

# Warnings and safety regulations for lead-acid batteries

## EN

**When working with the battery, the vehicle manufacturer's operating manual must be read and its instructions must be followed!**

### 1. Storage and Transport

- FIFO (first in – first out i.e.: use oldest goods first) Execute storeroom management.
- Unfilled batteries do not require maintenance.
- Store filled batteries fully charged and in a cool environment at all times (but not below the freezing point).
- Check charging level regularly or use charge retaining devices.
- Recharge filled batteries with an acid density of 1.21 kg/l and/or and open-circuit voltage of 12.3 V or after an alarm of the optical charge level display at the latest (see point 4).
- **For vehicle immobilisation: Read the vehicle manufacturer's operation manual first and follow its instructions!**
- Disrupting the voltage can cause failures of several electronic components (Engine immobiliser, radio, ...). Disconnect negative terminal (-) or connect a suitable charge retaining device.
- Filled batteries must be transported and stored in a vertical position, secured against tilting and short circuits as acid might otherwise leak.

### 2. Commissioning

- **Observe the safety instructions.**
- **Batteries delivered in filled condition are ready to use.** Only install fully charged batteries, min. open-circuit voltage 12.50 V (VRLA 12.70 V!)
- **Unfilled, charged starter batteries** are ready to use after being filled with battery acid (min. temperature of battery and acid prior to the filling: 10 °C).
- Remove plug. Fill the individual battery compartments with sulphuric acid with a density of 1.28 kg/l according to DIN 43530; fill until the acid level marking is reached.
- Let the battery rest for a minimum of 15 minutes, tilt it repeatedly and add some acid if required.
- Wipe the fill-in openings dry with absorbent tissues.
- Tighten and/or push the plug in tightly. Wipe off existing acid squirts (refer to point 5).
- Note: If the battery does not provide sufficient starter power due to too low temperatures or unfavourable storage conditions, the battery must be recharged; in order to do so, the following must be observed:
  - Recharge battery after filling with opened plug according to point 4.
  - Interrupt charging in case of too strong steaming/acid leaks and reduce charging current/cover fill-in openings if required.
  - Tilt battery repeatedly after charging is complete.
  - Let it rest to degas for at least 4 hours; then adjust electrolyte level if required.
  - Clean the fill-in openings with an absorbent paper tissue of acid squirts.
  - Seal the battery and clean (see above).

### 3. Mounting and Dismounting into the Car

- **Read the vehicle manufacturer's operation manual and follow their instructions!**
- Disrupting the voltage can cause failures of several electronic components (engine immobiliser, radio, ...).
- Switch off the engine and all power consumers prior to removing the battery.
- Disconnect the negative terminal (-) first, then the positive terminal (+).
- Clean battery poles and pole terminals and apply acid-free grease if required by the vehicle manufacturer.
- Brace the battery tightly. (Use original mounting devices.)
- Remove the protection cap of the positive pole in the vehicle first and put it right onto the pole of the replacement battery in order to prevent short circuits and sparking.
- When mounting, connect positive terminal (+) first then the negative terminal (-).
- Take care that pole terminals are fitted tightly.
- Use the attachments, such as pole covers, bracket, hose connection, filler plug and pole terminal retainer (if available), of the replaced battery and connect identical.
- Use supplied filler plug if required.
- Leave at least 1 gas exit opening unclosed; otherwise there is the danger of an explosion (this also applies when returning the used battery).

### 4. External Charging

- **Read and observe the operating manual of the charger device manufacturer.**
- Check electrolyte level prior to charging and adjust if required (see point 5 "Maintenance").

- Charge the battery only with suitable, voltage-controlled chargers with the same mains voltage, otherwise, the battery must be disconnected / removed.

### Recommendation:

- Charging current: 1/10 ampere of battery capacity Ah.
- Charging voltage: 14.4 V for 12 V batteries / 28.8 V for 24 V batteries.
- See Charger Device Recommendation of battery manufacturer for details.
- Never charge batteries that are frozen or have a temperature higher than 45 °C.
- Connect the battery's positive pole (+) with the positive pole of the charger and the battery's negative pole with the negative pole of the charger.
- Do not switch on the charger before the battery is completely connected.
- Switch off the charger after charging is complete.
- Discontinue charging if the temperature of the acid exceeds 55 °C.
- The charging must be discontinued if the battery heats up or leaks acid!
- Battery is fully charged when
  - current and voltage remain constant with voltage-controlled chargers.
  - the charging voltage does not rise for a period of 2 hours with current-controlled chargers.
  - the automatic charger switches off or changes to charge retaining.
- Make certain of sufficient ventilation during charging (see EN 50272 and ZVEI memorandum).

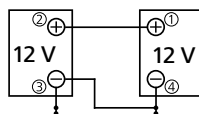
### 5. Maintenance

- Keep battery surface clean and dry; clean only with a damp or antistatic cloth.
- Protect poles/connection terminals of corrosion (as described in point 3).
- Do not open plug-less and VRLA batteries (adjusting the electrolyte not possible).
- Check electrolyte level (observe internal or external marking on the battery case or visual level display on the lid).
- If required, add demineralised or distilled water according to DIN 43530 until maximum acid level marking is reached. (Never add acid, impurities or so-called enhancing agents.)
- Consult an specialist garage if a high electrolyte loss occurs.
- Check battery if starter power is insufficient and recharge if required (see point 4).
- Batteries for which re-filling is not possible and the electrolyte level has fallen below the minimum acid level marking must be replaced.

### 6. Jump Starting

- **Read and observe operating manual of the charger device manufacturer!**
- Use only standardized jump-start cables (e.g. according to DIN 72 553).
- Observe the instructions contained in the operating manual of the jump start cable manufacturer.
- Use only batteries with identical nominal voltage.
- Motor of assisting vehicle off.
- Connect jump-start cable to the positive pole (+) of assisting battery 2 and to the positive pole (+) of the receiving battery 1 or to the positive vehicle connection pole (+) (refer to vehicle operating manual).
- Connect the jump start cable only now to the negative pole (-) of the assisting battery 3 and to a solid blank mass inside the receiving vehicle or the negative (-) vehicle jump start point 4 (do not use the negative pole of the receiving battery as connecting point).
- Start the receiving vehicle.
- If the first attempt to start fails, the assisting vehicle can be started PRIOR to the 2nd starting attempt.
- Disconnect the jump-start cable in reverse order.

Battery of vehicle providing assistance



Battery of vehicle requiring assistance

### 7. Warranty

We guarantee the processing of proper material, flawless technical execution and the compliance with DIN/EN standards for measuring, power and durability.



The instructions on the battery and of this operating manual must be followed. Store this operating manual together with the vehicle's operating manual.



Wear eye protection during all work carried out on or with the battery.



Keep children away from acid, battery and chargers.



### Explosion hazard:

- When charging batteries, a highly explosive detonating gas mixture forms – therefore:



### Fire, sparks, naked flames and smoking are prohibited!

- Prevent sparking when working with cables and electric equipment!  
- Prevent short circuits!  
- Prevent electrostatic discharges!



### Injury hazard:

Battery acid is highly caustic, therefore:  
- Wear protective gloves and eye protection during all work carried out on or with the battery.  
- Do not tilt the battery, acid can leak from the degassing openings.



### First aid:

- If acid should spray into your eyes, rinse immediately with clear water for several minutes! Consult a doctor immediately afterwards.  
- If acid gets sprayed onto the skin or clothing, neutralize immediately with acid converter or soapsuds and rinse with a lots of water.  
- If acid has been swallowed, consult a doctor immediately!



### Warning note:

- Do not expose the batteries to direct daylight without protection (case will become brittle).  
- Discharged batteries can freeze (freezing point of fully-charged battery -70 °C, at 50 % charging level -15 °C) Case will become unsound!



### Disposal:

- Dispose of used batteries at a designated collection point.  
- For transport, the instructions of point 1 must be observed.  
- Never dispose of used batteries together with the domestic waste!  
- Transport damaged batteries in suitable containers (leaking acid).