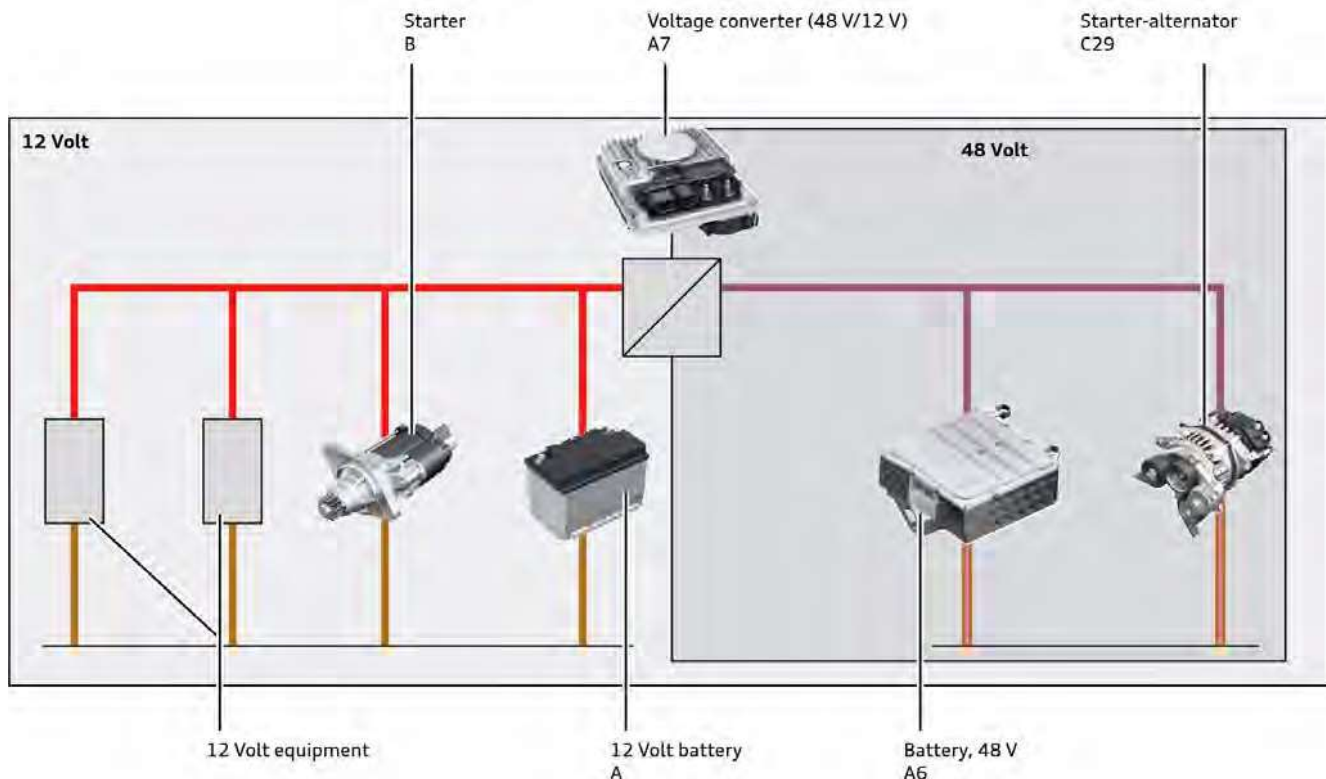


48 Volt main electrical system

Audi A3 vehicles with PR number 0K4 are designed as MHEVs (Mild Hybrid Electric Vehicles). The MHEV technology integrates a 48 Volt lithium-ion battery, a voltage converter and a 48 Volt belt-driven starter-alternator in a 48 Volt onboard electrical supply.

PR no. 0K4 = MHEV hybrid drive system

Schematic diagram



680_143

48 Volt belt-driven starter-alternator

As the name implies, this component has two functions. When operated as an alternator, it provides the electrical system with electrical energy and charges the 48 Volt battery. Its electric motor function is used to start the combustion engine when the engine oil temperature is above 45 °C. It is also able to support the combustion engine in certain driving situations. This means that the belt-driven starter-alternator provides part of the power output required to overcome driving resistance, thereby relieving the load on the combustion engine.

Thanks to the connection via the poly V-belt, an engine start using the starter-alternator is very quiet and almost completely free of vibrations. The 48 Volt belt-driven starter-alternator is air-cooled. It is connected to the engine control unit J623 via a sub-bus data wire. In addition, it uses the hybrid CAN and can be reached at diagnostic address 00CC using the diagnostic tester. As on any belt-driven starter-alternator, a special tensioner is used to ensure that the poly V-belt has a large wrap angle around the drive pulley of the starter-alternator.

48 Volt lithium-ion battery

The main components inside the housing of a lead battery are the battery cells, the separators, the cell connectors and the electrolyte. In contrast, the lithium-ion battery houses additional components such as an internal battery control unit and a relay. The control unit inside the battery takes part in the vehicle communication via the hybrid CAN. The diagnostic address on the vehicle diagnostic tester is 0021. Using this relay, the positive terminal stud can be "switched off". In this case, when the relay is open, there is no voltage at the terminal stud. The relay inside the battery is closed as soon as terminal 15 is active. The relay is opened when terminal 15 is deactivated or when the airbag control unit J234 sends a crash signal. The 48 Volt battery is fitted under the seat on the right side and is protected from mechanical damage by a metal housing. It has a capacity of 13.8 Ah and is actively cooled by an internal fan.

48 V/12 V voltage converter

The voltage converter operates bidirectionally. This means that, on the one hand, the 48 Volts generated by the alternator are converted into 12 Volts to charge the 12 Volt battery. On the other hand, the process is reversed under certain conditions, and 48 Volts are generated from 12 Volts. This occurs e.g. when an external charger is connected to the vehicle via the 12 Volt jump-start terminals. The voltage converter has a capacity of 2.5 kW and is actively cooled by a fan attached to the outside of the housing. Its diagnostic address is 00C4, and like the battery and the belt-driven starter-alternator, it uses the hybrid CAN.