

## The best solution – for customers and the environment

Bosch engineers are continuously working on innovative system solutions. The success of these developments speaks for itself: for decades Bosch has been one of the world's leading companies in the field of patented inventions.

### Starter motors

Our extensive range comprises innovative, sturdy starter motors for all passenger cars with gasoline and diesel engines. In addition to high starting reliability, Bosch starter motors, with their compact, light construction, allow simple application for vehicle manufacturers. As well as conventional starter motors, we offer a broad range of tried-and-proven Start/Stop Starter Motors for economical and comfortable start/stop solutions in vehicles.

### Generators

Bosch offers a broad range of compact, quiet-running generators for a wide variety of requirements and all types of passenger car. They feature high performance and efficiency. Our generators thus allow a reliable supply of energy to every vehicle electrical system and contribute towards an appreciable reduction in fuel consumption and CO<sub>2</sub> output.

### Solutions for commercial vehicles

Our product range for commercial vehicles comprises sturdy, powerful starter motors and efficient generators. High quality products with a service life of some 800,000 km, suitable for demanding applications and the toughest working conditions in on- and off-highway operation.

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Printed in Germany  
292000P0K6-C/CCA-201008-En

## Starter Motors and Generators Start/Stop technology reduces CO<sub>2</sub> emissions and saves fuel



**BOSCH**  
Invented for life

clean &  
economical



# Start/Stop Starter Motors: Drive normally – save as never before



The advantages of the system are particularly evident in city traffic



No movement – zero consumption: a principle which saves money. Innovatively implemented and technically realized by Bosch

Reduce CO<sub>2</sub>, save fuel and costs – automatically and without changing your usual driving style? Bosch makes it possible. With a technically mature, very effective and at the same time cost-favorable solution: the Start/Stop Starter Motor for use in start/stop systems. Suitable for vehicles with manual or automatic transmission, particularly efficient in the “stop-and-go” conditions of dense urban traffic.

### Economical driving and clean stops

The operating principle of the start/stop system is as simple as it is efficient: when the vehicle comes to a stop, the engine is automatically switched off. To drive off again, all you need to do is to activate the clutch or, in the case of vehicles with automatic transmission, take your foot off the brake pedal to restart the engine. A warm start only consumes as much fuel as 0.7 seconds idling time. So each stop saves money and benefits the environment from the first second on.

Our system saves money and preserves the environment

### Vehicle with manual transmission



When the vehicle comes to a stop the engine is immediately switched off when the gear lever is in neutral and the clutch pedal is released



Activating the clutch pedal once again restarts the engine automatically

### Vehicle with automatic transmission



After the brake pedal has been depressed, the engine is switched off as soon as the vehicle comes to a stop



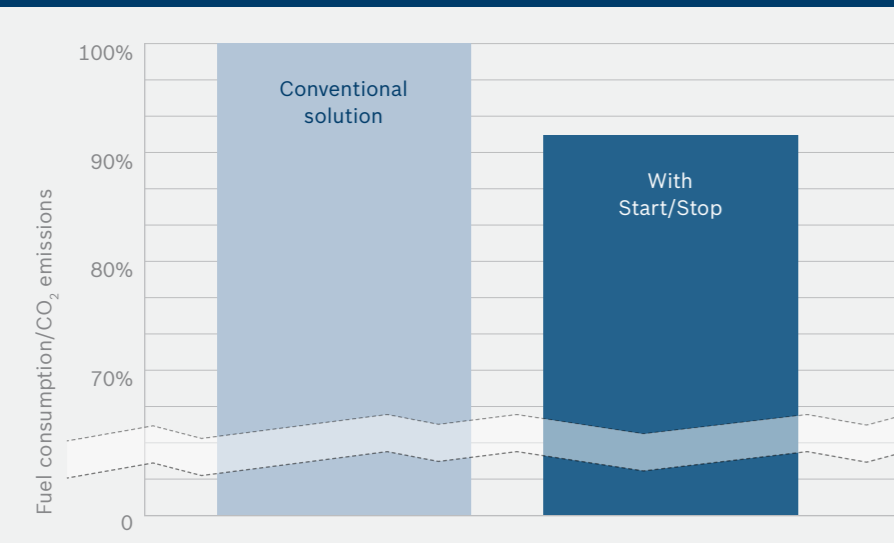
When the brake pedal is released, the engine restarts – rapidly and reliably

### An investment that quickly pays for itself

The relatively low extra cost for acquiring such a system is more than outweighed by its enormous savings potential: in the ECE15 measuring cycle, the urban section of the New European Driving Cycle (NEDC), reductions in fuel consumption and emissions of around 8% were measured. This cycle comprises a trip of 7 km with 12 stops of 15 seconds each. In actual urban traffic, stopping times can be considerably longer and savings – both in terms of fuel consumption and CO<sub>2</sub> output – can be as much as 15%. The employment of our system is thus a cost-saving and extremely effective way of adhering to both present and future emission limits.

Simple operation of the start/stop function

Savings potential of our start/stop system



# Starter motors with added value: a small step for us – a huge step for the environment



Lower fuel consumption  
and better air – even at  
red lights

Ideally, conventional starter motors can contribute toward small reductions in fuel consumption and emissions via lightweight construction. But Start/Stop Starter Motors from Bosch reduce both CO<sub>2</sub> output and fuel consumption in actual urban traffic by up to 15% – and thanks to their robust construction, they last a whole vehicle life. Our experience in series utilization impressively confirms this.

### Trailblazing concept: today's starting method

After a stop, our starter motor re-starts the engine not only automatically but also extremely quickly and quietly. Emissions are substantially lower than those produced by a classic engine start because the engine has already reached its operating temperature. Additionally the amount of fuel required to start the engine is considerably reduced. This is ensured by the improved control of the start activity and the combustion.

### Robust technology: for a vehicle's entire life

The number of starting operations performed by the starter motor, its lifetime in other words, has been considerably increased for this special application. Greater design strength has enabled the starter motor to survive the more frequent starts throughout the lifetime of the vehicle without suffering damage. The following measures have been undertaken:

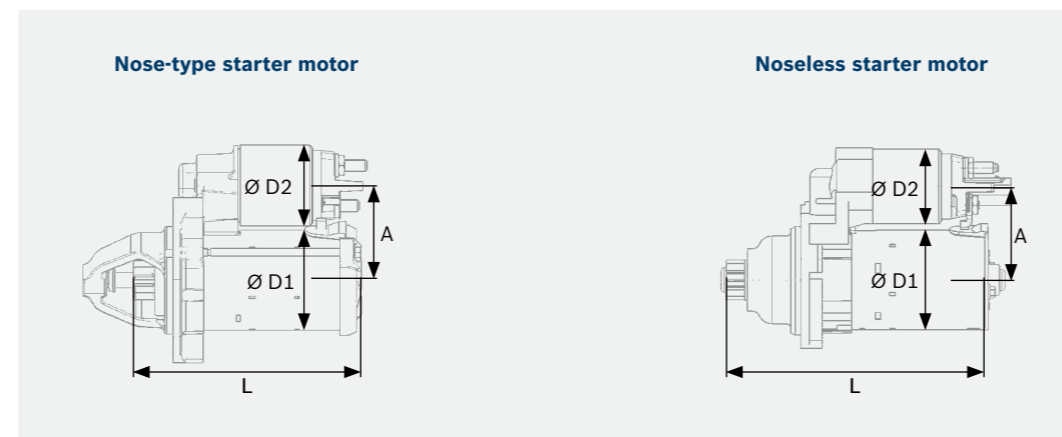
- ▶ Strengthening of bearings subjected to heavy loading
- ▶ Further improved planetary gear
- ▶ Use of strengthened pinion-engaging mechanics
- ▶ Optimization of the commutator for longer life

### Innovative construction: for universal use

The great extent of their functions and performance are convincing features of Start/Stop Starter Motors from Bosch. They are suitable for use in an extremely wide variety of vehicles: with gasoline or diesel engines and with manual or automatic transmission. Due to their compact dimensions, they are as easy to install in the vehicle as a conventional starter motor.



Bosch Starter Motor: the efficient solution for economical start/stop systems



### Overview of Start/Stop Starter Motors

		SC70-S	SC70-M	SC70-L	SC74-E	S78-M
		Gasoline		Diesel		
Weight	Nose-type	2.8	2.9	3.1	3.5	4.3
	Noseless	3.1	3.2	3.4	3.8	4.7
Length (L)	Nose-type	166	170	180	183	190
	Noseless	197	201	213	216	220
Stator housing	Ø (D1)	70	70	70	74	78
Relay	Type	305	305	305	305	305
	Ø (D2)	52.5	52.5	52.5	52.5	52.5
Axle distance						
Relay/stator housing (A)		65.5	65.5	65.5	65.5	71
Max. battery (DIN)	[Ah/A]	66/300	66/300	88/395	110/450	143/570

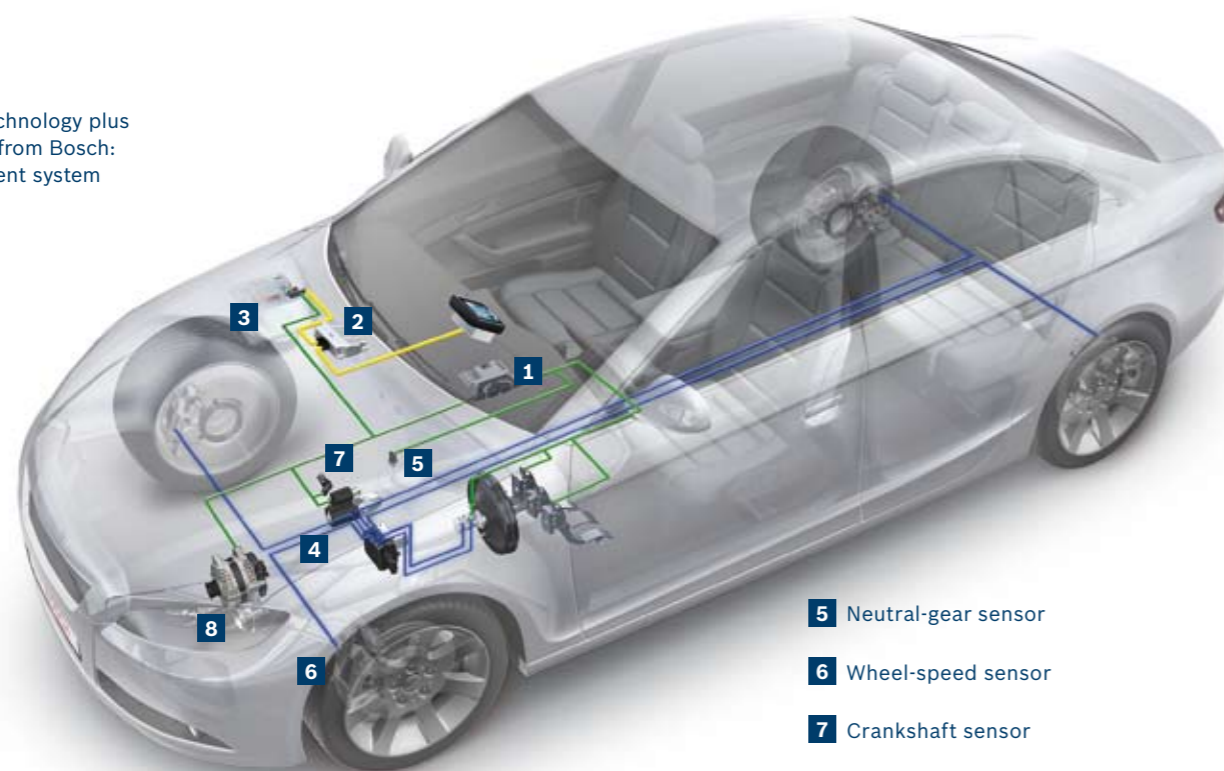
## The clean combination: Start/Stop technology and Efficiency Line Generators



Efficiency Plus Solutions  
from Bosch: 10% cleaner,  
10% more economical

Start/Stop technology from Bosch can reduce fuel consumption and CO<sub>2</sub> output by up to 8%. In connection with our new Efficiency Line Generators (EL generators), savings of as much as 10% are even possible. With these Efficiency Plus Solutions we are making a highly efficient contribution toward clean and economical driving – offering vehicle manufacturers decisive sales arguments.

Start/Stop technology plus  
EL generator from Bosch:  
a highly efficient system



- 1 Engine control unit with Start/Stop software option
- 2 12 V DC/DC converter
- 3 Battery sensor
- 4 Start/Stop Starter Motor

- 5 Neutral-gear sensor
- 6 Wheel-speed sensor
- 7 Crankshaft sensor
- 8 Efficiency Line Generator

### EL generators: economical thanks to their high efficiency

The higher the degree of effectiveness, the more efficient the generator and the less fuel is needed to generate electrical energy. The new generator generation achieves an efficiency of up to 77%, a value never before reached and which has been realized by further improved electrical design, optimized materials and an optional high-efficiency diode from Bosch.



### EL generators offer astonishing savings potential

When the vehicle's electrical system is subjected to low loads (around 350 Watt), measurements in the New European Driving Cycle (NEDC) show fuel savings of up to 0.5%. Under actual driving conditions, with considerably higher loads on the electrical system (800 to 1,250 Watt) as a result of comfort and safety systems, fuel consumption and CO<sub>2</sub> output are reduced by up to 2%. The optional communication interface (LIN) provides the precondition for data exchange with an intelligent generator control unit. This permits additional reductions in fuel consumption and emissions of up to 2% via the recuperation of braking energy.

Efficiency Line Generator from Bosch:  
efficient, environmentally friendly, economical

### EL generators: the ideal supplement to start/stop systems

EL generators from Bosch increase the efficiency of start/stop systems. These systems only switch the engine off if the state of the battery charge will permit a reliable restart.

A powerful generator which charges the battery quickly permits the frequent and thus the effective utilization of the start/stop function. EL generators are the best possible solution for this because, due to their particularly powerful performance at low rotation speeds, they are able to recharge the vehicle battery very quickly once more. So very soon after every restart, sufficient electrical energy is thus available to guarantee another restart after the next stop.