OE innovative ignition technology

Mercedes-Benz M-Class with BERU OE ignition coils & relays

BERU is a trusted development partner to all leading automobile manufacturers. Wherever the cars of the future are being created, BERU is in demand as an expert in ignition technology.

Perfection built in BERU®

FEDERAL-MOGUL MOTORPARTS



Increased market coverage

We constantly grow in the market!

	Relative growth	absolute figures
Austria	14.0%	688.220
Belgium	10.8%	637.668
France	6.0%	2.230.482
Germany	7.5%	3.405.825
Great-Britain	6.2%	2.183.486
Italy	6.3%	2.172.374
Netherlands	5.8%	491.136
Poland	6.5%	831.947
Portugal	8.4%	574.762
Spain	9.8%	2.500.110
Car park Total Europe		17.925.863

BERU

Perfection built in

- True innovator
- Impressive OE – Pedigree
- Global no. 1 in glow plug technology
- Complete range with excellent coverage
- Made in Germany

Now in stock

Trade Number
GSE140

OE Reference
000 545 35 16; 025 545 28 32; 646 153 65 79

Main Application
C-Class, E-Class, Vaneo

EAN/UPC-Code
4044197768899

Dimension (mm)
209 x 100 x 70

Gross Weight (kg)
0,143

Net Weight (kg)
0,119

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®

Now in stock

Trade Number
GSE141

OE Reference
A 019 545 69 32,
A 025 545 29 32,
A 028 545 40 32,
A 000 545 36 16

Main Application
C-Class, E-Class, Sprinter

EAN/UPC-Code
4044197768905

Dimension (mm)
209 x 100 x 70

Gross Weight (kg)
0,148

Net Weight (kg)
0,124

Now in stock

Trade Number
GSE142

OE Reference
55353011, 6235240

Main Application
Agila, Astra, Vectra

EAN/UPC-Code
4044197768912

Dimension (mm)
209 x 100 x 70

Gross Weight (kg)
0,208

Net Weight (kg)
0,184

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®

Now in stock

Trade Number
GSE143

OE Reference
55354141, 6235303

Main Application
Astra G, Meriva

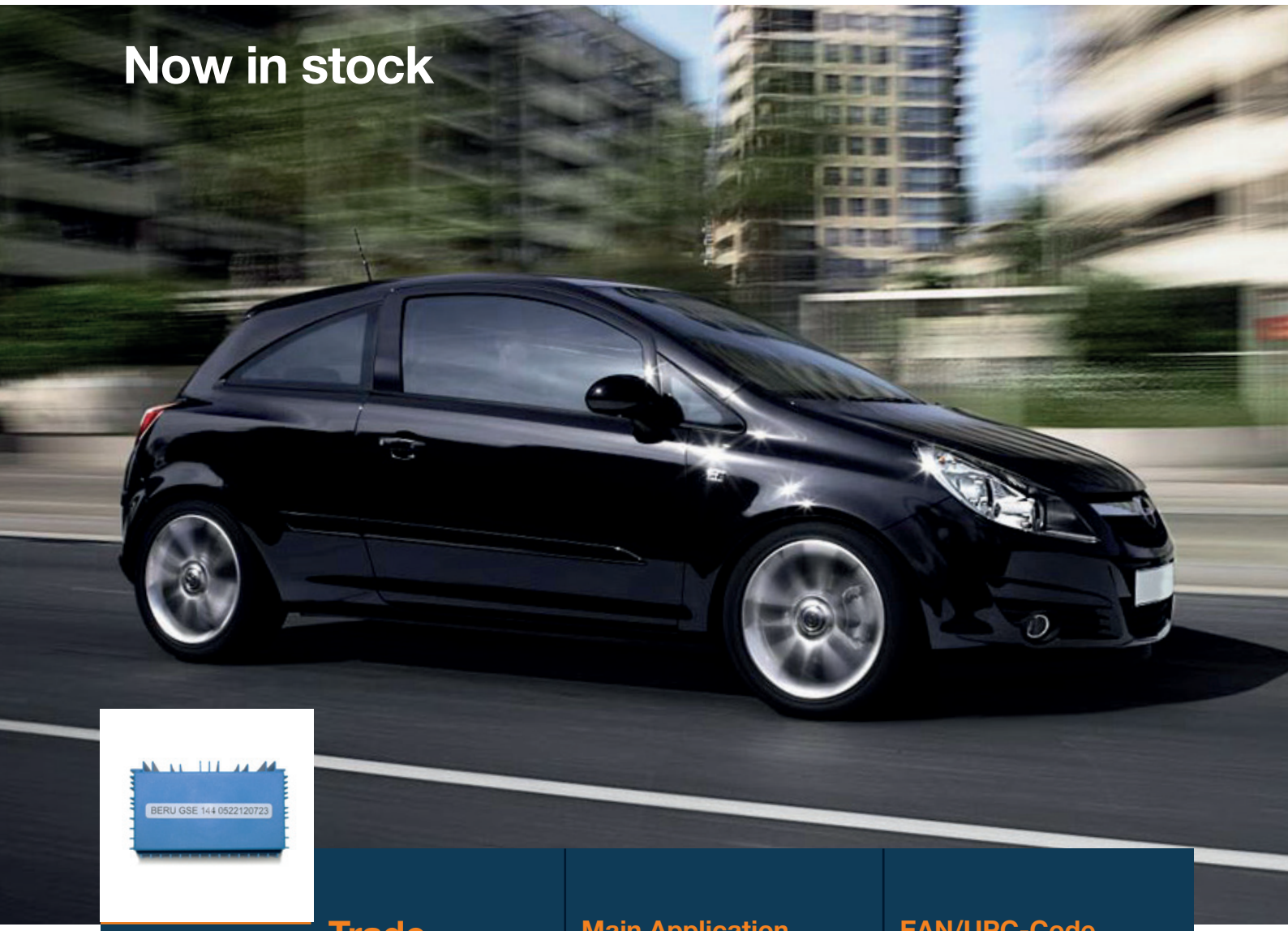
EAN/UPC-Code
4044197768929

Dimension (mm)
209 x 100 x 70

Gross Weight (kg)
0.211

Net Weight (kg)
0.187

Now in stock



Trade Number
GSE144

OE Reference
55557760, 1232076

Main Application
Corsa D

EAN/UPC-Code
4044197768936

Dimension (mm)
209 x 100 x 70

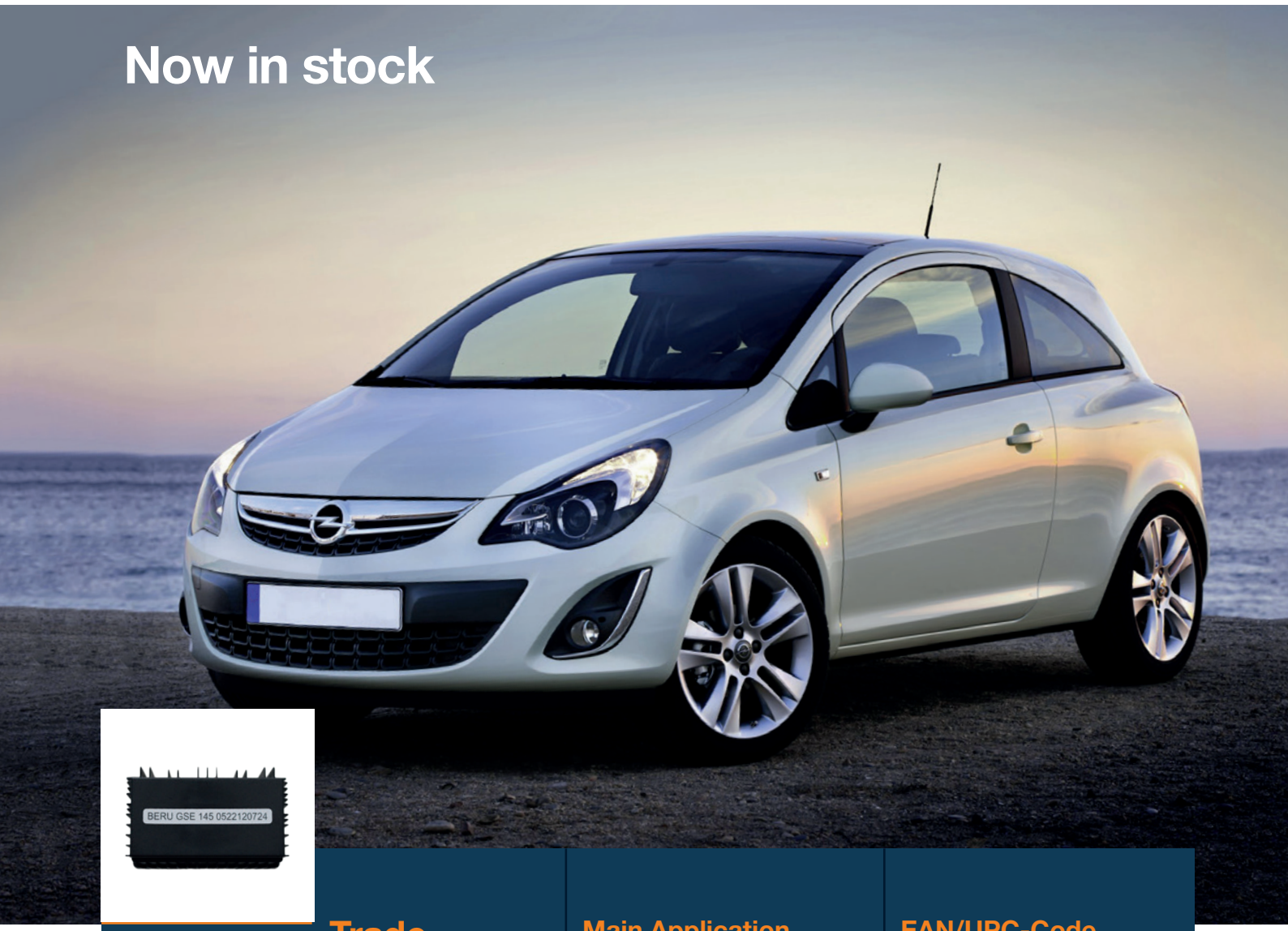
Gross Weight (kg)
0,118

Net Weight (kg)
0,094

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®

Now in stock



Trade Number
GSE145

OE Reference
55557761, 1232077

Main Application
Corsa D

EAN/UPC-Code
4044197768943

Dimension (mm)
209 x 100 x 70

Gross Weight (kg)
0,118

Net Weight (kg)
0,094

Now in stock

Trade Number
GR081

OE Reference
357911253

Main Application
Audi A3, Seat Leon, Golf IV

EAN/UPC-Code
4044197768882

Dimension (mm)
35 x 35 x 71

Gross Weight (kg)
0,050

Net Weight (kg)
0,044

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®

Now in stock

Trade Number
GSE114

OE Reference
A 642 900 58 01

Main Application
CLK, C-class, E-class, Sprinter

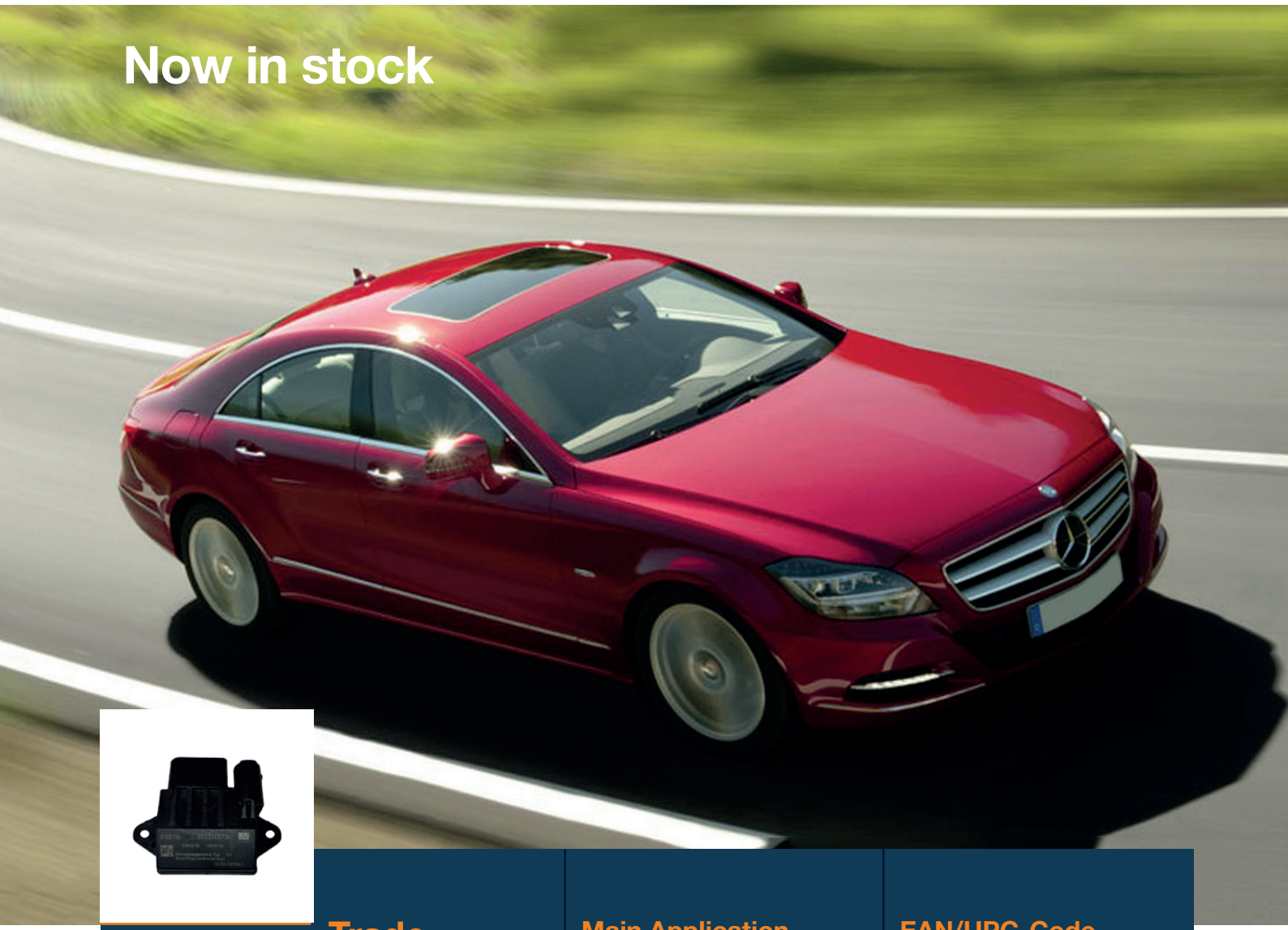
EAN/UPC-Code
4014427141594

Dimension (mm)
45 x 35 x 89

Gross Weight (kg)
0,203

Net Weight (kg)
0,155

Now in stock



Trade Number
GSE116

OE Reference
A 642 900 57 01

Main Application
GLK, C-class, G-class, M-class

EAN/UPC-Code
4014427141570

Dimension (mm)
44 x 44 x 84

Gross Weight (kg)
0,205

Net Weight (kg)
0,18

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®

BERU Diesel Cold-Start Technology

As versatile as our customer's cars

You don't become market leader by chance.
But rather through trusted first-class quality.

BERU Glow plug range in 1:1 OE-quality for up to 98% market coverage

GN

Main Application:
BMW, FIAT, Mercedes-Benz, Renault, VW

ISS (Instant Start System)

Main Application:
Audi, BMW, Mercedes-Benz, Mini, Opel/Vauxhall

Ceramic Glow Plugs

Main Application:
BMW

Pressure Sensor Glow Plugs

Main Application:
Audi, Opel/Vauxhall, Seat, Skoda, VW

BERU NEWSLETTER #5

Rely on our OE pedigree - BERU ignition coils

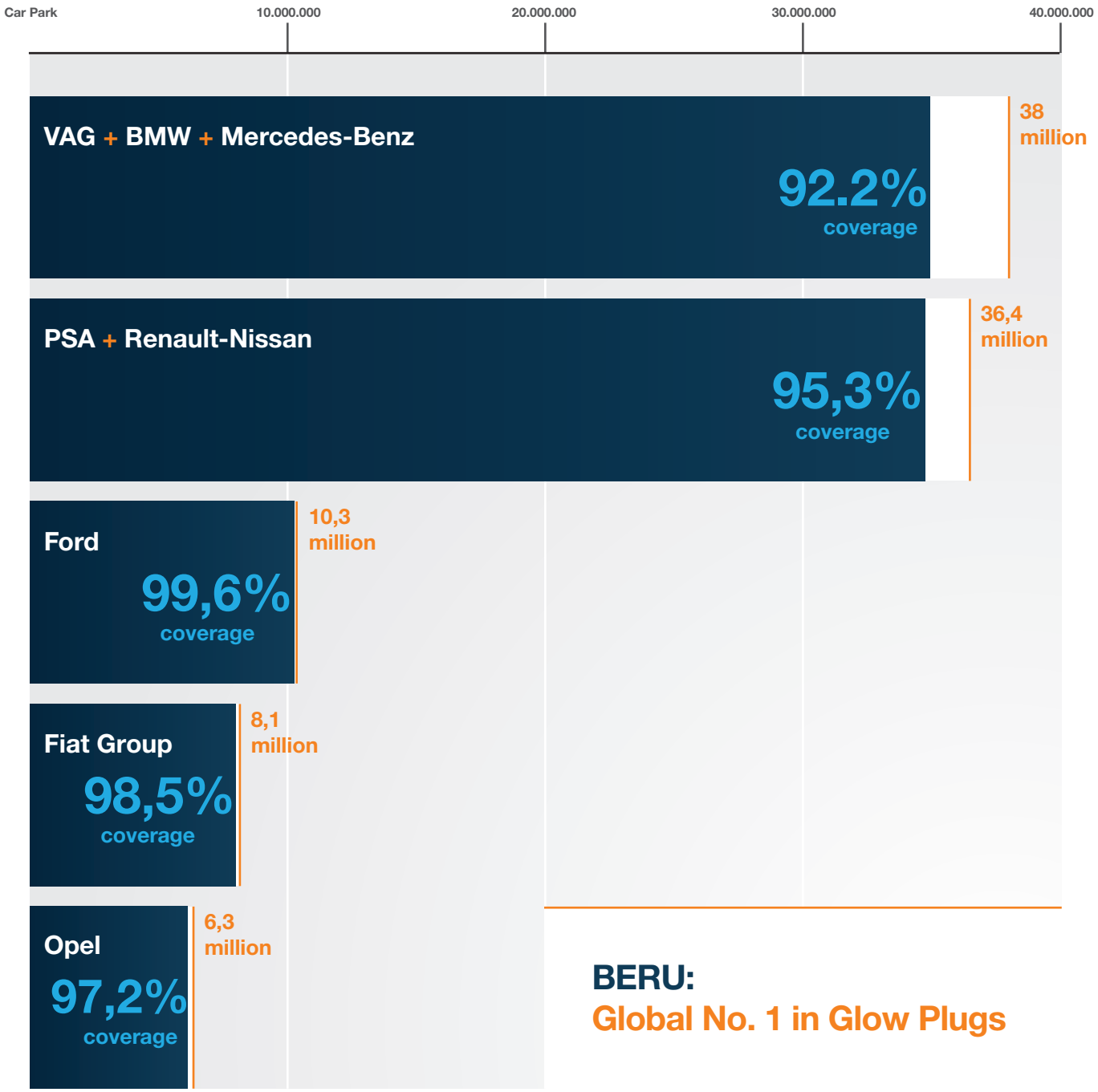
9 new BERU Ignition Coils for the Aftermarket

BERU is a trusted development partner to all leading automobile manufacturers. Wherever the cars of the future are being created, BERU is in demand as an expert in ignition technology.

Perfection built in BERU®

FEDERAL-MOGUL MOTORPARTS

Exceptional OE-quality, innovation and coverage, make BERU glow plugs the aftermarket choice



BERU:
Global No. 1 in Glow Plugs

Now in stock

Trade Number
ZSE154

OE Reference
078 905 104,
078 905 104A

Main Application
Audi A4
Audi A6
Audi A8
VW Passat
Skoda Superb V6

EAN/UPC-Code
4014427140788

Dimension (mm)
290x165x95

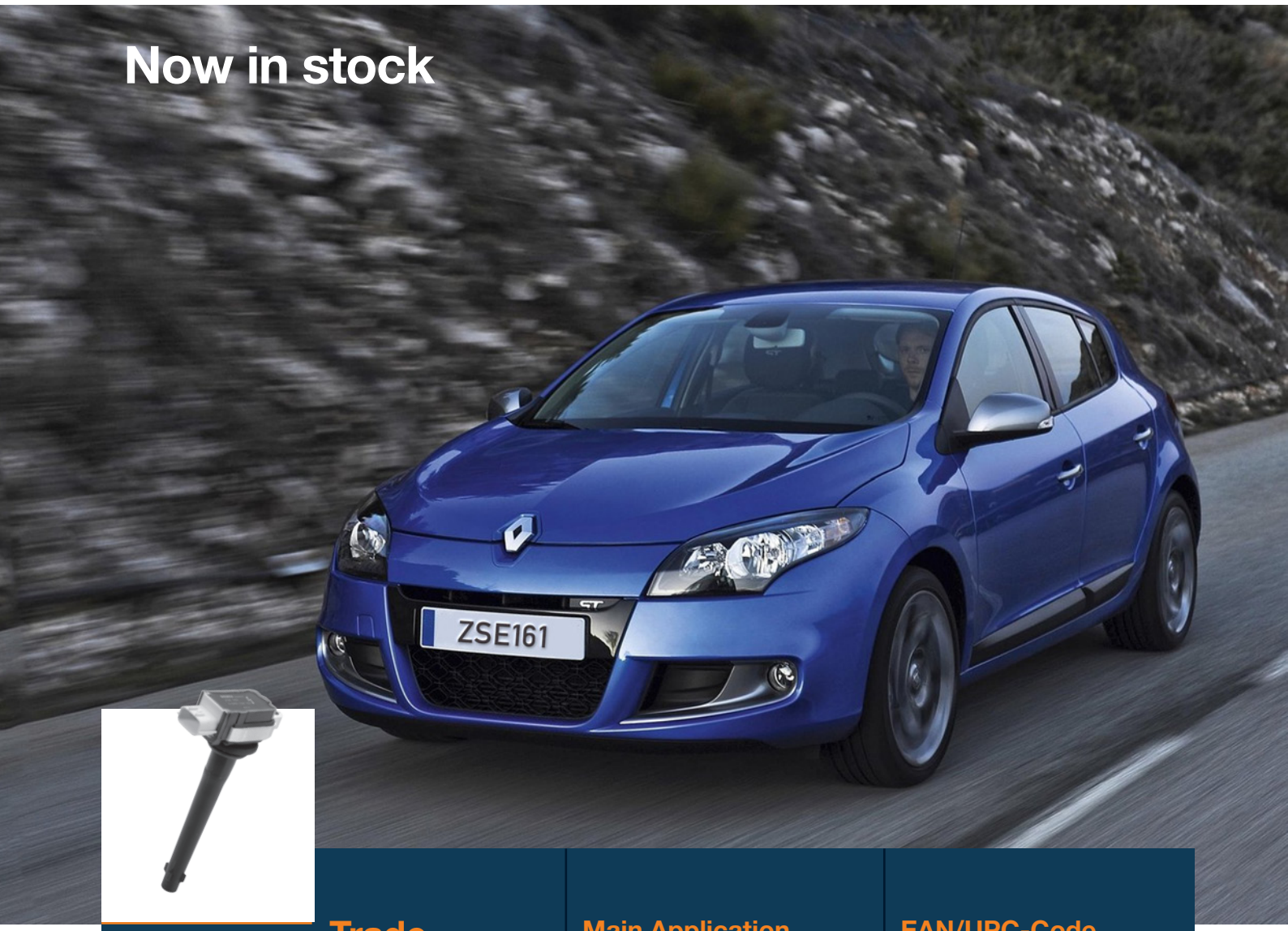
Gross Weight (kg)
1,83

Net Weight (kg)
1,70

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®

Now in stock



Trade Number
ZSE161

OE Reference
8200699627

Main Application
Renault Fluence
Renault Grand Scénic III
Renault Laguna III
Renault Laguna III Grandtour
Renault Latitude
Renault Megane Cc
Renault Megane III Coupe
Renault Megane III Hatchback

EAN/UPC-Code
4044197771547

Dimension (mm)
165x90x45

Gross Weight (kg)
0,24

Net Weight (kg)
0,20

Now in stock

Trade Number
ZSE174

OE Reference
12629037,
1208039

Main Application
Alfa Romeo 159 (SW)
Cadilac CTS
Cadilac SRX
Opel/Vauxhall Signum
Opel/Vauxhall Vectra C
Saab 9-3

EAN/UPC-Code
4044197771554

Dimension (mm)
160x67x57

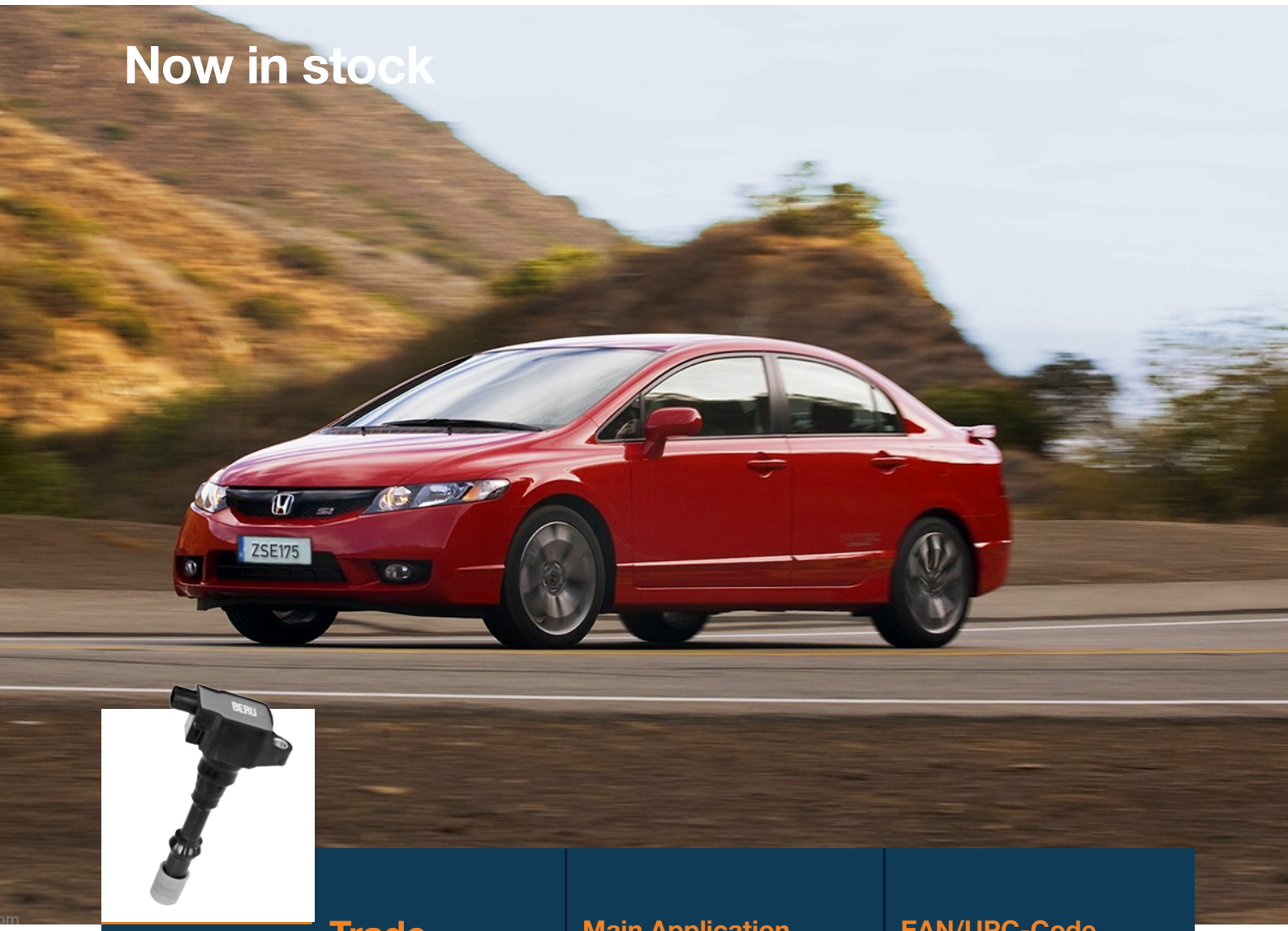
Gross Weight (kg)
0,30

Net Weight (kg)
0,25

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®

Now in stock



Trade Number
ZSE175

OE Reference
30520PWA003,
30520PWA013,
30520PWAS01,
30520REAZ01

Main Application
Honda City
Honda Civic VII & VIII
Honda Jazz II

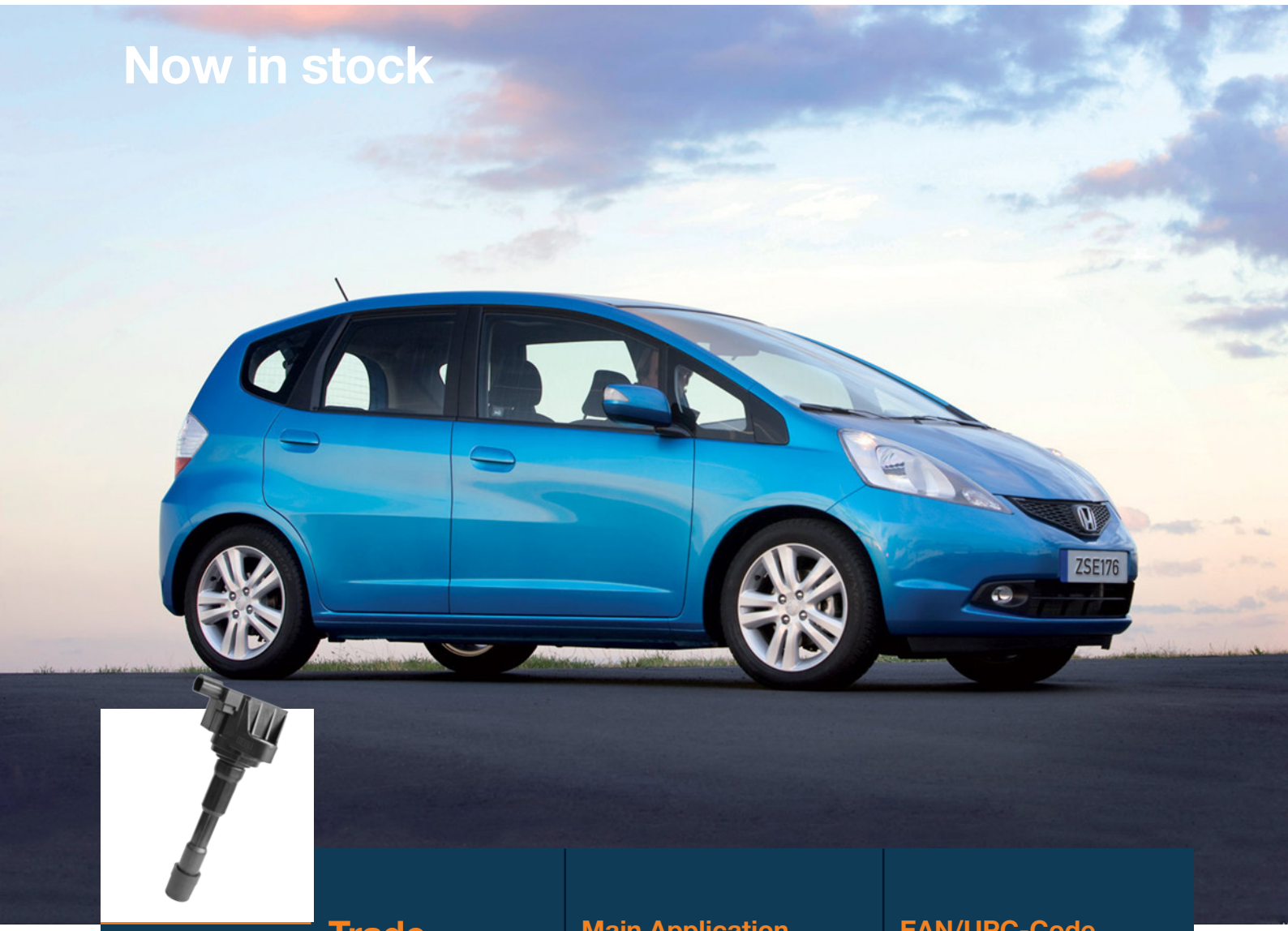
EAN/UPC-Code
4044197810451

Dimension (mm)
156x84x38

Gross Weight (kg)
0,25

Net Weight (kg)
0,19

Now in stock



Trade Number
ZSE176

OE Reference
30521PWAS01,
30521PWA013,
30521PW003,
30521RLB003,
30521REAZ01

Main Application
Honda Civic VIII
Honda Jazz III

EAN/UPC-Code
4044197810468

Dimension (mm)
164x68x62

Gross Weight (kg)
0,26

Net Weight (kg)
0,20

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®

Now in stock

Trade Number
ZS177

OE Reference
996 602 101 01
996 602 102 00
997 602 107 00
997 602 107 02

Main Application
Porsche 911 Carrera
Porsche GT3
Porsche Boxster
Porsche Cayman

EAN/UPC-Code
4044197776528

Dimension (mm)
170x75x65

Gross Weight (kg)
0,34

Net Weight (kg)
0,29

Now in stock

Trade Number
ZS178

OE Reference
996 602 104 00
997 602 104 00
997 602 104 02

Main Application
Porsche 911 Carrera
Porsche GT3
Porsche Boxster
Porsche Cayman

EAN/UPC-Code
4044197776535

Dimension (mm)
170x75x65

Gross Weight (kg)
0,34

Net Weight (kg)
0,29

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®

Now in stock

Trade Number
ZS472

OE Reference
597085

Main Application
Citroën C2
Citroën C3
Citroën C4
Peugeot 206
Peugeot 207
Peugeot 307
Peugeot 1007

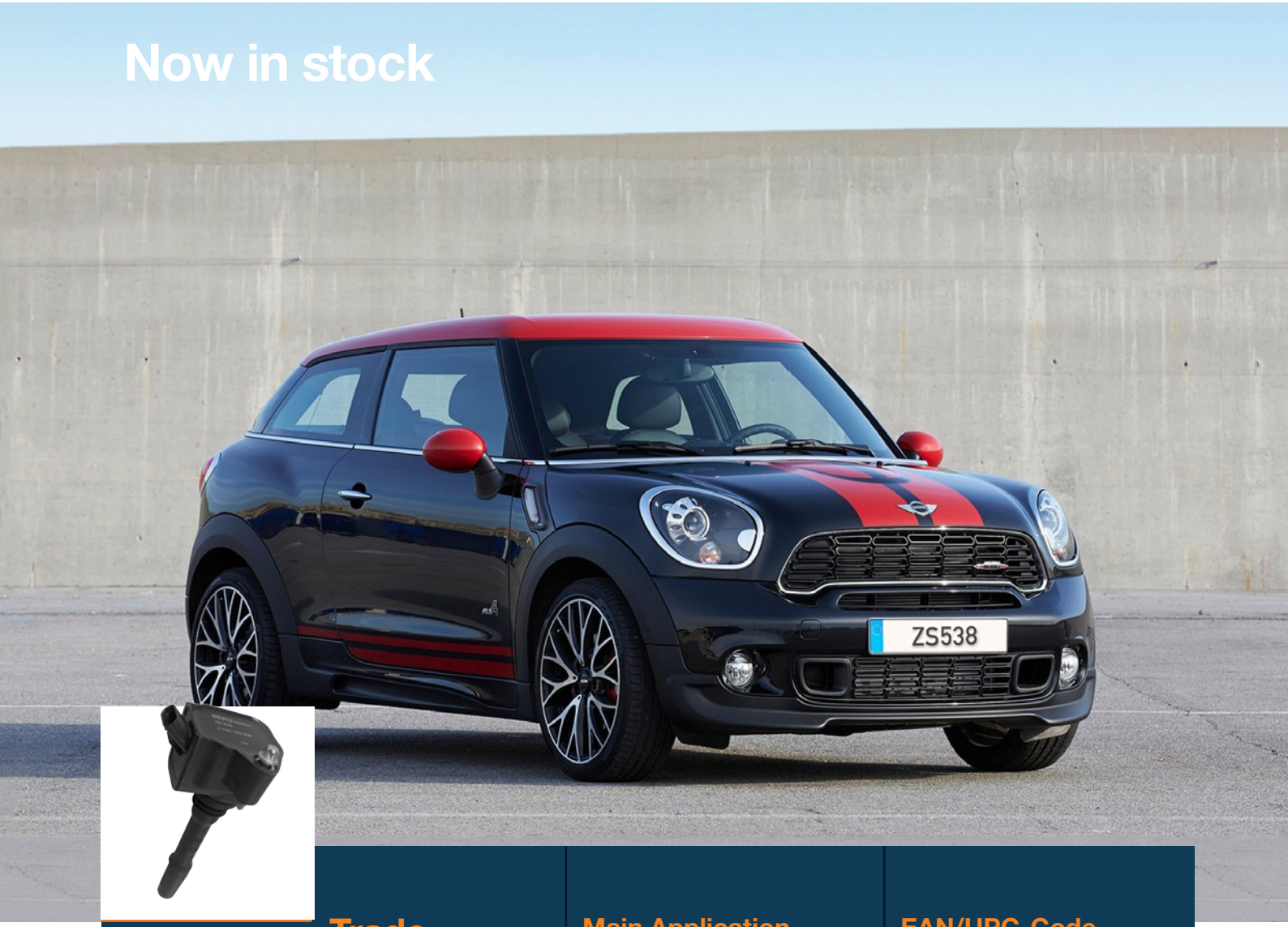
EAN/UPC-Code
4014427141907

Dimension (mm)
320x144x33

Gross Weight (kg)
1,00

Net Weight (kg)
0,78

Now in stock



Trade Number
ZS538

OE Reference
7 619 385,
12 13 7 619 385

Main Application
BMW / Mini Cooper

EAN/UPC-Code
4044197810444

Dimension (mm)
170x70x60

Gross Weight (kg)
0,39

Net Weight (kg)
0,24

FEDERAL-MOGUL MOTORPARTS

Perfection built in BERU®

BERU Ignition Coils

As versatile as our customer's cars

You don't become market leader by chance.
But rather through trusted first-class quality.

BERU supplies over 400 ignition coil types - for more than 7.750 different vehicle models.

Distributor Ignition Coils
(Single Ended Coils)

Applications:
VW, Audi

Pencil Coils / Plug Top Coils

Applications: BMW, Fiat, Mercedes-Benz, Porsche, Renault, VW

Block Ignition Coils

Applications:
BMW, Fiat, Renault, VW

Ignition Coil Rails

Applications:
VW, Opel, Peugeot, Citroën, Škoda

BERU NEWSLETTER #6
CERAMIC GLOW PLUGS

BERU extends its Ceramic Glow Plug range

BERU Ceramic Glow Plugs for VW, Opel, Renault-Nissan now also available in our range for the aftermarket.

BERU is a trusted development partner to all leading automobile manufacturers. Wherever the cars of the future are being created, BERU is in demand as an expert in ignition technology.

Perfection built in BERU®

FEDERAL-MOGUL MOTORPARTS

BERU Ceramic Glow Plugs

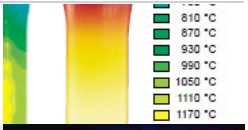
Modern engine designers are looking for solutions that make heat energy available when the engine would otherwise generate higher emissions due to excess cooling.

High requirements linked to refinement, low emissions and performance can result in poorer starting characteristics, something which the BERU ceramic glow plug can offer a solution for.

The forward looking BERU Ceramic Glow Plugs (CGP) fulfill these requirements – from rapid temperature rise to a high maximum temperature. At the same time they are characterized by high-durability and long life.

Technical features

- **Glow temperatures up to 1300°C**



- **Extremely rapid heat-up time in under 3 seconds to 1300°C**

- **Extended life time**

- **Exact measurement of the glow plug resistance**
- **Optimized close-loop control for pre-, intermediate and post-heating**
- **Reducing pollutant emissions due to improved combustion**

What makes BERU Ceramic Glow Plugs special?

Shorter heat up times than conventional ceramic glow plugs.

Particular design of the ceramic treating rod:

The heating element consists entirely of electrically conductive ceramic. Because its surface has a higher specific resistance than the material of the supply and return conductors, the glow rod only glows at the tip (cap) and thus reaches high temperatures more rapidly. The glow pin contact consists of an internal and external conductor separated by an insulator.

1 Heating section cap
2 Glow pin contact
3 Cap area
4 External conductor
5 Insulator
6 Internal conductor

Ready to order: 15 NPI's from BERU

Ceramic Glow Plugs

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CGP007
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Ignition coils

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Glow Plug timer relay

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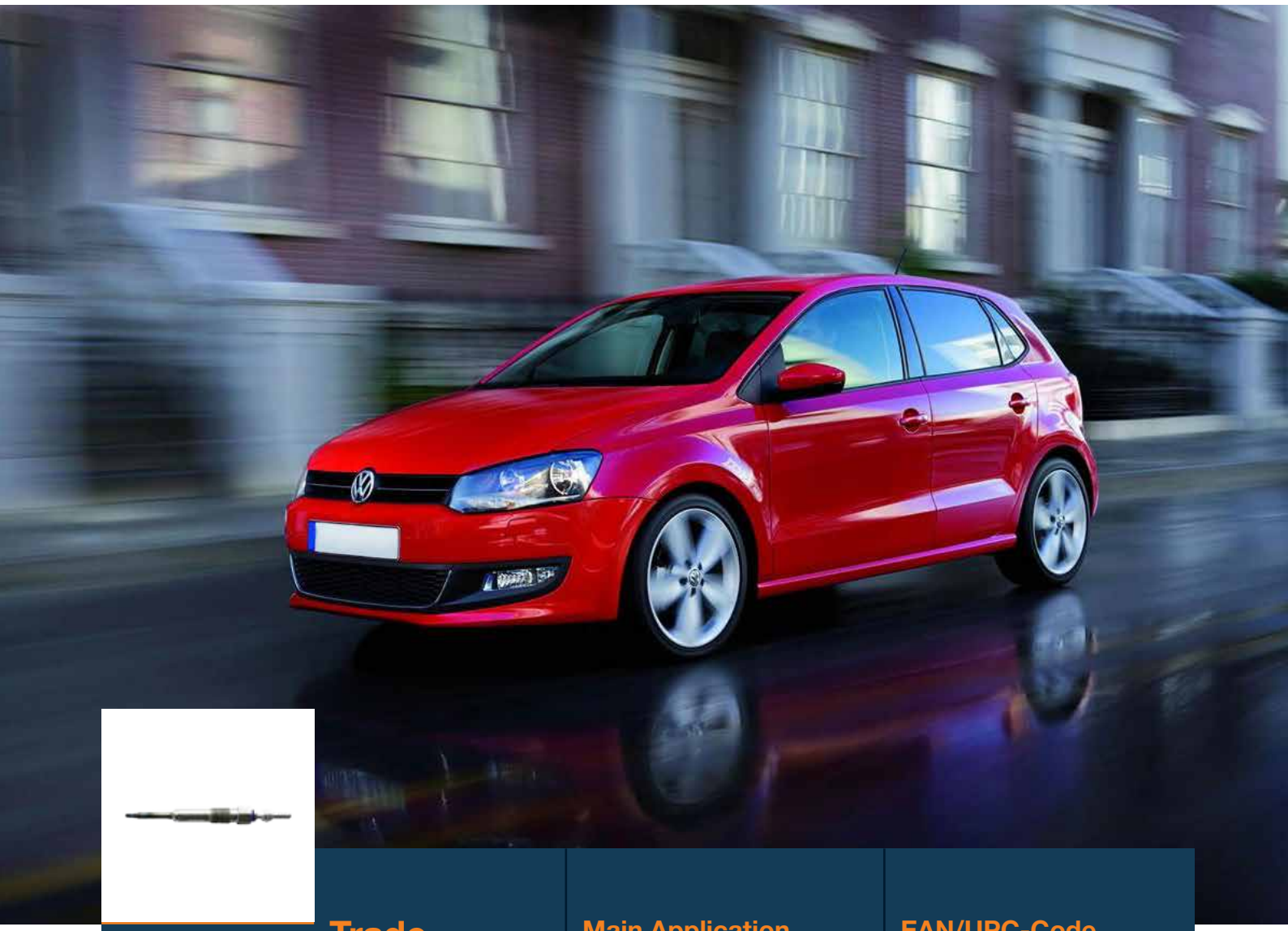
GSE152
Page 14

Perfection built in BERU®



Trade Number
CGP002

Product group
Ceramic Glow Plug

OE Reference
N 105 916 04
N 105 916 08

Main Application
Audi: A3, A4

Seat: Alhambra, Altea, Cordoba, Ibiza, Leon, Toledo

Skoda: Fabia, Octavia, Roomster, Superb

Volkswagen: Crafter, Jetta, New Beetle, Passat, Polo, Sharan, Touareg, Transporter

Year
2004

EAN/UPC-Code
4044197848225

Dimension (mm)
97 x 12 x 9

Gross Weight (kg)
0,027

Net Weight (kg)
0,025

Trade Number
CGP003

Product group
Ceramic Glow Plug

OE Reference
N 105 798 03
N 105 798 05

Main Application
Audi: A3, A4, A6
Seat: Altea, Leon, Toledo
Skoda: Octavia
Volkswagen: Golf, Jetta, Passat, Touran

Year
2004

EAN/UPC-Code
4044197848249

Dimension (mm)
117 x 8 x 6

Gross Weight (kg)
0,022

Net Weight (kg)
0,019

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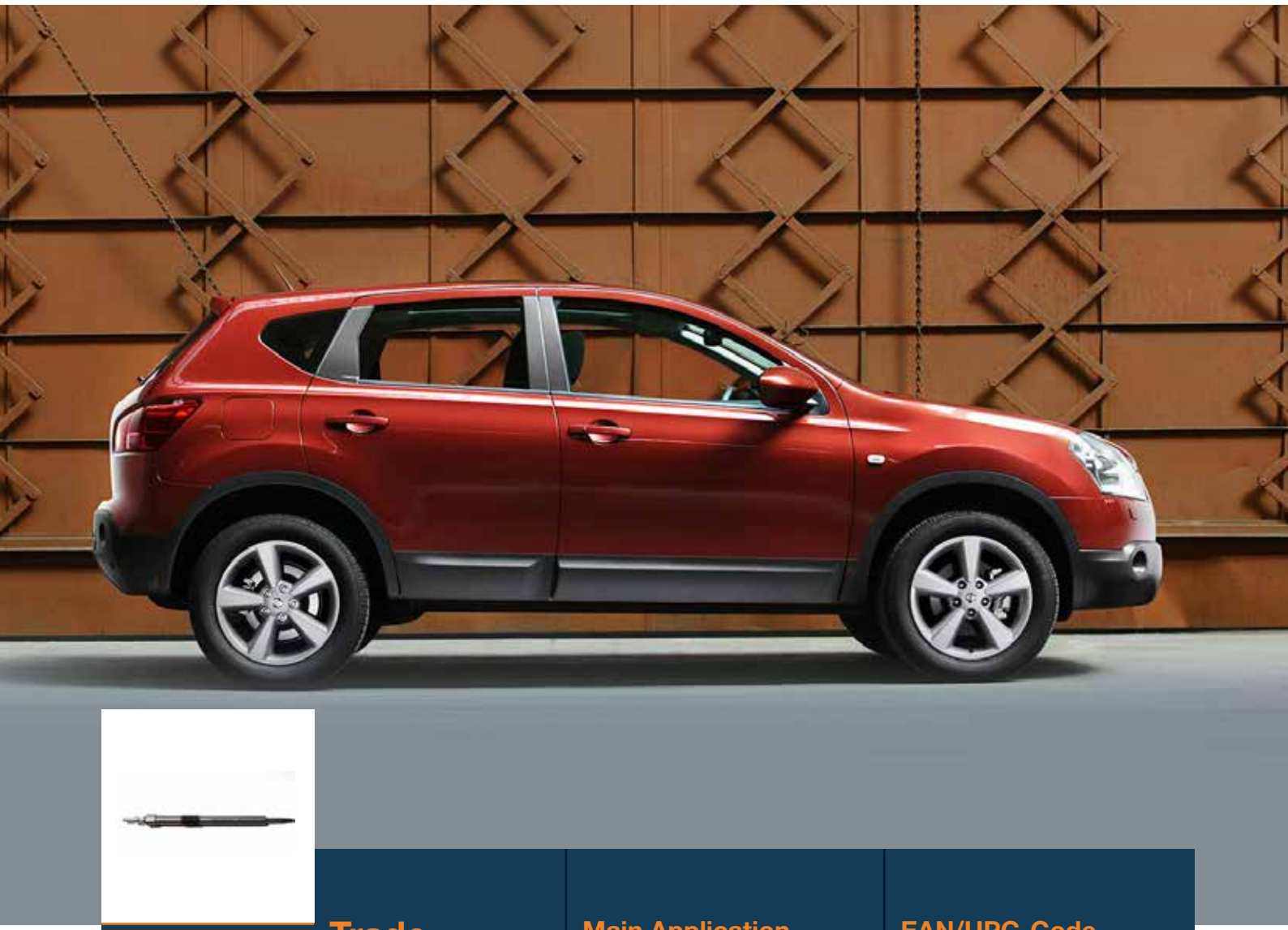

Trade Number
CGP007

Product group
Ceramic Glow Plug

OE Reference
Opel: 93198468
Nissan: 11065 5X00A
Renault: 82 00 561 251

Main Application
Opel: Movano Bus, Vivaro F7 CDTI

Nissan: Murano, Navara, Pathfinder, Qashqai, X-Trail CDI

Renault: Espace IV, Koleos, Trafic II Bus

Year
2007

EAN/UPC-Code
4044197848263

Dimension (mm)
163 x 11 x 9,5

Gross Weight (kg)
0,023

Net Weight (kg)
0,021

Trade Number
GSE104

Product group
Glow Plug timer relay

OE Reference
A 034 545 64 32

Main Application
Mercedes Benz: C-Class (W203) C30CDI AMG

Year
2002-2008

EAN/UPC-Code
4044197844142

Dimension (mm)
190 x 130 x 8

Gross Weight (kg)
0,336

Net Weight (kg)
0,250

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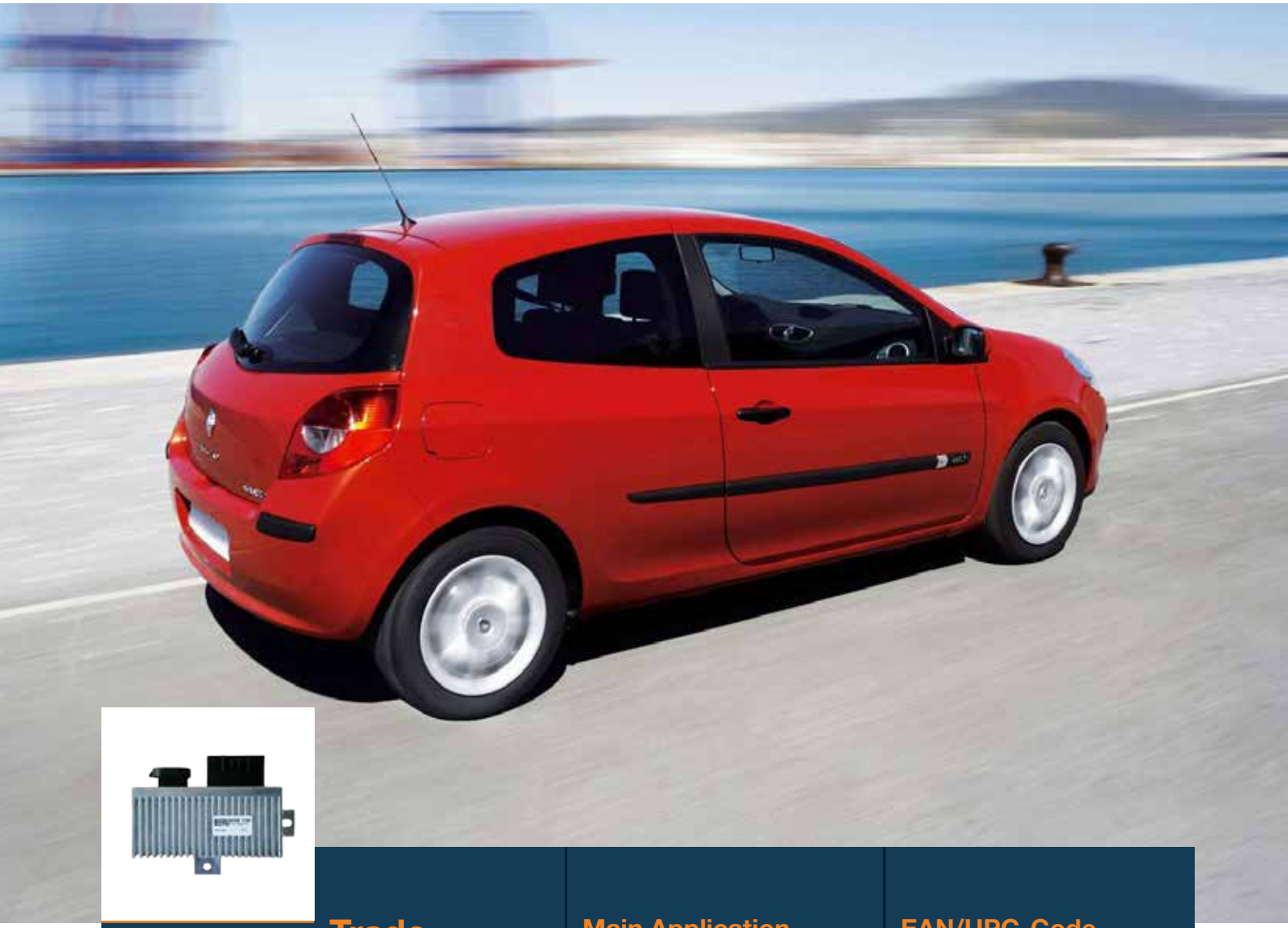

Trade Number
GSE128

Product group
Glow Plug timer relay

OE Reference
77 00 109 860

Main Application
Renault: Clio II, Kangoo

Year
1998-2005

EAN/UPC-Code
4044197844289

Dimension (mm)
210 x 100 x 70

Gross Weight (kg)
0,210

Net Weight (kg)
0,158

Trade Number
GSE129

Product group
Glow Plug timer relay

OE Reference
77 00 111 525

Main Application
Renault: Clio II, Laguna I

Year
1997-2005

EAN/UPC-Code
4044197844302

Dimension (mm)
210 x 100 x 70

Gross Weight (kg)
0,212

Net Weight (kg)
0,160

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Trade Number
GSE147

Product group
Glow Plug timer relay

OE Reference
9640469680

Main Application
Citroën: Berlingo
Ford: Focus II, Fiesta V
Mazda: Mazda 2
Opel: Movano, Vivaro
Renault: Trafic II Bus

Year
2001

EAN/UPC-Code
4044197844166

Dimension (mm)
105 x 100 x 40

Gross Weight (kg)
0,105

Net Weight (kg)
0,076

Trade Number
GSE148

Product group
Glow Plug timer relay

OE Reference
598120

Main Application
Citroën: XM

Peugeot: 605

Year
1989-2000

EAN/UPC-Code
4044197844180

Dimension (mm)
210 x 100 x 70

Gross Weight (kg)
0,216

Net Weight (kg)
0,154

Perfection built in BERU®

Trade Number
GSE149

Product group
Glow Plug timer relay

OE Reference
598131

Main Application
Citroën: Berlingo, C2, C3, C5I, Evasion, Jumper, SAXO, XANTIA, XSARA Break, Picasso

Peugeot: 106, 206, 306, 406, 605, 607, 806, 807, Boxer Box, Bus, EXPERT, Partner Box

Year
1994

EAN/UPC-Code
4044197844203

Dimension (mm)
210 x 100 x 70

Gross Weight (kg)
0,204

Net Weight (kg)
0,142

Trade Number
GSE151

Product group
Glow Plug timer relay

OE Reference
047L907282

Main Application
Audi: A3, A4 Avant, A5, A6 Avant, A8 4,2 TDI quattro, Q5 2,0 TDI quattro

Seat: Alhambra, Leon

Skoda: Octavia

Volkswagen: Beetle, Golf Sportsvan, Golf V, VII, Passat TDI , Sharan TDI, Transporter V Box

Year
2003-

EAN/UPC-Code
44044197844241

Dimension (mm)
105 x 100 x 40

Gross Weight (kg)
0,083

Net Weight (kg)
0,053

Perfection built in BERU®

Trade Number
GSE152

Product group
Glow Plug timer relay

OE Reference
038907281D

Main Application
Audi: A1, A3, Q3 TDI quattro

Seat: Alhambra TDI, Altea, Ibiza IV, V, Leon, Toledo III

Skoda: Fabia TDI, Fabia Combi, Octavia, Superb, Yeti,

VW: Amarok, Caddy III Box, EOS, Golf V, Passat, Polo, Scirocco, Tiguan, Touran

Year
2003

EAN/UPC-Code
4044197844265

Dimension (mm)
105 x 100 x 40

Gross Weight (kg)
0,097

Net Weight (kg)
0,067

Trade Number
ZSE156

Product group
Ignition Coils

OE Reference
22448-ZE00C

Main Application
Nissan: Armada, Titan

Year
2003

EAN/UPC-Code
4014427141501

Dimension (mm)
172 x 94 x 73

Gross Weight (kg)
0,230

Net Weight (kg)
0,190

Perfection built in BERU®

Trade Number
ZSE157

Product group
Ignition Coils

OE Reference
22448-AR215

Main Application
Infiniti: FX45, M45, Q45

Year
2003-2008

EAN/UPC-Code
4014427141518

Dimension (mm)
172 x 94 x 73

Gross Weight (kg)
0,220

Net Weight (kg)
0,180

Trade Number
ZSE158

Product group
Ignition Coils

OE Reference
22448-JA10C

Main Application
Infiniti: EX35, M35, Q50

Nissan: 350 Z, Roadster, Altma, Murano, Tena II

Renault: Laguna III, Latitude 2,5 V6

Year
2008

EAN/UPC-Code
4014427141525

Dimension (mm)
172 x 94 x 73

Gross Weight (kg)
0,230

Net Weight (kg)
0,190

Perfection built in BERU®

Trade Number
ZSE159

Product group
Ignition Coils

OE Reference
12570616

Main Application
Cadillac: CTS 5,7 V8, Escalade

Chevrolet: Avalanche, Camaro, Corvette, Silverado 1500, Trailblazer

Year
2009

EAN/UPC-Code
4014427141532

Dimension (mm)
172 x 94 x 73

Gross Weight (kg)
0,310

Net Weight (kg)
0,270

In this BERU Newsletter

Ignition Technology

Spark Plugs

- Ultra
- Ultra X Titan
- Platin

Ignition Coils

- Distributor Ignition Coils
- Pencil Coils/Plug Top Coils
- Block Ignition Coils
- Ignition Coil Rails

Ignition Leads & Components

Diesel Cold Start Technology

Glow Plugs

- Post heating (GN)
- Post heating electrical (GE)
- Ceramic Glow Plugs

Pressure Sensor Glow Plugs (PSG)

Instant Start System (ISS)

Also available from BERU

Cooling

- Fan wheels
- Fan Clutches
- Elelctrical Fans

Sensors

- Oxygen
- High-temperature
- Speed, Oil and Temperature

Perfection built in BERU®

BERU NEWSLETTER #7
PRESSURE SENSOR GLOW PLUGS

New BERU Pressure Sensor Glow Plug 007 for the VW AG group

BERU, the first and only manufacturer to supply PSG in series production.

Discover also **18** new Ignition Coils for more than **420** applications

BERU is a trusted development partner to all leading automobile manufacturers. Wherever the cars of the future are being created, BERU is in demand as an expert in ignition technology.

Perfection built in BERU®

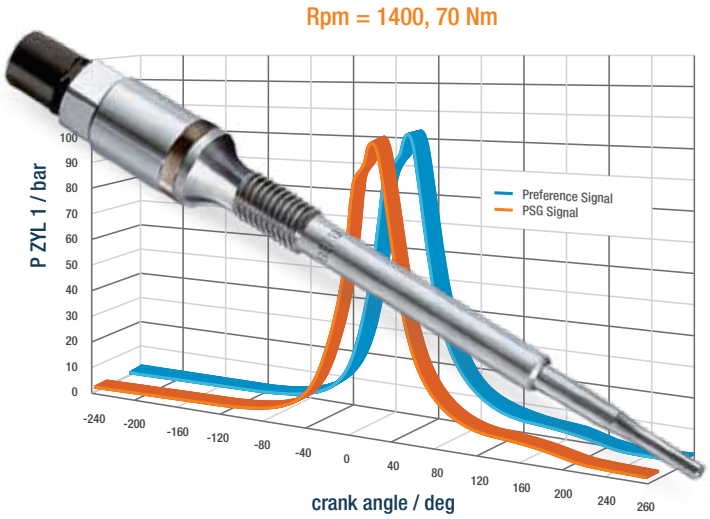
FEDERAL-MOGUL MOTORPARTS

Innovative pressure sensor glow plug

With the world's first glow plug to enable the regulation of the combustion processes inside a closed loop system on the market, BERU once again highlights its technological lead. By installing pressure sensor glow plugs higher peak pressures can be implemented in today's smaller engines, standard and future combustion processes can be pushed even further to their limits, and constantly stable emissions control can be obtained throughout the engine's entire service life.

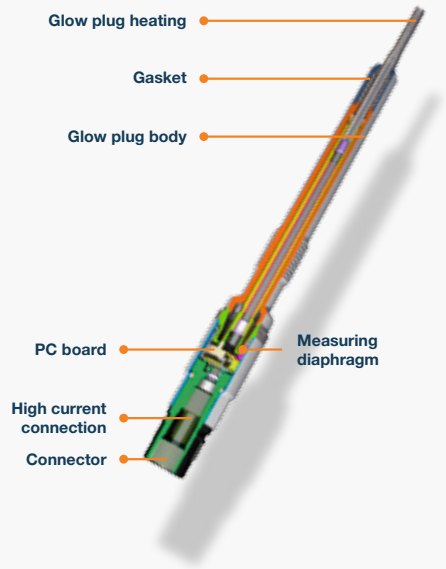
Future of cold start technology

The BERU PSG is an intelligent glow plug with integrated combustion chamber pressure sensor which reports data to the engine control electronics. Injection is adjusted to the actual combustion in real time.



Technical features

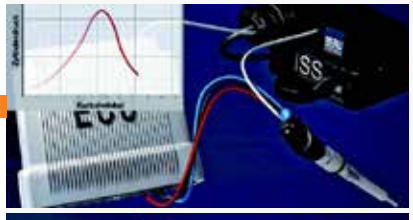
- **Sensor principle: piezo-resistive**
- **Moving heating rod to transfer the pressure**
- **Robust sealing element between body and heating rod**
- **Miniaturised electronics integrated into top part of the glow plug**
- **Calibrated and programmed to customer specifications**
- **Integral concentric automotive connector**



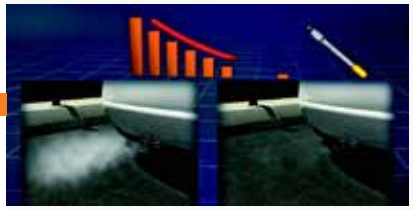
Benefits at a glance

1. Cylinder pressure can be recorded up to 200 bar, accurate to +/- 2% and with a resolution up to 700 steps per combustion cycle.
2. The ECU is able to constantly adapt the fuel injection, the charge pressure and the exhaust gas recycling rate.
3. Ignition can be optimised to each cylinder
4. Improves cold starts and cold running quality.
5. Enables optimum torque control
6. Higher engine performance with limited emission of pollutants, soot particles and nitrogren oxides
7. "Closed loop" method introduced into the Diesel Engines

1



2



7

Ready to order: 19 NPI's from BERU

Glow Plugs
Pressure Sensor Glow Plugs

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Ignition coils

Distributor Ignition Coils

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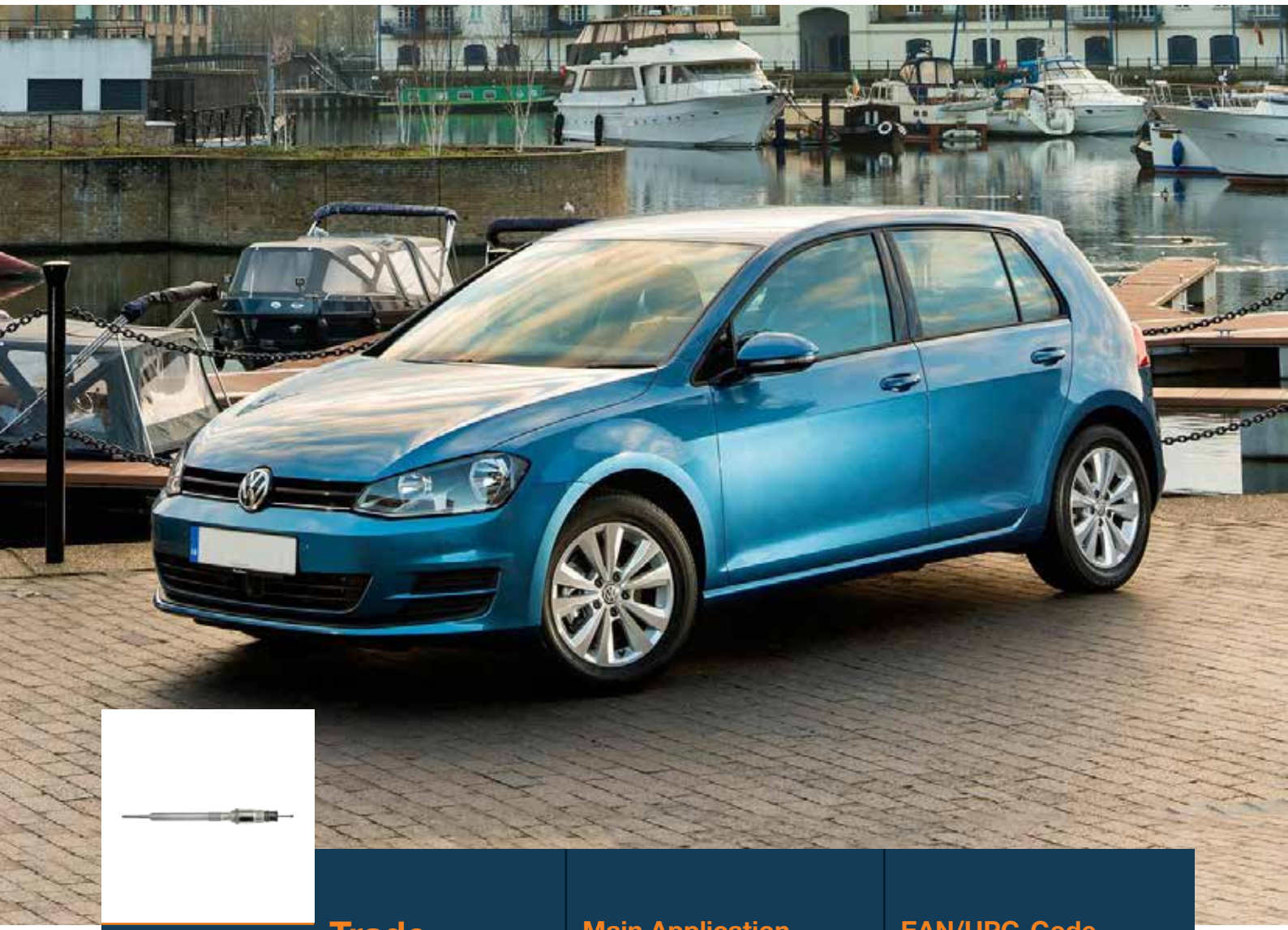
Ignition Coil Rails

ZS452
Page 22

Perfection built in BERU®



Trade Number

PSG007

replaces PSG002

Product group

Pressure Sensor Glow Plugs

OE Reference

03L905061G
03L905061F
03L905061E
03L905061D

Main Application

Audi: A1, A3
(Audi A1 2015→)
(Audi A3 2013→)

Seat: Ibiza
(2016→)

Skoda: Octavia
(2013→)

Volkswagen: Golf, Sharan, Tiguan
(Golf 2014→)
(Sharan 2016→)
(Tiguan 2012→)

EAN/UPC-Code

4044197858545

Dimension (mm)

260 × 34 × 37

Gross Weight (kg)

0,079

Net Weight (kg)

0,055

Trade Number
ZSE177

Product group
Distributor Ignition Coils

OE Reference
12 558 693

Main Application
Chevrolet:
Silverado 2500 6,0 AWD,
TAHOE 4,8 V8-6,0 V8
(1999→2006)

Hummer: H2 SUT
(1999→2006)

EAN/UPC-Code
4044197844128

Dimension (mm)
82 × 75 × 80

Gross Weight (kg)
0,275

Net Weight (kg)
0,250

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Trade Number
ZS445

Product group
Distributor Ignition Coils

OE Reference
9091902197

Main Application
Lexus: GS, LS (1993→2000)

Toyota: 4 Runner, MR2 II (1989→1995)

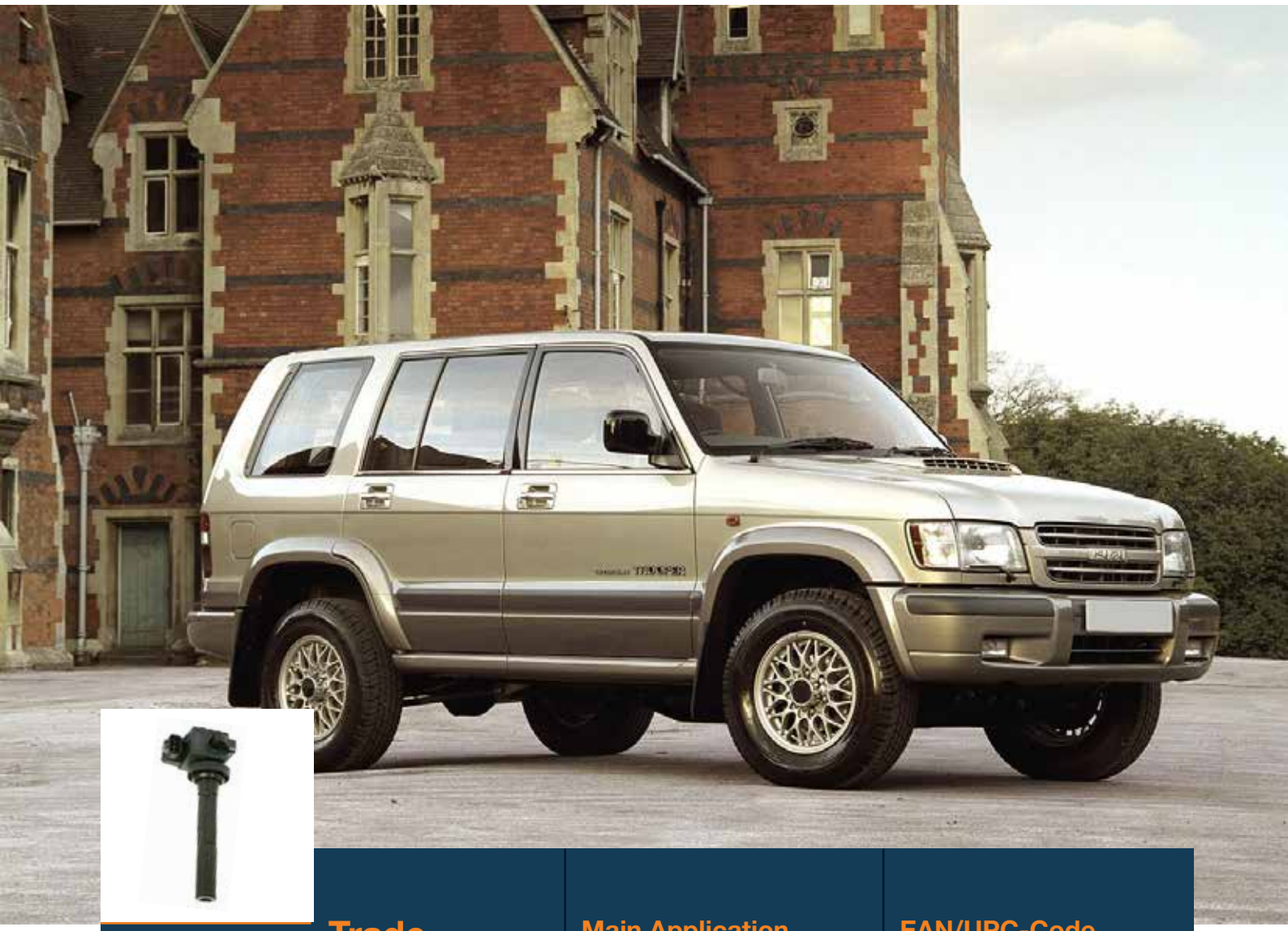
Volkswagen: Taro 2,4i 4x4 (1989→1997)

EAN/UPC-Code
4014427139805

Dimension (mm)
83 × 72 × 127

Gross Weight (kg)
0,494

Net Weight (kg)
0,448



Trade Number
ZSE160

Product group
Plug Top Coils

OE Reference
8971363250

Main Application
Honda: Acura SLX V6, Passport V6 (1998→1999)

Isuzu: Amigo, Rodeo, Trooper V6 (1998→2001)

ONLY FOR EXPORT USA

EAN/UPC-Code
4014427141549

Dimension (mm)
222 × 80 × 73

Gross Weight (kg)
0,280

Net Weight (kg)
0,240

Perfection built in BERU®

Trade Number
ZSE163

Product group
Plug Top Coils

OE Reference
946 602 104 00

Main Application
Porsche:
Macan 3,0S;
Macan 3,6 Turbo
(2014→)

EAN/UPC-Code
4044197771752

Dimension (mm)
53 × 34 × 23

Gross Weight (kg)
0,320

Net Weight (kg)
0,260

Trade Number
ZS446

Product group
Plug Top Coils

OE Reference
1275971

Main Application
Volvo: 940 (944) 2,0 Turbo, 960 II, C70I Convertible, S40 I+II, S90, V90 Estate (1990→)

EAN/UPC-Code
4014427139829

Dimension (mm)
98 × 200 × 90

Gross Weight (kg)
0,258

Net Weight (kg)
0,196

Perfection built in BERU®

Trade Number
ZS453

Product group
Plug Top Coils

OE Reference
04606869AB
04606869AC

Main Application
Chrysler: 300 C (2003→2012)

Dodge: Avenger, Journey (2007→)

Fiat: Freemont (2011→)

Volkswagen: Routan (2008→2010)

EAN/UPC-Code
4014427141143

Dimension (mm)
84 × 64 × 196

Gross Weight (kg)
0,281

Net Weight (kg)
0,182

Trade Number
ZS473

Product group
Plug Top Coils

OE Reference
90919-02212

Main Application
Toyota: Land Cruiser 90, 4 Runner 3,4i (1995→)

EAN/UPC-Code
4014427142140

Dimension (mm)
188 × 110 × 92

Gross Weight (kg)
0,384

Net Weight (kg)
0,295

Perfection built in BERU®

Trade Number
ZSE093

Product group
Plug Top Coils

OE Reference
(A)2769060260
(A)2721500280
(A)2761500080
(A)2769060160

Main Application
Mercedes: C-Class (W204), E-Class (W212), G-Class (W463) M-Class (W166), S-Class (W222) (2011→)

EAN/UPC-Code
4044197749348

Dimension (mm)
210 × 100 × 90

Gross Weight (kg)
0,326

Net Weight (kg)
0,250

Trade Number
ZSE094

Product group
Plug Top Coils

OE Reference
(A)2769065100
(A)2769064500

Main Application
Mercedes:
GL-Class (X166) GL 400 4-matic,
M-Class (W166) ML400 4-matic
(2011→)
ONLY FOR ETHANOL-FUEL (E85)

EAN/UPC-Code
4044197749355

Dimension (mm)
210 × 100 × 90

Gross Weight (kg)
0,328

Net Weight (kg)
0,252

Perfection built in BERU®

Trade Number
ZSE025

Product group
Block Ignition Coils

OE Reference
96350585
10450424
10490192
1104038
8-01104-038-0
1208051

Main Application
Opel: Frontera 2,2i (1998→)

Daewoo: Lanos, Lengaza, Nubira 1,4i-2,0i (1997→)

EAN/UPC-Code
4014427077404

Dimension (mm)
210 × 120 × 90

Gross Weight (kg)
1,060

Net Weight (kg)
0,979

Trade Number
ZSE162

Product group
Block Ignition Coils

OE Reference
058905101A

Main Application
Audi: A4, A6, A6 Avant (1995→2001)

Volkswagen: Passat, Passat Variant (1996→2005)

EAN/UPC-Code
4014427141914

Dimension (mm)
228 × 160 × 113

Gross Weight (kg)
1,290

Net Weight (kg)
1,170

Perfection built in BERU®

Trade Number
ZS447A

Product group
Block Ignition Coils

OE Reference
96253555
25182496
96253555

Main Application
Chevrolet:
Aveo Hatchback, Captiva, Kalos, Lacetti, Matiz, Nubira Estate (2005→)

Daewoo: Evanda, Kalos, Lacetti, Lanos Saloon, Matiz, Nubira, Rezzo (1997→)

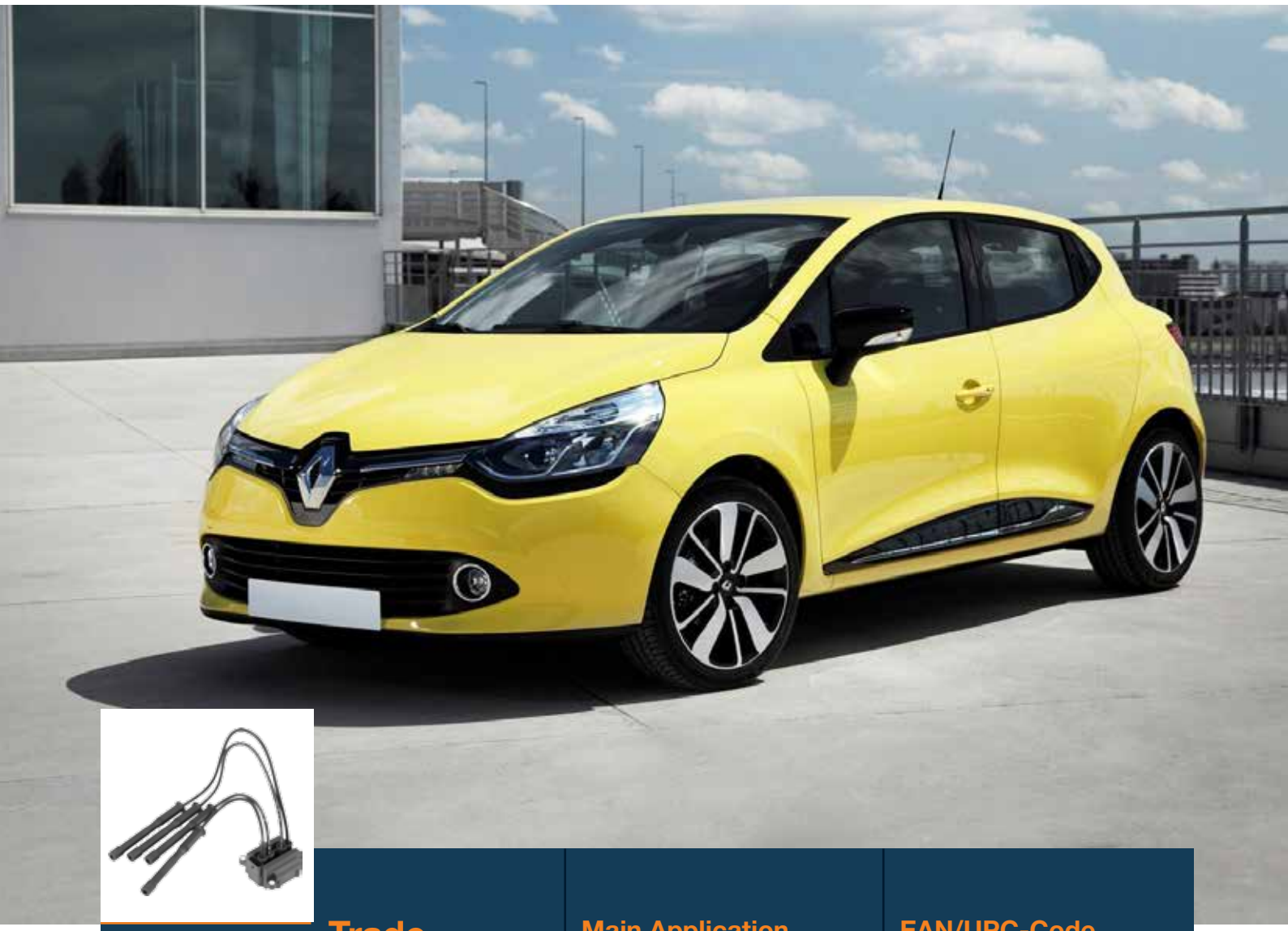
Opel: Antara 4x4 (2006→)

EAN/UPC-Code
4014427139836

Dimension (mm)
130 × 98 × 100

Gross Weight (kg)
0,841

Net Weight (kg)
0,783



Trade Number
ZS454

Product group
Block Ignition Coils

OE Reference
8200084401
8200051128

Main Application
Proton: Savvy (2005→)

Renault: Clio, Kangoo, Thalia, Twingo (2001→)

EAN/UPC-Code
4044197743285

Dimension (mm)
320 × 170 × 140

Gross Weight (kg)
1,025

Net Weight (kg)
0,942

Perfection built in BERU®

Trade Number
ZS455

Product group
Block Ignition Coils

OE Reference
56032520AB
56032520AC
56032520AE
56032520AF

Main Application
Chrysler: Grand Voyager, Town & Country, Voyager III/IV (2000→2008)

Dodge: Caravan (2000→2007)

Jeep: Wrangler II/III (2006→2007)

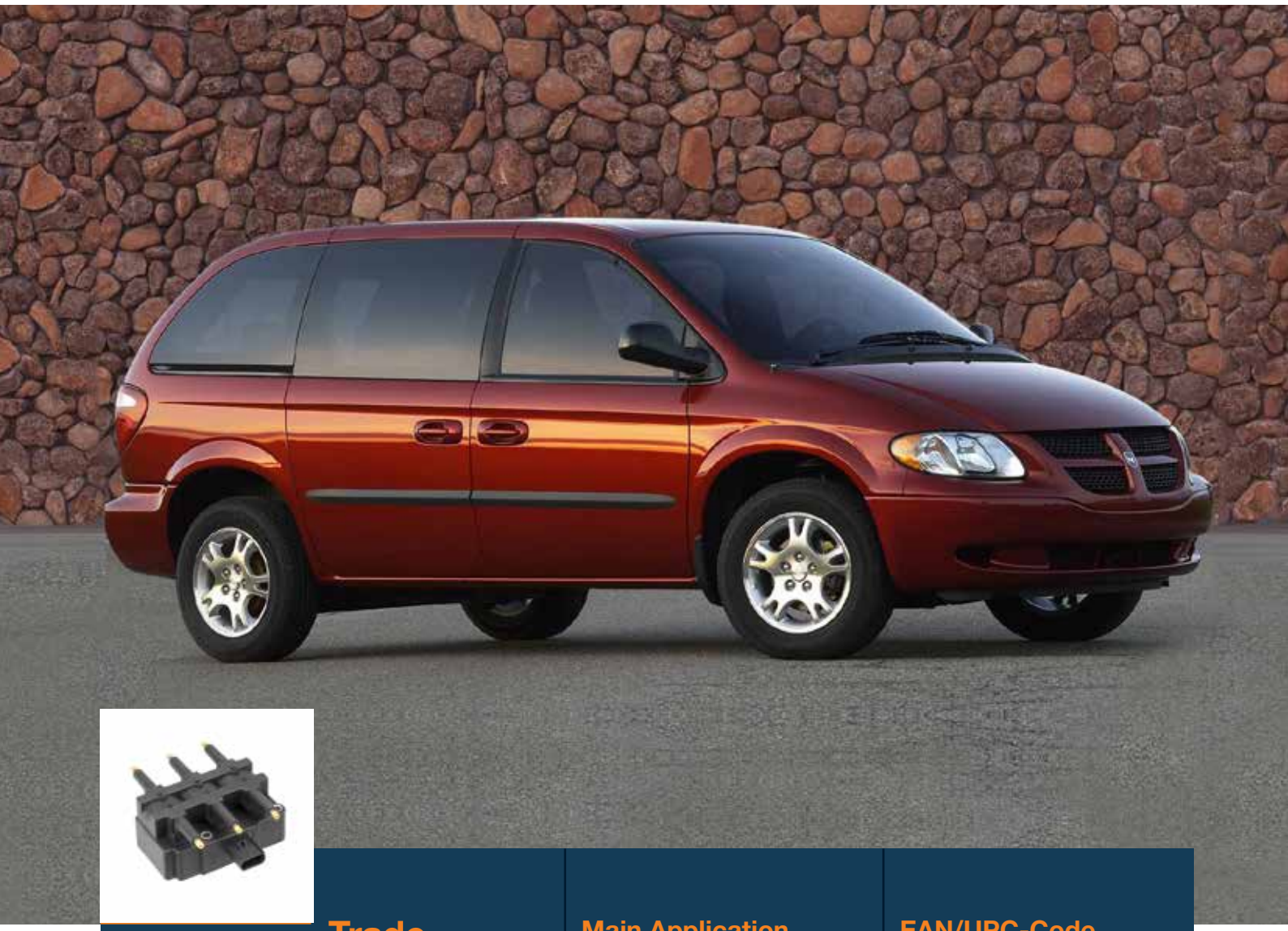
Volkswagen: Routan (2008→2010)

EAN/UPC-Code
4014427141150

Dimension (mm)
154 × 137 × 72

Gross Weight (kg)
1,542

Net Weight (kg)
1,404



Trade Number
ZS456

Product group
Block Ignition Coils

OE Reference
56029098AA
56029098AB

Main Application
Chrysler: Voyager IV (2000→2008)

Dodge: Caravan (2000→2007)

Jeep: Wrangler II/III (2006→)

EAN/UPC-Code
4014427141167

Dimension (mm)
154 × 137 × 72

Gross Weight (kg)
1,500

Net Weight (kg)
1,368

Perfection built in BERU®

Trade Number
ZS469

Product group
Block Ignition Coils

OE Reference
NEC 100630

Main Application
Land Rover: Freelander 4x4 (1998→2006)

Rover: 100/Metro, 200, 25, 400, Cabriolet, Coupe (1990→2005)

EAN/UPC-Code
4014427140955

Dimension (mm)
157 × 115 × 105

Gross Weight (kg)
0,921

Net Weight (kg)
0,822

Trade Number
ZS470

Product group
Block Ignition Coils

OE Reference
4609140AB
4609140

Main Application
Chrysler: Voyager III/IV (1999→2008)
Dodge: Caravan (1995→2007)

EAN/UPC-Code
4014427140962

Dimension (mm)
157 × 115 × 105

Gross Weight (kg)
1,407

Net Weight (kg)
1,306

Perfection built in BERU®

Trade Number
ZS452

Product group
Ignition Coil Rails

OE Reference
56041476AA
56041019
56041476AB

Main Application
Jeep: Cherokee 4,0 i, Grand Cherokee I+II 4,0i, Wrangler (1991→2006)

EAN/UPC-Code
4014427141136

Dimension (mm)
692 × 182 × 102

Gross Weight (kg)
2,115

Net Weight (kg)
1,810

Diesel Cold Start Technology

Glow Plugs

- Post heating (GN)
- Post heating electrical (GE)
- Ceramic Glow Plugs

Pressure Sensor Glow Plugs (PSG)

Instant Start System (ISS)

Ignition Technology

Spark Plugs

- Ultra
- Ultra X Titan
- Platin

Ignition Coils

- Distributor Ignition Coils
- Pencil Coils/Plug Top Coils
- Block Ignition Coils
- Ignition Coil Rails

Ignition Leads & Components

Also available from BERU

Cooling

- Fan wheels
- Fan Clutches
- Elelctrical Fans

Sensors

- Oxygen
- High-temperature
- Speed, Oil and Temperature

Perfection built in BERU®

BERU Ignition Coils — The decisive spark

The ignition coil is an important part of the ignition system. It provides the necessary high voltage and ignition energy for producing the high voltage sparks at the spark plug. BERU ignition coils are developed vehicle-specific according to customer requirements with or without built-in electronic module and manufactured by computer-controlled technology.

Ignition Coils for distributor-less ignition

In the course of the fully electronic ignition, ignition coils without an ignition distributor are being controlled directly by the appropriate control unit. Following BERU variants are available:

Pencil Coils

Pencil coils

Technical features

- Mounted directly on the spark plug
- Extremely temperature resistant
- High-value materials for optimum ratio of weight to volume
- With or without electronics module depending on the vehicle type

Plug Top Coils

Plug Top Coils

Technical features

- Mounted directly on the spark plug
- Extremely temperature resistant
- With or without interference suppressed spark plug and electronic module depending on the vehicle type

Ignition Coil Rails

BERU coil rails – the alternative to pencil coils or plug top coils / coil on plugs.

Ignition Coil Rails

Technical features

- Simple mounting on the engine
- As double spark or single spark technology

Block Ignition Rails

BERU 4-cylinder coil for distributor-less ignition.

BERU 5-cylinder coil for distributor-less ignition.

BERU 6-cylinder coil for distributor-less ignition (double spark concept).

Technical features

- Extremely temperature resistant
- Static high voltage distribution
- Double spark coils with and without integrated electronics modules for 4, 5 – and 6-cylinder vehicles

Coils for Ignition Systems with Ignition Distributors

In coils with ignition distributors, the generated high voltage goes from the coil to the distributor. The distributor distributes this high voltage to the corresponding spark plugs.

Distributor Ignition Coils (Single Ended Coils)

BERU distributor coil, the further development of the classic cylinder coil — for vehicles with transistor ignition.

Technical features

- Extremely temperature-resistant
- For vehicles with transistor ignition
- High quality materials for optimum weight-volume ratio
- With mounted or integrated electronics module

Bottle Coils/Cylinder Coils

BERU cylinder coils – the million times proven solution for vehicles of older generations with contact-controlled battery ignition.

Technical features

- Extremely temperature resistant
- Rotating high voltage distribution
- For vehicles of older generations with contact-controlled battery ignition
- Million times proven solution

BERU Ignition Technology — For a Reliable Ignition Process

A gasoline engine needs three things: air, fuel, and a spark. The spark plug ignites the air/fuel mixture, producing the combustion that powers the engine. It plays a major role in fuel economy; clean, efficient combustion; and the reliable operation of engines and catalytic converters.

Compact, light plug top ignition coils and bi-hex spark plugs provide durable and environmentally friendly ignition especially for modern downsized engines.

In addition the BERU brand offers complete ignition systems combining ignition coils, ignition modules, ignition cables and connectors.

Rely only on high-grade replacement ignition parts offered on our virtual shelves.