

Power Management

DC/DC converters

DC/DC converters

DC/DC converters are required in vehicles to supply power for new technologies. Depending on the application, a distinction must be made between different types of converters. Hella develops or supplies voltage converters, voltage stabilizers, charger converters and charge equalizers for the power supply to vehicle electric systems.

Voltage converters

Voltage converters are used in vehicles with two separate vehicle electric systems to transfer the power from a high to a lower voltage level or vice versa.

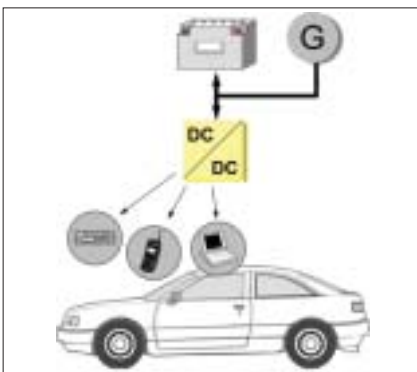
They guarantee the power supply to the 12 V vehicle electric system through an alternator, a fuel cell or a high-voltage battery. They are always necessary when – on account of general technical conditions – the electrical power source in the vehicle supplies a higher vehicle electric system voltage than the standard loads require.

For this specific application case Hella has developed a bi-directional DC/DC converter with an output capacity of 1000 W and an efficiency level of 93 % for maximum input voltages of up to 60 V.



Bi-directional voltage converter, output capacity 1000 W

Voltage stabilizers



Stabilization of the load voltages

Voltage stabilizers supply a constant output voltage for voltage-critical loads in the vehicle. Loads which react sensitively to fluctuations in voltage can thus still be operated in vehicles with high voltage dynamics.

Voltage stabilizers level out fluctuations in voltage in the main power supply. They can provide constant voltage to the loads by acting as an upward converter if voltage drops, or as an upward and downward converter if the vehicle electric system voltage drops or increases excessively. In the case of vehicles with idling switch-off of the combustion engine in start-stop operation, voltage stabilizers ensure the supply to the audio system or consistent brightness of the lighting e. g. headlamps, even when this drop in voltage occurs. The output capacity of the voltage stabilizer depends on the capacity of the load. Hella develops voltage stabilizers in the capacity range from 70 W to 350 W.

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Charge converters

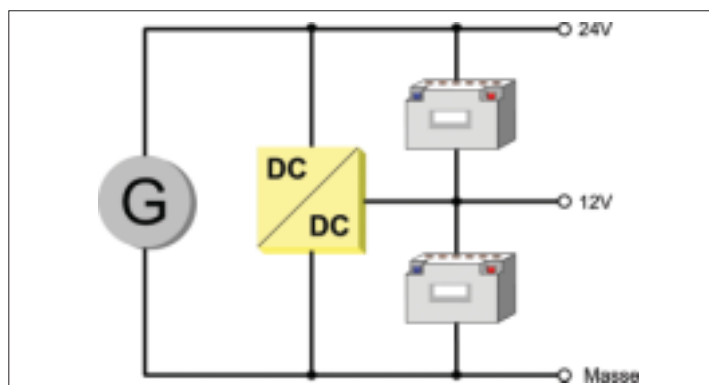
Charge converters are used in vehicles with different or equal voltage levels for redundant power supply and for charging power stores. Charge converters can be combined into one device with control units for vehicle electric systems or power stores to optimize system costs. Through the use of these converters, an optimum charge-state is always reached. In addition, the system availability and the service-life of the power stores are increased. In the case of recirculation of the braking energy, the charge converter supports power distribution within the vehicle electric system so that the start-up ability of the vehicle is always guaranteed, and free storage capacities are available for regaining kinetic energy.



Charge converters from Hella integrated into a vehicle electric system control unit

Charge equalizers

Charge equalizers equalize the charge between two or more storage cells or batteries. In the case of series connection of storage cells, the strong cyclical loads required by hybrid applications in the vehicle cause different charge quantities in the individual cells. Charge equalization is necessary to ensure the operativeness and storage quality of the cells. In the case of 24 V vehicle electric systems in commercial vehicles or buses, the charge equalizer increases the service-life of the 12 V lead batteries connected in series, at the same time making a 12 V vehicle electric sub-system available for selected loads.



Charge equalization in commercial vehicles