Networking of components

- TO1 Instrument cluster
- B14 Outside temperature display temperature sensor
- CAN-B Passenger compartment CAN
- CAN-C Engine compartment CAN
- G2 Generator
- K57 Battery cut-off relay
- N3/10 ME-SFI [ME] control module
- N10/10 Driver-side SAM control module
- N10/11 Passenger-side SAM control module
- N73 DI control module
- N82/1 Vehicle power supply control module

The two-battery vehicle power supply increases the starting reliability and availability of the vehicle by ensuring optimum charging of the starter battery.

The two-battery vehicle power supply consists of the following areas:

**Starter**
- Starter battery (G1/4) in engine compartment
- Starter (M1)

**Vehicle power supply**
- On-board electrical system battery (G1) in trunk
- Battery cutoff relay (K57)
- Vehicle power supply control module (N82/1)

Via the fuse connection (F52), the starter is protected against overloading by fuse 1 (F52f1) and the generator is protected by fuse 2 (F52f2). Both areas are separated from one another by the battery cutoff relay (K57) which is switched by the vehicle power supply control module (N82/1) according to requirements.

Function prerequisites:
- Transmitter key (A8/1) in DI control module (N73)

Function of two-battery vehicle power supply

The vehicle power supply control module (N82/1) is actuated by a cut-in signal from the DI control module (N73). It checks the operating condition of the vehicle power supply. This cut-in signal is created by inserting the transmitter key (A8/1) into the DI control module (N73). If a “start signal” is not received after t = 30 seconds the connection is interrupted and the vehicle power supply control module (N82/1) returns to the stand-by mode. To reactivate the system, the driver must remove the transmitter key (A8/1) and insert it again. The cut-in signal initializes the vehicle power supply control module (N82/1) again.

The starter battery (G1/4) and the on-board electrical system battery (G1) are separated or connected in parallel by the battery cutoff relay (K57) depending on the operating condition (see chart below). The signal TERM 61 ON (engine running) is transferred by the passenger SAM control module (N10/11) on the passenger compartment CAN to the vehicle power supply control module (N82/1).

In the normal operating mode, the starter battery (G1/4) is charged according to a predetermined charging characteristic, which is stored in the vehicle power supply control module (N82/1). The charging characteristic takes the starter battery voltage and temperature into account to ensure optimum recharging of the starter battery (G1/4). The starter battery (G1/4) is disconnected from the on-board electrical system battery (G1) once the battery has been recharged.

The mode is then switched to the floating operation mode.

The on-board electrical system battery (G1) is charged directly by the generator (G2).

- To protect the components of the vehicle power supply, the vehicle must only be jump started via the starter battery (G1/4).
- If the battery cutoff relay (K57) is faulty, the vehicle power supply is not supplied with an emergency power supply. The message “GO TO GARAGE” therefore appears in the instrument cluster (A1).
### Block diagram of vehicle power supply control module (N82/1)

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<td>G1/4</td>
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<tr>
<td>G2</td>
<td>Generator</td>
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<td>F521</td>
<td>Fuse 1</td>
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<td>F522</td>
<td>Fuse 2</td>
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#### Operating state of vehicle power supply

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<th>Operating state of vehicle power supply</th>
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| Normal starting                        | - Transmitter key (A8/1) in DI control module (N73)  
- No undervoltage at terminal 30  
- Starter battery (G1/4) separated from on-board electrical system battery (G1)  
- Vehicle power supplied by on-board electrical system battery (G1) |
| Normal mode                            | - Term. 61 ON  
- No undervoltage at terminal 30  
- Starter battery (G1/4) separated from on-board electrical system battery (G1)  
- Starter battery (G1/4) charged by vehicle power supply control module (N82/1) |
| Emergency start                        | - Transmitter key (A8/1) in DI control module (N73)  
- Undervoltage at terminal 30 detected (on-board electrical system battery discharged)  
- Vehicle power supply control module (N82/1) sends “limp-home mode” CAN message  
- Consumers not required for starting engine are switched off (e.g. heated rear window)  
- Starter battery (G1/4) and on-board electrical system battery (G1) switched in parallel by battery cutoff relay (K57)  
- Starter battery (G1/4) adopts vehicle power supply  
- Warning indicator in instrument cluster (A1) |
| Limp-home mode                         | - Term. 61 ON  
- Starter battery (G1/4) and on-board electrical system battery (G1) remain connected in parallel until no undervoltage at TERM. 30  
- Entry in fault memory of vehicle power supply control module (N82/1)  
- After TERM. 61 OFF, the starter battery (G1/4) remains connected to the on-board electrical system battery (G1) for t = 5 minutes. |
| Switch off phase                       | - Transmitter key (A8/1) not in DI control module (N73)  
- Term. 61 OFF  
- Starter battery (G1/4) separated from on-board electrical system battery (G1) |

#### Battery cut-off relay, location/task/design, function

- GF54.10-P-4200R

#### Vehicle power supply control module, location/task/design

- GF54.21-P-4118R