Stop-start system

A stop-start system is an automatic system designed to reduce fuel consumption.

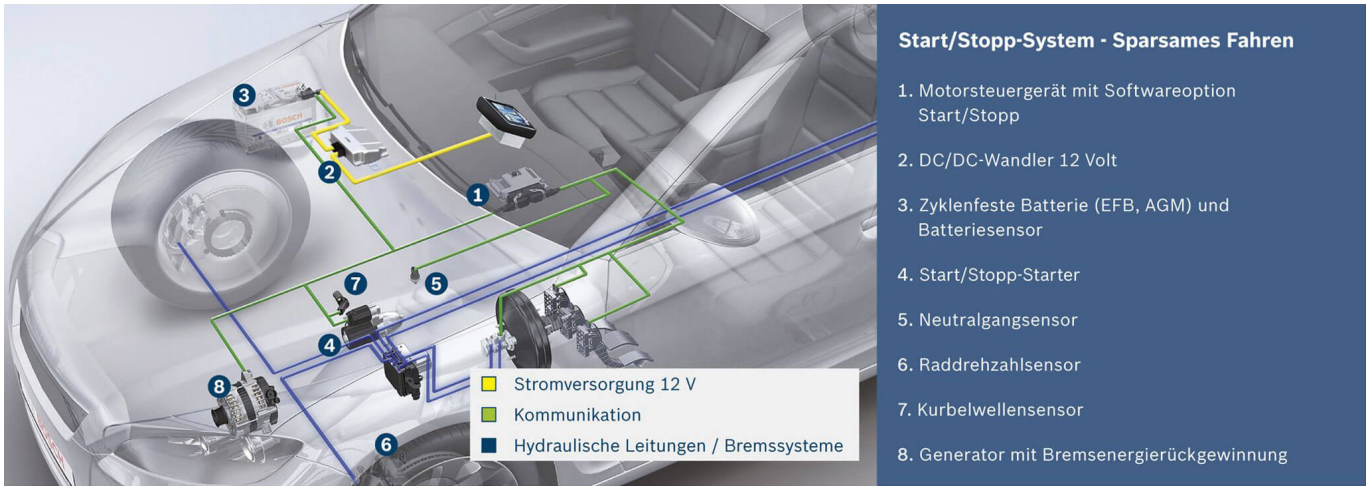
Function

A stop-start system automatically switches off the engine if the vehicle is stationary, in neutral and the clutch pedal is released. The engine re-starts on pressing the clutch. On vehicles with an automatic gearbox, the engine is switched off automatically as soon as the car comes to a halt with the brake pressed. Re-starting takes place as soon as the brake pedal is released.

A stop-start system will only function properly if certain conditions are satisfied. It does not function for example:

- If the ambient temperature drops below or rises above a certain value
- If the battery charge is very low
- If the interior temperature has not yet reached the set value

Stop-start system components



A stop-start system consists of numerous different components.

Coordination: Energy management (Figs. 1 and 3)

The engine control unit with integrated stop-start coordinator and the battery sensor are the main components of the energy management system, which also includes a deep-cycle resistant battery featuring EFB or AGM technology and the DC/DC converter..

DC voltage: DC/DC converter (Fig. 2)

The voltage level in the vehicle electrical system drops briefly when the starter is operated. This can

impair the functioning of electronic devices – e.g. loss of radio reception or cut-out of navigation. The DC/DC converter prevents such a loss of comfort by stabilising the vehicle electrical system voltage on starting the engine.

Monitoring: Electronic battery sensor EBS (Fig. 3)

The electronic battery sensor EBS in the battery posts präzise und dynamisch die precisely and dynamically detects the characteristic operating values such as current, voltage and temperature. The values are evaluated directly at the battery terminal. The sensor uses the measured values to monitor the capacity of the battery and determine the energy input and output capability.

Stop-start starter motor (Fig. 4)

With

- Reinforced bearings
- - An enhanced gear unit
- A heavy-duty meshing mechanism and
- Optimisation of the commutator for a longer service life the starter motor has been

optimised for frequent starting operations.

Sensors (Figs. 5, 6 and 7)

With the current information it receives from the sensors, the control system can optimise the starting operation. The neutral sensor indicates whether a gear is engaged, whilst the wheel speed sensor measures whether the vehicle has actually come to a standstill. Engine activity is signalled accordingly by the crankshaft sensor.

Power source: Generator (Fig. 8)

Highly efficient generators from Bosch produce surplus electrical energy for supplying the vehicle electrical system even in the low speed range and immediately after starting the vehicle. In combination with the powerful battery they thus increase the availability of the stop-start function.

Depreciation

The service life of the starter has been considerably extended to enable it to withstand the frequent starting operations over the course of the vehicle lifetime.

Stop-start systems also place a greater load on vehicle batteries. As compared to conventional starter batteries they not only have to be more powerful, but also have greater deep-cycle resistance. They have to provide the energy for the frequent engine starts and the electric loads in the vehicle during the stop phase. These requirements are satisfied by Enhanced Flooded Batteries or Absorbent Glass Mat batteries. AGM batteries are used for energy recovery systems (regenerative braking).

Specialist workshop knowledge is also required for changing the battery in vehicles with a stop-start system. A suitable control unit diagnostic tester is necessary with a lot of vehicles (e.g. Audi, BMW,

Volvo) when performing replacement. Only batteries approved by the manufacturer may be used. As a general rule, use of conventional lead-acid batteries is no longer permitted. An AGM battery can only be replaced with an AGM battery. An EFB battery can however be replaced with either an EFB or an AGM battery. The stop-start system cannot achieve its full potential if the wrong type of battery is fitted. A fully charged battery is of the utmost importance in winter for vehicles with a stop-start system. It is therefore advisable to charge the battery on every workshop visit.

Environmental protection

Stop-start systems make an important contribution to environmental protection. They make it possible to save up to 8% fuel in the urban driving cycle of the "New European Driving Cycle" (NEDC). In real urban traffic, savings may be even higher.

Images

SEG Automotive

DENSO Aftermarket

Valeo_EN

CORTECO_EN

Bosch

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