



Service

Workshop Manual

Bora 1999 > , Bora Variant 1999 > ,
CC 2010 > , Eos 2006 > , Golf 1998 > ,
Golf 2004 > , Golf 2009 > ,
Golf Plus 2005 > , Golf Plus 2009 > ,
Golf Variant 1998 > , Lupo 1999 > ,
Lupo 3L 1999 > , Passat 1997 > ,
Passat 2006 > , Passat CC 2009 > ,
Passat Variant 1997 > , Phaeton 2003 > ,
Polo 1995 > , Polo 2002 > ,
Polo 2010 > , Polo KH IN 2010 > ,
Polo Lim IN 2011 > ,
Polo Lim RUS 2011 > , Scirocco 2009 > ,
Sharan 1996 > , Sharan 2011 > ,
Tiguan 2008 > , Touareg 2003 > ,
Touareg 2010 > , Touran 2003 >

Electrical System, General Information

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List of Workshop Manual Repair Groups

Repair Group

- 27 - Starter, current supply, CCS
- 90 - Gauges, instruments
- 92 - Windscreen wash/wipe system
- 94 - Lights, bulbs, switches - exterior
- 96 - Lights, bulbs, switches - interior
- 97 - Wiring



Technical information should always be available to the foremen and mechanics, because their careful and constant adherence to the instructions is essential to ensure vehicle road-worthiness and safety. In addition, the normal basic safety precautions for working on motor vehicles must, as a matter of course, be observed.

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27 – Starter, current supply, CCS

1 Battery



WARNING

Danger of injury! Observe warning notices and safety regulations ⇒ [page 2](#)!



Caution

To prevent damage to the battery and vehicle, the following should be observed concerning types of battery ⇒ [page 1](#).

1.1 Fundamentals for batteries

To ensure long use of the battery, the battery must be checked, serviced and maintained according to the specifications in this manual.

Apart from supplying energy for starting the engine, the battery has other tasks: it acts as a buffer and supplies electrical energy to the complete electrical onboard supply of the vehicle.

1.2 Types of batteries

General notes



Caution

The description for the following batteries is for maintenance-free batteries. No stickers may be removed and do not replenish with distilled water. Only perform a visual check. Refer to chapter, Checking battery ⇒ [page 5](#).

1.2.1 Battery with magic eye

This is a maintenance-free battery with liquid electrolyte (wet battery).



Caution

No stickers may be removed and do not replenish with distilled water. Only perform a visual check. Refer to chapter, Checking battery ⇒ [page 5](#).



WARNING

Batteries where the magic eye is colourless or light yellow must not be checked or charged. Do not slave/jump start the vehicle!

Danger of explosion when checking and charging or slave/jump starting.

These batteries must be renewed.



This battery is equipped with a magic eye. The magic eye provides information concerning the level of the electrolyte and the charge state of the battery via a coloured display. Checking colour display of the magic eye ⇒ [page 6](#)

1.2.2 Absorbent glass mat battery

Maintenance-free battery with a contained electrolyte and no magic eye.

Lead-acid battery where the electrolyte is contained within a microscopic glass mat (AGM). The battery is sealed and fitted with valves.

AGM is the abbreviation for absorbent glass mat.

Due to containment of the electrolyte, this type of battery may not have a magic eye. Absorbent glass mat batteries are identified by the abbreviation AGM on the battery.



Note

Always replace an absorbent glass mat battery with another absorbent glass mat battery.

1.3 Warning notices and safety regulations

1.3.1 Dangers when handling vehicle batteries

Recognition and avoidance of dangers

Batteries can be dangerous. These dangers can be avoided when the warnings on the battery, in the operating manual and in ELSA are observed.



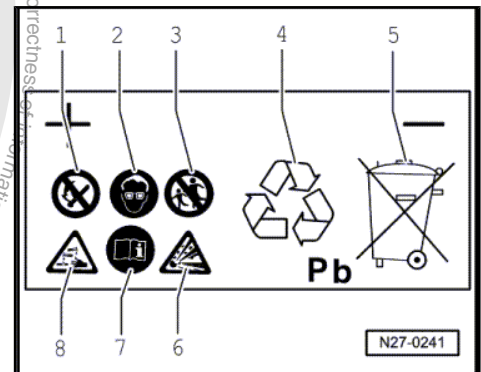
WARNING

- ◆ *Untrained personnel e.g. apprentices, trainees etc. may only work on batteries when supervised by a vehicle mechanic/foreman or vehicle electrician/foreman.*
- ◆ *Acid is highly corrosive. There is a considerable danger of acid burns if personnel do not handle batteries correctly. Therefore suitable measures must be taken to ensure that equipment/solutions etc. are available to neutralize acid burns. A suitable solution is: e.g. a soap solution.*
- ◆ *If electrolyte leaks from a battery it may cause skin burns or acid corrosion and rusting on the vehicle. This may damage safety relevant components on the vehicle.*
- ◆ *The gas which forms when charging and the gas which may escape through vent valves is explosive. In extreme cases a battery may explode if the battery is not handled correctly.*
- ◆ *Batteries must be renewed where the magic eye is colourless or light yellow. They must not be checked or charged and do not slave/jump start. Danger of explosion when checking and charging or slave/jump starting.*
- ◆ *It is prohibited to cause sparks through grinding, welding, cutting operations and use naked lights in the vicinity of batteries. Smoking is also prohibited. Sparks generated by electrostatic charging must also be avoided. Always touch the vehicle body before touching the battery.*
- ◆ *Only work on batteries in well ventilated and suitable rooms.*

1.3.2 Safety markings on battery

Safety markings on battery

1. - Fires, sparks, naked flames and smoking are prohibited when handling batteries. Avoid sparks as well as electrostatic discharge when working with cables and electrical units. Avoid short circuits. Therefore never lay a tool on a battery.
2. - Wear eye protection before commencing work on battery.
3. - Keep children away from acid and batteries.
4. - Disposal: old batteries are classed as hazardous waste. They may only be disposed of through a suitable collection centre and only in accordance with respective legislation.
5. - Never dispose of old batteries in household waste system!
6. - There is a danger of an explosion when working with batteries. A highly explosive gas is produced when batteries are charged.
7. - Always follow instructions on battery, in ELSA "Electrical System, General Information" and in owner's manual.
8. - Battery acid is very caustic; therefore wear eye protection and gloves when working with batteries. Do not tilt battery. Acid can leak out of the gas vents of some batteries.





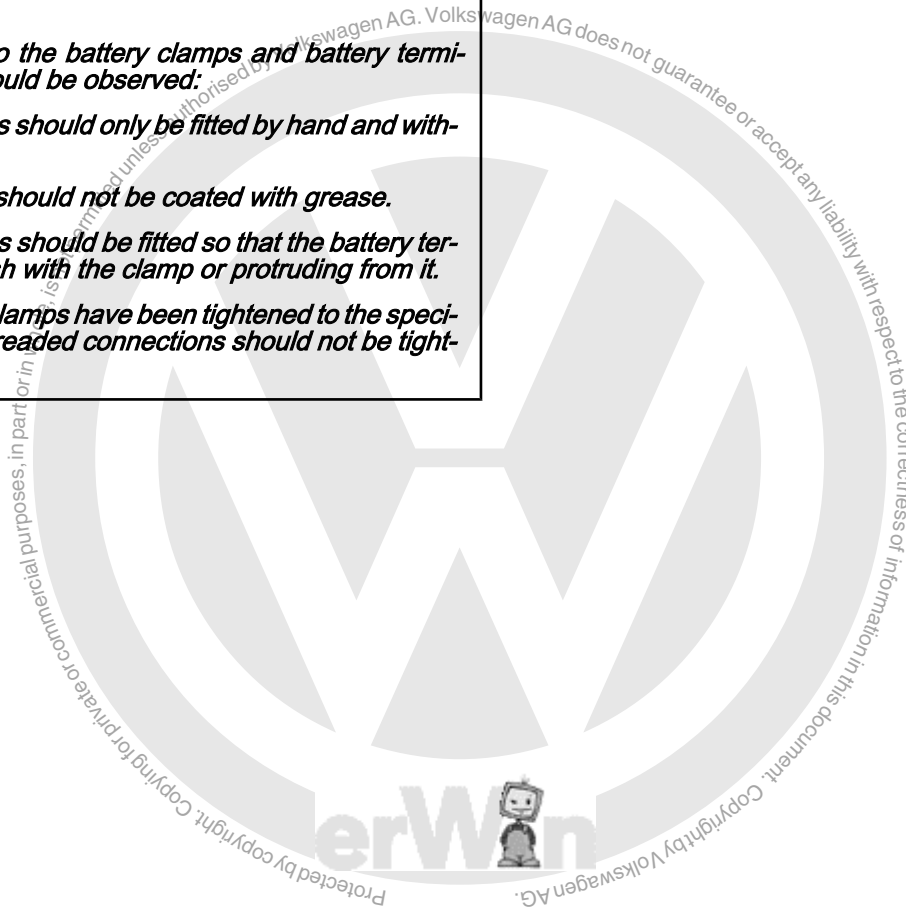
1.4 Battery terminal connection



Caution

To prevent damage to the battery clamps and battery terminals, the following should be observed:

- ◆ *The battery clamps should only be fitted by hand and without using force.*
- ◆ *Battery terminals should not be coated with grease.*
- ◆ *The battery clamps should be fitted so that the battery terminal is either flush with the clamp or protruding from it.*
- ◆ *Once the battery clamps have been tightened to the specified torque, the threaded connections should not be tightened any further.*





2 Checking battery



WARNING

Danger of injury! Observe warning notices and safety regulations ⇒ [page 2](#)!



Caution

To prevent damage to the battery and vehicle, the following should be observed concerning types of battery ⇒ [page 1](#) .

2.1 Checking the various types of batteries

2.1.1 Checking battery with magic eye



WARNING

Danger of injury! Observe warning notices and safety regulations ⇒ [page 2](#)!

Carry out procedure in sequence as follows:

1. Visual check ⇒ [page 6](#)
2. Check colour display of „3-colour“ magic eye ⇒ [page 6](#)
or „2-colour“ magic eye ⇒ [page 7](#) .



WARNING

Batteries where the magic eye is colourless or light yellow must not be checked or charged. Do not slave/jump start the vehicle!

Danger of explosion when checking and charging or slave/jump starting

These batteries must be renewed.

3. Perform a battery load test using battery tester with printer -VAS 5097 A- ⇒ [page 9](#) .
– Battery test with battery tester with printer -VAS 6161- ⇒ [page 14](#) .
4. Depending on the result of the battery test, „perform current draw test“ ⇒ [page 22](#) .

2.1.2 Absorbent glass mat battery

Carry out procedure in sequence as follows:

1. Visual check ⇒ [page 6](#)
2. Perform a battery load test using battery tester with printer -VAS 5097 A- ⇒ [page 9](#) .
– Battery load test with battery tester with printer -VAS 6161- ⇒ [page 14](#)



3. Depending on the result of the battery test, „perform current draw test“ ⇒ [page 22](#) .

2.2 Visual check



WARNING

Danger of injury! Observe warning notices and safety regulations ⇒ [page 2](#) !

It is essential to visually inspect the external condition, to check the terminals and to ensure proper attachment of the battery before performing extensive tests.



Caution

- ◆ *The battery will be damaged if the battery is not secured correctly.*
- ◆ *Vibrations shorten the life of the battery, there is a danger of an explosion, the cell plates may be damaged and the clamping bracket may damage the battery housing.*
- ◆ *Check battery is securely seated, if necessary tighten securing bolt to specified torque.*

Performing this test establishes:

- ◆ If battery housing is damaged Electrolyte can leak out if the housing is damaged. If battery acid leaks out, serious damage to the vehicle could be caused. Treat components affected by leaked battery acid immediately with acid neutraliser or a soap solution.
- ◆ Check whether the battery terminals (battery wire connections) are damaged. The necessary contact on the battery clamps cannot be guaranteed if the battery terminals are damaged. When connecting the battery clamps, tighten the battery clamps to torque specified in this workshop manual „Electrical system“ for the respective vehicle. If the battery clamps are not correctly seated and tightened, the wiring may burn. Which will cause malfunctions in the electrical system. Therefore it can no longer be guaranteed that the vehicle will function correctly.

2.3 Checking colour display of magic eye

2.3.1 Checking colour display of „3-colour“ magic eye



WARNING

Danger of injury! Observe warning notices and safety regulations ⇒ [page 2](#) !