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| AH54.10-P-0001-01A | Notes on battery | | |

**Model all (4xWD, BUS, CAR, Heavy transporter, Light transporter, TRUCK, UNIMOG, smart)**

## Modification notes

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| 03.03.2017 | 48 V scopes added | | |

**General information on batteries**
- Do not store batteries over a longer period at a storage point with direct solar radiation.
- Discharged or defective batteries can freeze, therefore store free from frost.
- Avoid polarity reversal and short-circuits.
- Do not place any tools or other conducting objects on the battery (risk of short-circuit).
- Before removal and installation of batteries all switchable current consumers should be switched off, as well as the engine switched off so that inadvertent arcing is ruled out.

**Information on gel batteries or fleece batteries (VRLA, AGM)**
- The battery is leakproof and therefore it can be installed in any position.
- The battery is maintenance free.
- The battery housing is cast.
- During quick charging, care should be taken to ensure that the battery housing does not heat up too much, as this will result in damage otherwise.

**Information on lead-acid batteries**
- Always store lead-acid batteries horizontally to prevent acid leaking out and do not tilt during transportation.
- When fast charging ensure that the housing of the lead-acid battery does not heat up excessively.

**Information on lithium-ion batteries**
- The battery is leakproof and therefore it can be installed in any position.
- The battery is maintenance free.
- The battery housing is bolted on and it may not be opened.
- During quick charging, care should be taken to ensure that the battery housing does not heat up too much, as this will result in damage otherwise.
- At battery temperatures < 0 °C, the charging voltage is to be limited to 13.5 V or the battery is to be conditioned before charging to interior temperature.
- Always **disconnect the negative terminal first** and always **connect the positive terminal first**.
- Only charge batteries with DC, 10 % of the capacity is recommended as charging current for slow charging and 50 % of the capacity recommended for fast charging.
- Only switch on the charger after connecting to the terminals and switch off before disconnecting.
- If the battery is to remain in the parked vehicle for an extended period, the negative terminal should be disconnected.
- If possible batteries should be kept clean and dry.
- The battery may only be stored in original packaging when outside the vehicle.
- The battery belongs to the hazard class 9, II and is to be handled as per the specifications.

**Information on 48 V batteries (lithium-ion batteries)**
- A 48 V connector may not be unplugged under load.
- A 48 V connector may only be unplugged in de-energized state. The 48 V on-board electrical system is de-energized when the 12 V battery is disconnected.
- If a light arc is generated while improperly disconnecting under load, the connector coupling is to be checked for damage and the connector or wiring harness and/or the 48 V components must be replaced.
- With a discharged 12 V battery, this can be recharged through the 48 V on-board electrical system. This recharge function is stopped 10 s after disconnecting the 12 V ground line. When replacing the 12 V battery, **before releasing the positive line, wait for 10 seconds**.
- The 48 V battery is not connected directly when charging externally, but charged through the 12 V on-board electrical system using a given/approved 12 V charger.
- If a jump start is required, the external voltage source is to be connected as usual to the jump-start connection point. A brief period however, must first be waited until the 48 V battery is charged far enough to enable an attempt at starting the engine to be made (3 to 4 minutes).
- 48 V components, that exhibit internal (contact protected) voltages above the contact protection limit, are to be labeled with appropriate hazard symbols. These components may not be opened and in the event of any damage or if there are any exposed parts conducting current, a voltage supply (e.g. engine running) is not permitted.
- After an irreversible crash switch-off situation, the restart procedure may only be conducted after thoroughly checking the complete 48 V on-board electrical system.
- 48 V ground lines (circuit 41) are to be connected to a separate ground bolt, after being disconnected from the 12 V ground lines.
- 48 V ground lines (circuit 41) are identified by the brown/violet color.
- On 48 V positive lines (circuit 40) the same definitions apply as for the 12 V positive lines (red with additional color).