



**BOSCH**

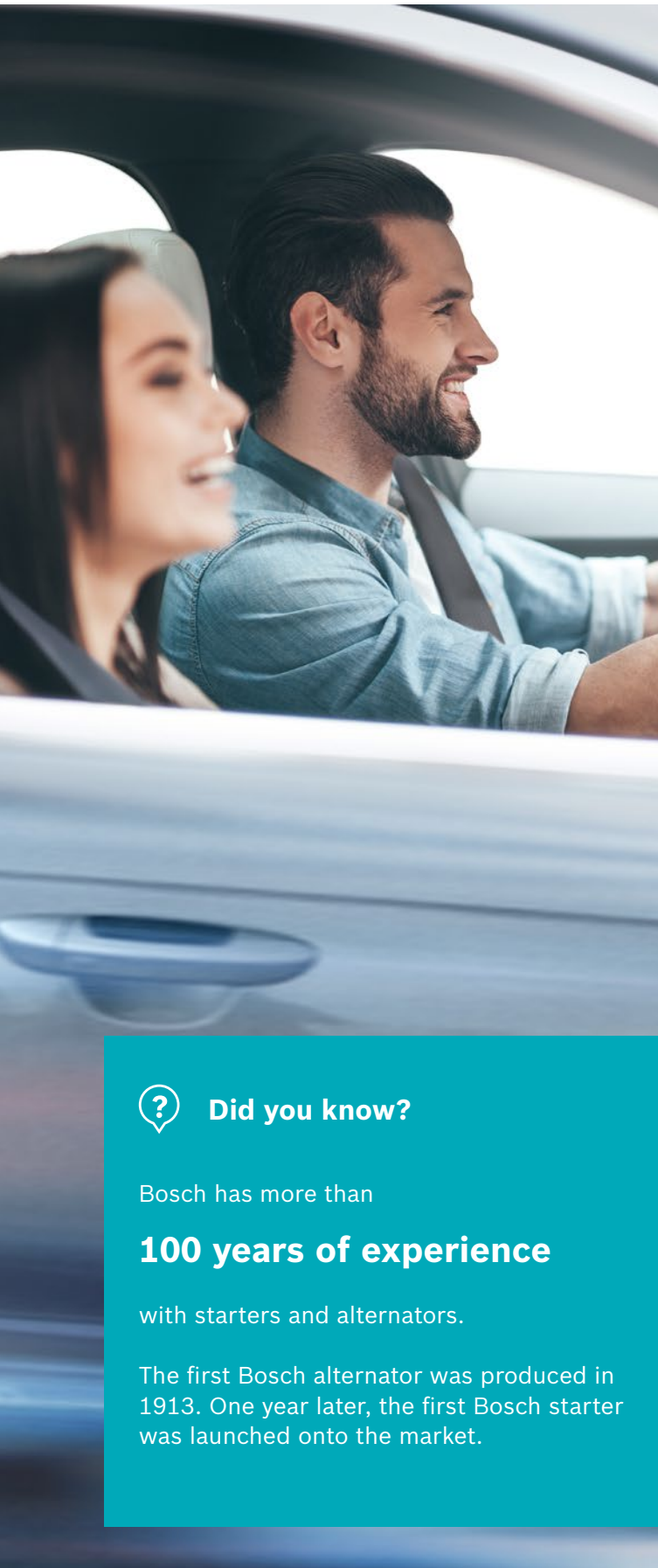
Invented for life

Driven by  
**ENERGY**

**Absolute power**  
Bosch starters and  
alternators

# Getting started with full power

## Bosch starters and alternators



### Did you know?

Bosch has more than

**100 years of experience**

with starters and alternators.

The first Bosch alternator was produced in 1913. One year later, the first Bosch starter was launched onto the market.

Minus 8 °C: the vehicle starts as usual and the heating systems works well. Half a year later: asphalt glows in summer heat while the air conditioning ensures a comfortable atmosphere inside the vehicle. As a basis for reliable power supply, Bosch offers workshops a complete range of starters and alternators including the right solution for essential requirements.



### Parts, diagnostics and services

The workshop and retail range includes high-quality spare parts, modern workshop equipment for diagnoses, servicing and repairs as well as special trainings and a technical hotline. Consequently, Bosch offers a complete package facilitating the diagnosis, removal and installation of replacement parts for workshops.



### Value-based solutions

Bosch eXchange offers a high-quality alternative for value-based repairs. The exchange products are treated according to the same standards as original parts and have to pass strict functional and quality tests. This ensures high quality and reliability at lower prices while still providing the same warranty as in the new parts program.



### Competence and know-how

Thanks to decades of experience and extensive knowledge, Bosch understands the technical requirements of motor vehicles. Bosch starters and alternators benefit from this know-how. Bosch provides reliable solutions meeting the technical requirements and standing out for their high quality.



### Global presence

More than 14,000 associates in 150 countries and an extensive dealer network, reliably ensure targeted workshop support and local availability of the spare parts range.



# Getting started with full power

## Bosch starters and alternators

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### ESI[tronic] software for diagnoses and servicing

By means of ESI[tronic] 2.0 software, Bosch offers workshops an excellent solution for effective and efficient vehicle diagnoses for repair or servicing.

Advantages:

- ▶ Easy operation
- ▶ Standardized system
- ▶ Comprehensive vehicle coverage
- ▶ Modular design



# Starters and alternators

## Overview

Workshop customers want their vehicle to be reliable. The Bosch range of starters and alternators thus mainly includes solutions meeting high expectations in terms of reliability, robustness and durability. Premium Bosch quality therefore supports workshops in satisfying their customers.

### Premium quality

The production of starters and alternators for the aftermarket is subject to the same stringent quality guidelines as the production of original equipment. The whole production process is controlled meticulously – from start to finish. Even the final functional and quality tests also meet the same standards applied to original equipment. As a result, each and every part features 100 % Bosch quality.

### Reliable and durable

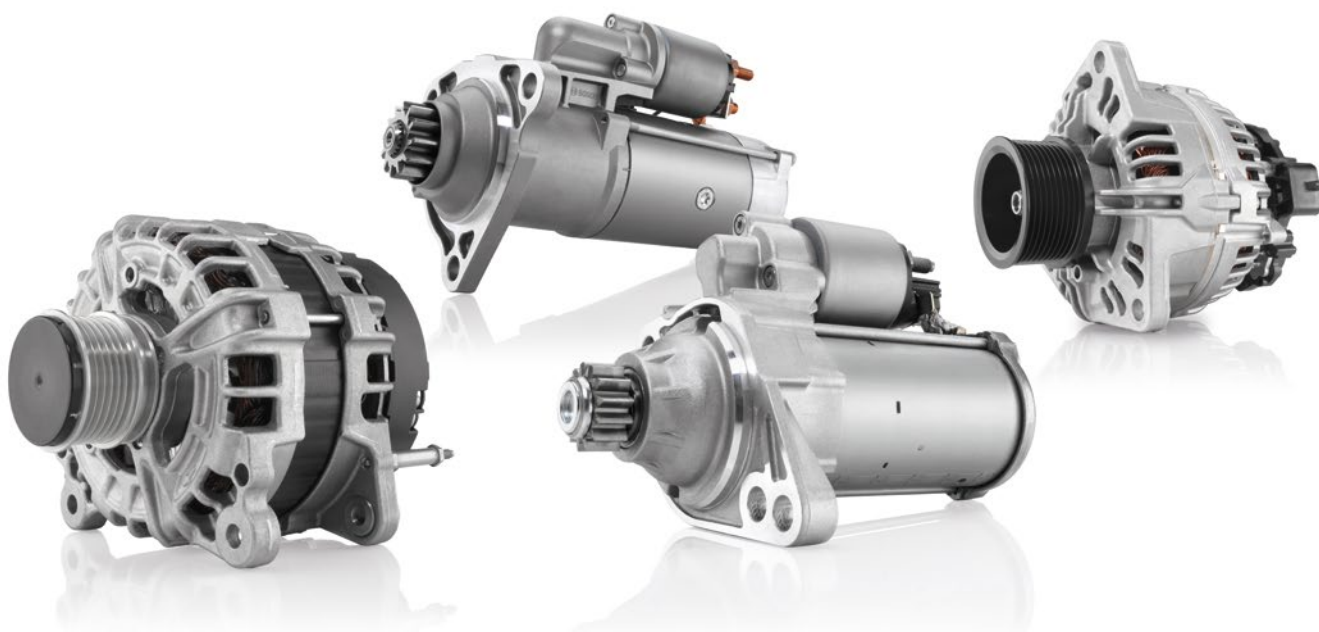
Bosch starters and alternators are made out of high-quality materials and components and processed thoroughly. Before being launched onto the market, they are tested under extreme conditions – such as heat, cold or moisture – to ensure reliable vehicle starting in everyday use and to guarantee a reliable power supply.

### Competent, experienced and innovative

Bosch looks back at more than 100 years of experience with starters and alternators. This extraordinary know-how also influences the selection, development and production of the current product range based on advanced technologies and procedures. In this manner, Bosch keeps adding innovative solutions to its range helping modern powertrain systems to save fuel and to reduce the emissions.

### Broad product range

Bosch starters and alternators suit a variety of cars and commercial vehicles. Due to their high reliability and their long service life, they are used for several applications. Bosch continuously expands its range and enhances it in a target-oriented manner aligning it with the requirements of workshops and their customers.



# Car and commercial vehicle starters

## Product range & details

Bosch offers workshops a broad range of innovative starters for 12 and 24-volt on-board systems in cars and commercial vehicles. They stand out for their high reliability and starting performance even under tough external conditions and they meet highest demands in terms of robustness and quality.



	Car starters	Commercial vehicle starters
	<b>Reliable starting performance:</b> developed, built and tested for reliable vehicle engine starting even under the most adverse conditions. These starters are geared to the specific requirements of the respective vehicle and ensure an extraordinarily long service life.	
Technology	Conventional; start/stop	Conventional; parallel-starter system
Scope of application		
Power	12 V	12 V/24 V
Available spare parts	Armature, brush holders, overrunning clutches, pinions, relays, bearings, bushings	

### Advantages at a glance

- ▶ **Excellent starting reliability:** the robust and compact starter design ensures reliable performance under extreme environmental conditions
- ▶ **High performance:** these starters are produced under the same production and test conditions as original equipment
- ▶ **Outstanding service life:** these starters are made out of high-quality components, e.g. optimized brushes for a large number of starting cycles



### Did you know?

The Bosch range includes one of

## the world's smallest start/stop starters.

With just 2.2 kg, it is not only smaller, but also some 20 % lighter than comparable products. It is used for gasoline engines with a displacement of up to 2 l and small diesel engines.



### Accessories

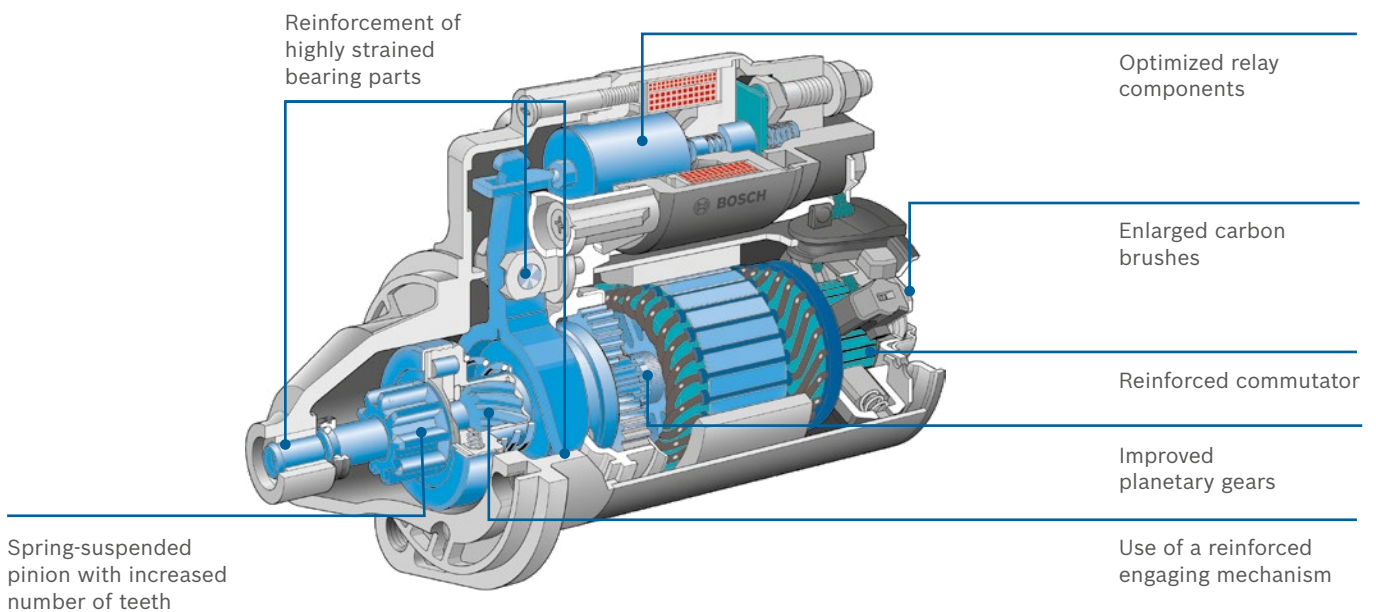
Start/stop systems place high demands on batteries. Bosch S5 A and S4 E batteries ensure a reliable power supply for frequent starts and stops.



# Starters for start/stop systems

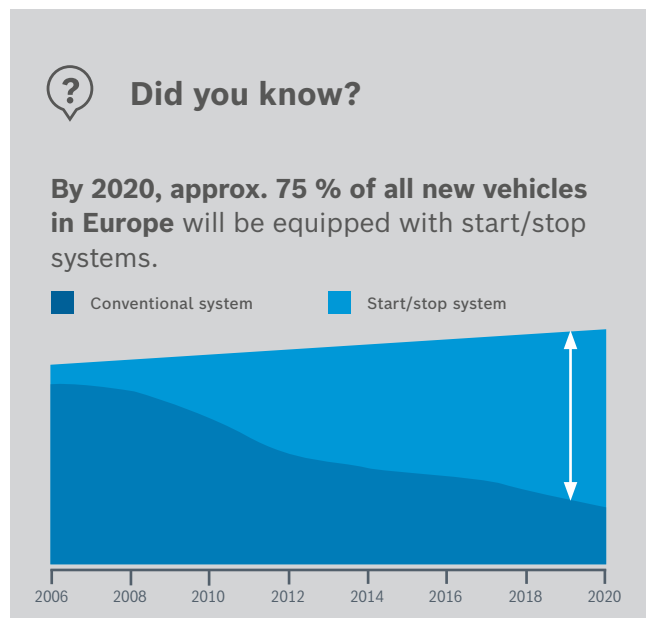
## Technology

Compared to conventional starters, start/stop starters have to cope with 3 to 4 times as many starting cycles – without compromising the service life. Bosch thus pays particular attention to the reinforcement of components such as bearings, gears and engaging mechanisms.



**i Start/stop systems**

The operating principle of start/stop systems is as easy as efficient. During vehicle standstill and in case of adequate state of charge of the battery, the combustion engine is turned off. Pushing the accelerator pedal, it is automatically started again if required. As a result, no fuel is consumed and no CO<sub>2</sub> emitted during standstill, e.g. in traffic jams or at red traffic lights. Accordingly noise emissions are reduced.





# Commercial vehicle starters

## Product range & details

Bosch offers a broad range of high-quality starters for on- and off-highway vehicles. Whether for 12- or 24-volt on-board system, for diesel vehicles with up to 30 l or large engines with up to 90 l (diesel) or 180 l (gasoline) of displacement, Bosch has the matching solution for all of them.



Starters for on- and off-highway vehicles		
<b>Reliable starting performance:</b> developed, built and tested for reliable vehicle engine starting even under the most adverse conditions. These commercial vehicles (CV) starters are geared to the specific field of application of the respective vehicle and ensure an extraordinarily long service life.		
On-board system	12 V	24 V
Performance at T=+20°C 100 % SOC*	up to 5.5 kW	up to 13.2 kW
Performance at T=-20°C 80 % SOC*	up to 4.2 kW	up to 10 kW
Diesel engine class	up to 9 l	up to 30 l
Scope of application		

\* SOC = the battery's state of charge

### Advantages at a glance

- ▶ **Excellent starting reliability:** the robust and compact commercial vehicle starter design ensures reliable performance under extreme conditions
- ▶ **High quality:** these starters are produced under the same production and test conditions as original equipment
- ▶ **Outstanding service life:** these starters are made out of high-quality components geared to the specific requirements of each application



### Reliable starting of large engines

For use in large engine (up to 90 l diesel engines, up to 180 l gasoline engines), the Bosch range includes parallel-starter systems. It comprises two or three 24-volt starters combined at a relatively small installation space and combining their individual starting powers.



### Bosch CV starters and alternators for renowned manufacturers

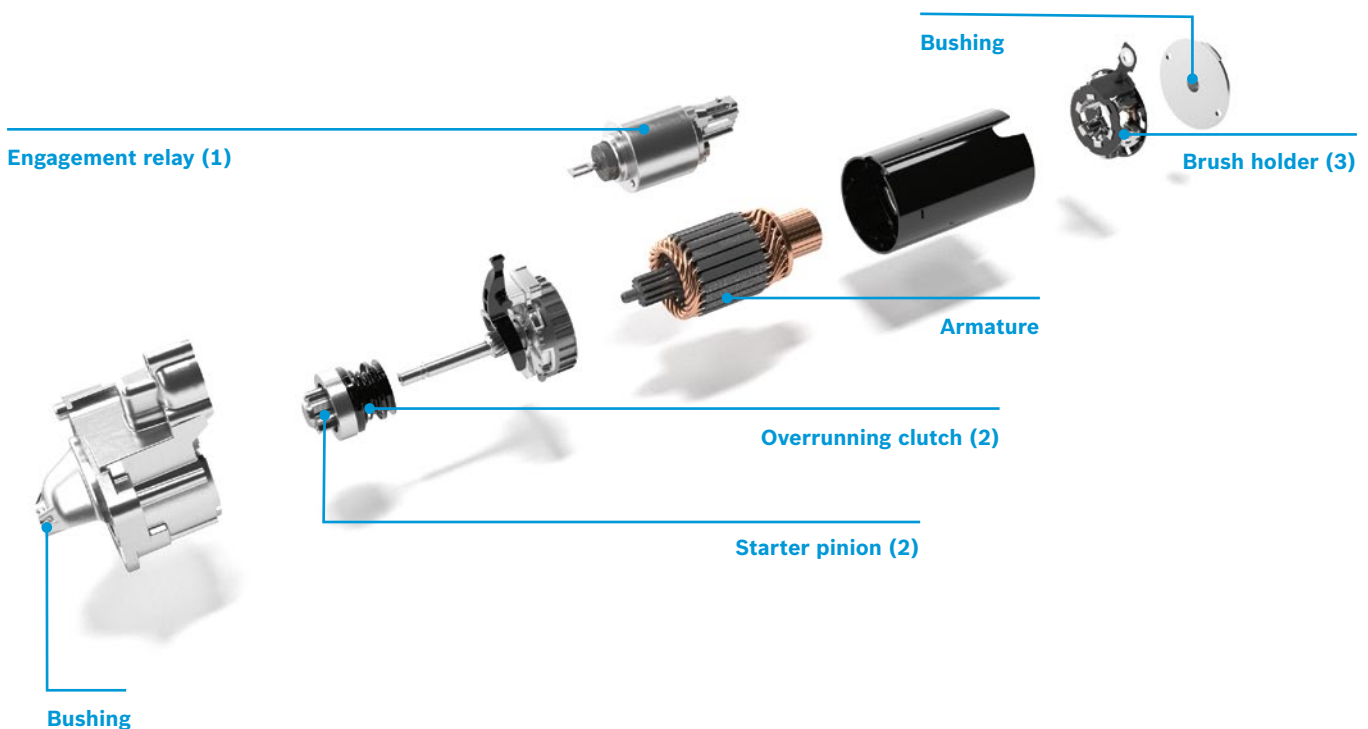
- |                 |                 |
|-----------------|-----------------|
| ▶ Ashok Leyland | ▶ Liebherr      |
| ▶ CAT           | ▶ MAN           |
| ▶ CNH           | ▶ Mercedes Benz |
| ▶ Cummins       | ▶ MTU           |
| ▶ DAF           | ▶ MWM           |
| ▶ DEUTZ         | ▶ PACCAR        |
| ▶ INTERNATIONAL | ▶ SCANIA        |
| ▶ IVECO         | ▶ TATA MOTORS   |
| ▶ John Deere    | ▶ VOLVO         |
| ▶ Komatsu       | ▶ WEICHAI POWER |



# Spare parts for starters

## Product details

For quick and reliable starter repairs, Bosch provides workshops with selected spare parts – featuring high quality.



### (1) Engagement relay

- ▶ **Long service life:** due to the high quality of the plastics and metals used
- ▶ **Suited practically any application:** depending on vehicle and starter
- ▶ **Excellent switching reliability:** thanks to copper contacts with special contact design – in part even with silver-coated copper surfaces

### (2) Starter pinion with overrunning clutch

- ▶ **Trouble-free and reliable engaging:** due to optimized system featuring a special pinion geometry and engagement spring
- ▶ **High wear resistance:** thanks to optimized greases and curing procedures as well as to the use of high-quality materials

- ▶ **Long service life:** overrunning clutch equipped with optimized bearing bushings

### (3) Brush holder

- ▶ **Long service life:** due to optimized carbon brushes featuring a special material composition
- ▶ **Protection against corrosion:** thanks to brush holders made of synthetic materials or coated metal
- ▶ **Consistent performance throughout the entire service life:** coil springs ensure the right contact pressure of the brushes

# Car and commercial vehicle alternators

## Product range & details

Bosch offers workshops a broad range of robust and durable alternators. Thanks to particularly high levels of performance and efficiency, they ensure reliable power supply even under adverse environmental conditions – in case of both low or extremely high demands of the on-board electrical system.



	Car alternators	Commercial vehicle alternators
	<b>Bosch alternators are the preferred choice in terms of reliability and durability:</b> They are developed, built and tested for a reliable supply of the vehicle's electrical consumers – even under extremely adverse environmental conditions.	
Power	14 V	28 V
Scope of application		
Technology	Conventional 3-phase/5-phase winding, high-efficiency diodes, active rectifier	Conventional; modular performance features
Spare parts available	Pulleys, rotors, rectifiers, alternator regulators, bearings, protective caps	

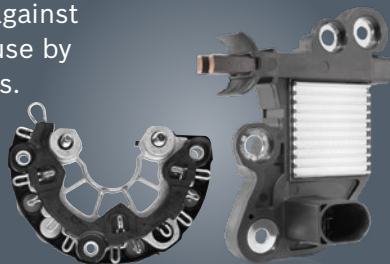
### Advantages at a glance

- ▶ **Excellent reliability in terms of power supply:** the robust and compact alternator design ensures an outstanding high power output under extreme environmental conditions
- ▶ **High performance:** these alternators are produced under the same production and test conditions as original equipment
- ▶ **Powerful energy supply under all circumstances:** outstanding power output even at low engine speeds



### Long service life

Bosch alternators stand out for their very long service life. As the regulator and the rectifier are equipped with high-tech diodes, they reliably protect the on-board electronics against damages cause by voltage peaks.



### Bosch Automotive catalog eCat-online



#### The quick way to find the matching product

- ▶ Free-of-charge online spare-parts catalog
- ▶ With a wealth of additional information
- ▶ Available in 28 languages

[www.bosch-automotive-catalog.com](http://www.bosch-automotive-catalog.com)

# High-efficiency alternators

## Technology

There is a trend towards ever more compact and light vehicle components. At the same time, new vehicle generations are equipped with ever more sophisticated electrical and electronic systems. To ensure reliable power supply of the electrical consumers by means of a smaller alternator, two highly efficient technologies are used to increase the level of efficiency: high-efficiency diodes (HED) and active rectifiers (SAR).



More energy  
with the same  
design

### HED technology

Unlike conventional PN diodes with a standard semiconductor junction, alternators with high-efficiency diodes use the characteristics of a metal semiconductor junction with the so-called Schottky effect. Therefore, the voltage required to activate the conducting state of the diodes is reduced.

Reducing the threshold voltage, the level of efficiency is increased. Therefore, the power output of alternators featuring the same design is increased.

### SAR technology

In Bosch alternators with the active rectifier (SAR or Synchronous Active Rectifier), the rectification of the alternating current is performed by power transistors (MOSFETs) and not diodes (as in other systems). This reduces losses at the rectification of the multiple-phase current thus generated. Lower decrease in voltage at the transistors also reduces the power dissipation. Therefore, it increases the performance of alternators featuring the same size increasing their level of efficiency. This occurs at the lower range where a Bosch alternator with SAR technology provides approx. 10 A more than conventional alternators.



# Commercial vehicle alternators

## Product range & details

Bosch commercial vehicle alternators ensure a reliable on-board power supply for on- and off-highway vehicles with a large number of electrical consumers. They are designed for most diverse applications and reliably cover energy demands – even in case of extreme requirements.



### Alternators for on- and off-highway vehicles

**Bosch commercial vehicle alternators are the preferred choice in terms of reliability and durability.** They are developed, built and tested to reliably supply the electrical consumers of commercial vehicles – even under extremely adverse environmental conditions.

On-board system	14 V	28 V
Output at 1 800 rpm	40 – 100 A	20 – 65 A
6 000 rpm	70 – 240 A	50 – 150 A
Level of efficiency in %	63 – 71 %	68 – 72 %
Scope of application		

#### Advantages at a glance

- ▶ **Excellent reliability in terms of power supply:** the robust and compact design of commercial vehicle alternators ensure an outstanding high power output under extreme environmental conditions
- ▶ **High quality:** these alternators are produced under the same production and test conditions as original equipment
- ▶ **Powerful energy supply:** outstanding charging current even at low engine speeds due to specifically matched high-quality components



### KTS Truck & ESI[tronic] 2.0 Truck

The solution for simple diagnoses and quick repair of on- and off-highway vehicles.



### Did you know?

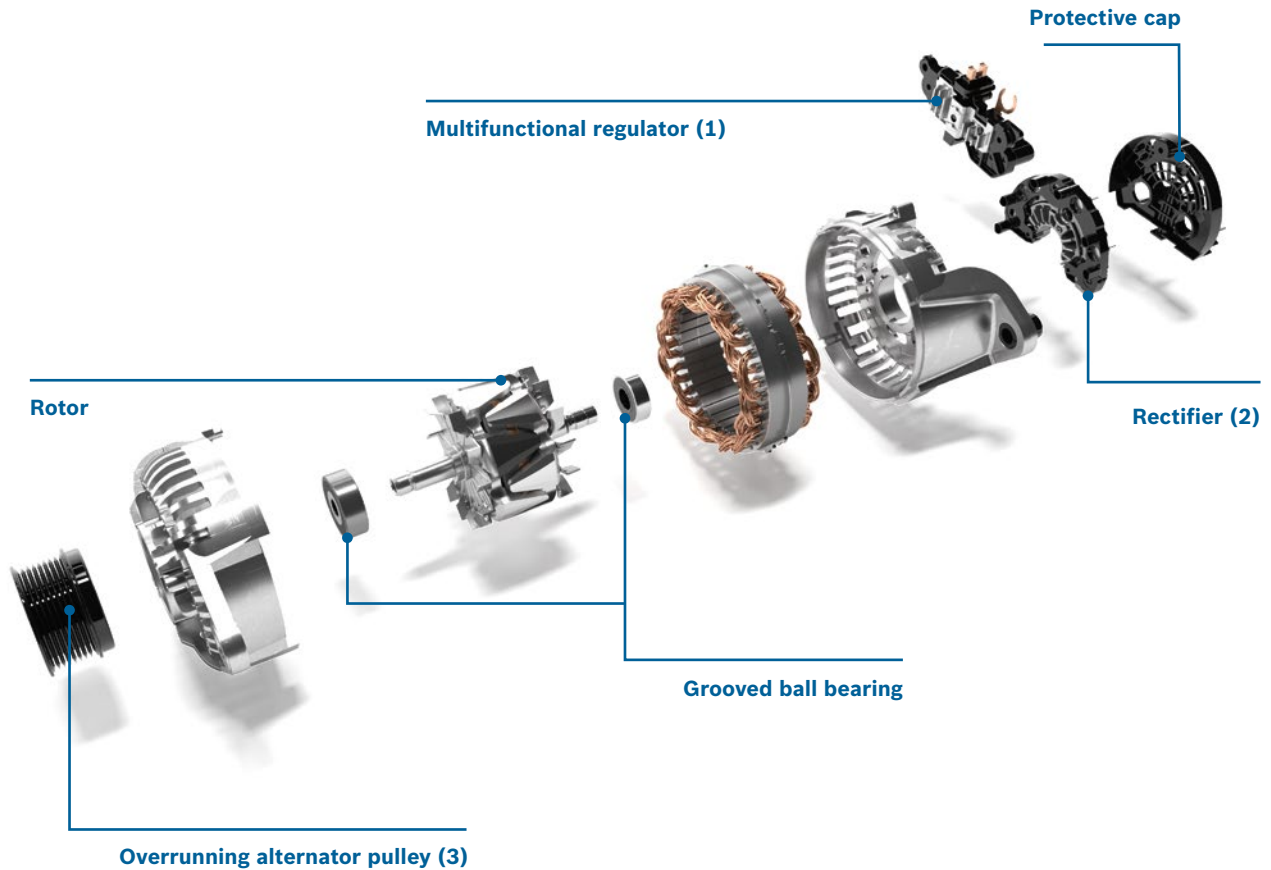
In order to meet different requirements, the Bosch range includes commercial vehicle alternators with modular performance features:

- ▶ **Service life:** particularly robust and durable due to increased number of ball bearings and reinforced bearing bushings
- ▶ **Temperature:** extremely heat resistant due to temperature-resistant sealing of ball bearings
- ▶ **Belt tension:** for extreme belt forces with reinforced bearing shields and bigger A-ball bearings
- ▶ **High ambient temperature:** coping even with extreme heat due to optimized ventilation system, high-temperature bearings and stator insulation materials

# Spare parts for alternators

## Product details

For quick and reliable alternator repairs, the Bosch range thus also includes selected spare parts – featuring high quality.



### (1) Multifunctional regulator

- ▶ **Long service life:** due to brushes with optimized material mixture
- ▶ **Geared to the respective type of vehicle and alternator:** the parts are aligned with the OE specifications
- ▶ **Ensuring current flow throughout the entire service life:** by means of special connectors and high-quality materials
- ▶ **Protection against alternator overheating and overloads:** the control voltage is adjusted to ensure exact functionality of the on-board power supply and stable battery charging

### (2) Rectifier

- ▶ **High temperature resistance**
- ▶ **Reduction of voltage peaks:** due to individually tested Zener diodes
- ▶ **Reliable protection of the vehicle against overvoltages:** permanent current rectification prevents the emergence of overvoltages
- ▶ **High operational reliability:** special connection of all diodes by liquid welding

### (3) Overrunning alternator pulley

- ▶ **Protection against dust entry:** for being closed on both sides
- ▶ **Aligned with the engine type:** diameter, surface and number of grooves are perfectly matched
- ▶ **Relief for the belt drive**

# Bosch eXchange

## Value-based vehicle repair

Value-based repairs are in higher demand than ever before – and not just for older vehicles. But how can this be achieved without compromising on quality? The answer is Bosch eXchange. With its comprehensive range of high-quality exchange products, vehicle repair has become a success factor for automotive workshops.



### Advantages at a glance

- ▶ **High quality and reliability:** Bosch eXchange products are tested to the same standards as original parts and have to pass stringent functional and quality tests
- ▶ **Outstanding price-performance ratio:** Up to 30% more affordable than comparable products in the Bosch new parts program, while still offering the same warranty
- ▶ **Resource-saving and environmentally friendly:** Bosch eXchange saves resources and makes an important contribution to the circular economy by reusing old parts



# Starters for start/stop systems

## Application list

The application list shows parts of the Bosch range of starters for start/stop systems. This range covers the most common vehicle makes and models and is constantly expanded.

Vehicle make	Vehicle model	OE number	Part number (new part)	Part number (Bosch eXchange)
Alfa Romeo	Giulietta, Mito	51916168	0 001 170 400	0 986 024 020
	Mito	51916170	0 001 172 400	0 986 025 080
Audi	A1, A3	02Z 911 024 H	0 001 153 007	0 986 025 070
	A1, A3, Q3	02M 911 024 C	0 001 153 009	0 986 025 110
	A4, A5, A6, Q5	03L 911 021 G	0 001 139 075	0 986 024 040
BMW	1, 2, 3, 4, 5 series	12 41 8 571 905	0 001 172 406	0 986 024 980
	1, 2, 3, 4, 5 series, X1, X3, X5	12 41 8 570 238	0 001 148 033	0 986 022 020
	3, 4, 5, 6, 7 series, X3, X4	12 41 8 574 102	0 001 148 508	
Chevrolet	Aveo, Cruze, Orlando, Trax	25 194 650	0 001 170 610	0 986 025 210
	Malibu	55 572 065	0 001 148 003	0 986 025 550
Fiat	500, 500X, Bravo, Doblo, Idea, Panda, Punto, Tipo	51916168	0 001 170 400	0 986 024 020
	500, 500 L / X, Doblo, Fiorino, Idea, Panda, Punto, Qubo, Tipo	51916170	0 001 172 400	0 986 025 080
Ford	Transit , Tourneo custom	2033120	0 001 139 023	0 986 027 010
	Galaxy , Mondeo, S-Max	5270238	0 001 172 404	
Hyundai	i20, i30, i40, ix20, ix35, Veloster	36100 2B300	0 001 138 017	0 986 025 140
	Creta, i20, i30, i40, ix20, ix35, Tucson, Veloster	36100 2B302	0 001 138 055	0 986 029 130
Jeep	Renegade	51916 168	0 001 170 400	0 986 024 020
	Wrangler III	04801 871AB	0 001 139 047	
Kia	Cee'D, Pro Cee'D, Rio, Soul, Sportage, Venga	36100 2B300	0 001 138 017	0 986 025 140
	Carens, Cee'D, Pro Cee'D, Rio, Soul, Sportage, Venga	36100 2B302	0 001 138 055	0 986 029 130
Lancia	Delta III, Ypsilon	51916168	0 001 170 400	0 986 024 020
	Musa	51810308	0 001 138 009	0 986 025 190
Mercedes-Benz	C-, CLS-class, E-class, GLC-, GLE-, GLK-class, M-class, S-class, SLC-, SLK-class, Sprinter	651 906 23 00	0 001 139 065	0 986 024 590
	A-class, B-class, CLA-class, GLA-class	645 906 03 00	0 001 153 510	0 986 024 520
	C-, CLS-class, E-class, GLK-class, M-class, Sprinter, Vito, V-class	651 906 43 00	0 001 139 085	0 986 024 590
MINI	Cabrio, Clubman, Coupe, Roadster, Countryman, Paceman	12 41 7 823 314	0 001 138 039	0 986 025 130
	Countryman, Clubman	12 41 7 649 090	0 001 170 200	
Opel	Adam, Astra, Cascada, Corsa, Insignia, Meriva, Mokka, Zafira	25194650	0 001 170 610	0 986 025 210
	Astra, Cascada, Insignia, Zafira	55572065	0 001 148 003	0 986 025 550
	Astra, Corsa, Meriva	55591492	0 001 172 604	0 986 025 080
Porsche	Cayenne, Macan	948 604 214 01	0 001 139 021	
	Panamera	948 604 210 01	0 001 139 037	0 986 025 120
Renault	Megane III, Scenic III	23 30 072 24R	0 001 170 604	0 986 025 180
	Captur, Clio IV	23 30 010 73R	0 001 136 007	0 986 025 180
	Captur, Clio IV, Kadjar, Kangoo II, Megane III/IV, Scenic IV, Talisman	23 30 048 68R	0 001 170 628	
Seat	Altea, Ibiza IV, Leon, Toledo IV	02Z 911 024 H	0 001 153 007	0 986 025 070
	Alhambra, Altea, Ibiza IV, Leon	02M 911 024 C	0 001 153 009	0 986 025 110
Skoda	Fabia II, Octavia II, Praktik, Rapid, Roomster, Superb II, Yeti	02Z 911 024 H	0 001 153 007	0 986 025 070
	Fabia II, Praktik, Rapid, Roomster	02T 911 024 J	0 001 142 001	0 986 025 170
	Citigo, Fabia III, Octavia III, Superb III, Yeti	02M 911 024 Q	0 001 179 512	0 986 029 140
Volkswagen	Beetle, Caddy III / IV, Golf Plus, Golf V, Golf VI, Jetta IV, Passat, Polo, Touran, Transporter T5 / T6	02Z 911 024 H	0 001 153 007	0 986 025 070
	Beetle, Caddy III / IV, CC, Eos, Golf Plus, Golf VI, Jetta, Passat, Scirocco, Sharan, Tiguan, Touran, Transporter T5 / T6	02M 911 024 C	0 001 153 009	0 986 025 110
	Beetle, Golf VII, Jetta IV, Passat, Polo, Scirocco, Sharan, Tiguan, Transporter T6, Up!	02M 911 021 G	0 001 179 512	0 986 029 140

# Starters for start/stop systems

## Application list

The Bosch range includes a large variety of start/stop starters for the following vehicle makes and models and is constantly expanded.

Vehicle make	Model
Alfa Romeo	Giulietta, Mito
Audi	A1, A3, A4, A5, A6, A7, A8, Q2, Q3, Q5, S3, S4, S5, SQ5
BMW	1, 2, 3, 4, 5, 6, 7 series, X1, X3, X4, X5, X6, Z4
Chevrolet	Aveo, Cruze, Malibu, Orlando, Trax
Fiat	500, 500L, 500X, Bravo, Doblo, Doblo Cargo, Ducato, Fiorino, Grande Punto, Idea, Panda, Punto, Punto Evo, Qubo, Tipo, Uno
Ford	Focus, Galaxy, Mondeo, S-Max, Transit, Transit/Tourneo custom
Hyundai	Creta, i20, i30, i40, ix20, ix35, Tucson, Veloster
Jeep	Cherokee, Compass, Renegade, Wrangler III
Kia	Carens, Cee'd, Pro Cee'd, Rio, Soul, Sportage, Venga
Lancia	Delta, Musa, Ypsilon
Mercedes-Benz	A-class, AMG GT, AMG GT S, B-class, C-class, CLA-class, CL-class, CLS-class, E-class, G-class, GLA-class, GLC-class, GLE-class, GLK-class, GL-class, GLS-class, M-class, S-class, SLC-class, SLK-class, SL-class, SLR-class, Sprinter, Viano, Vito, V-class
MINI	Cabrio, Clubman, Coupe, Roadster, Countryman, Paceman
Opel	Adam, Astra, Cascada, Combo, Corsa, Insignia, Meriva, Mokka, Zafira
Porsche	Cayenne, Macan, Panamera
Renault	Captur, Clio IV, Clio IV Grandtour, Kadjar, Kangoo II, Megane III, Megane III CC, Megane III Coupe, Megane III Grandtour, Megane IV, Megane IV Grand Coupe, Megane IV Grandtour, Scenic III, Scenic IV, Grand Scenic IV, Talisman, Talisman Grandtour
Seat	Alhambra, Altea, Ateca, Ibiza, Leon, Toledo
Skoda	Citigo, Fabia, Octavia, Praktik, Rapid, Rapid Spaceback, Roomster, Superb, Yeti
Suzuki	Swift
Volkswagen	Amarok, Beetle, Beetle Cabriolet, Caddy, Caddy III, CC, Crafter, Crafter30, Crafter35, Crafter50, Eos, Golf Plus, Golf Sportsvan, Golf V, Golf VI, Golf VII, Jetta, Passat, Polo, Scirocco, Sharan, Tiguan, Touran, Transporter T5, T6, T-Rock, Up!

as of Jan. 2018



# What drives you, drives us.

Bosch technologies are used worldwide in almost all vehicles. People, and assuring their mobility, is what we are focused on.

Therefore, we have dedicated the last 125 years of pioneering spirit and expertise in research and manufacturing to achieving this.

We continue to work on our unique combination of solutions for spare parts, diagnostic devices, workshop equipment and services:

- ▶ Solutions for efficient vehicle repairs
- ▶ Innovative workshop equipment and software
- ▶ The world's most comprehensive range of new and replacement parts
- ▶ Large network of wholesale customers, for quick and reliable parts supply
- ▶ Competent hotline support
- ▶ Comprehensive educational and training offers
- ▶ Targeted sales and marketing support

**Find out more at:**  
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