



# Service

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## Workshop Manual OCTAVIA

### Electrical System

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## List of Supplements to OCTAVIA Workshop Manual

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### Electrical System

Replaces List of Supplements - Edition: 12.03

Supplement	Edition	Subject	Article Number
	08.96	Basic Edition of Workshop Manual	S00.5117.50.20
1	09.96	Supplement to Basic Edition	S00.5117.51.20
2	01.98	Side Turn Signal Lights	S00.5117.52.20
3	09.98	Octavia Estate	S00.5117.53.20
4	12.98	Octavia Model Year 99	S00.5117.54.20
5	03.99	Car radio Gamma	S00.5117.55.20
6	08.99	Parking aid, Radio-Navigation system (RNS)	S00.5117.56.20
7	03.00	Telephone preinstallation 2 - Cullmann, Alarm system with its own power supply	S00.5117.57.20
8	07.00	TAXI	S00.5117.58.20
9	12.00	Octavia MY 01	S00.5117.59.20
10	05.01	Multi-function steering wheel, Test CAN databus, Coding Radio-Navigation system	S00.5117.60.20
11	07.01	Switch-over of the headlight inner aperture, Mobile phone holder MY 02	S00.5117.61.20
12	11.01	Ungluing halogen headlight	S00.5117.62.20
13	03.02	Modifications to Repair Groups 94 and 96	S00.5117.63.20
14	06.02	Radio-Navigation system, Warning lamp for deactivated airbag	S00.5117.64.20
15	03.03	Modifications to Repair Groups 90, 91 and 96	S00.5117.65.20
16	12.03	Modifications to Repair Groups 91, 94 and 96	S00.5117.66.20
17	04.04	Modifications to Repair Groups 96	S00.5117.67.20
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## Battery

### Warning!

**Disconnect earth strap of battery before commencing work on electrical system.**

**Wear protective clothing and take appropriate safety measures when working on the battery.**

**Pay attention additionally to the following information when carrying out work on the airbag system or on the electrical belt tensioners:**

- ◆ Correct order before connecting battery.
- ◆ No persons must be present in the car when connecting the battery.

### Instructions for handling battery

- ◆ The battery terminal studs must neither be greased nor oiled.
- ◆ The battery terminals must be fitted on by hand without the use of force to avoid damaging the battery housing.
- ◆ The tightening torque for the battery terminals is 6 Nm -arrow-.

After connecting the battery terminals:

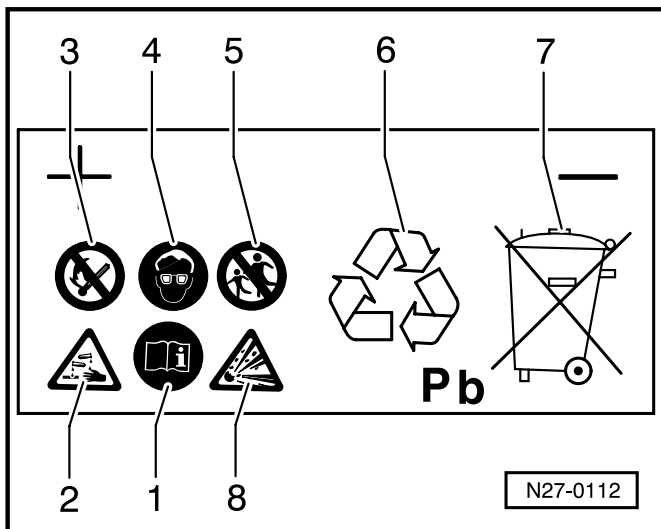
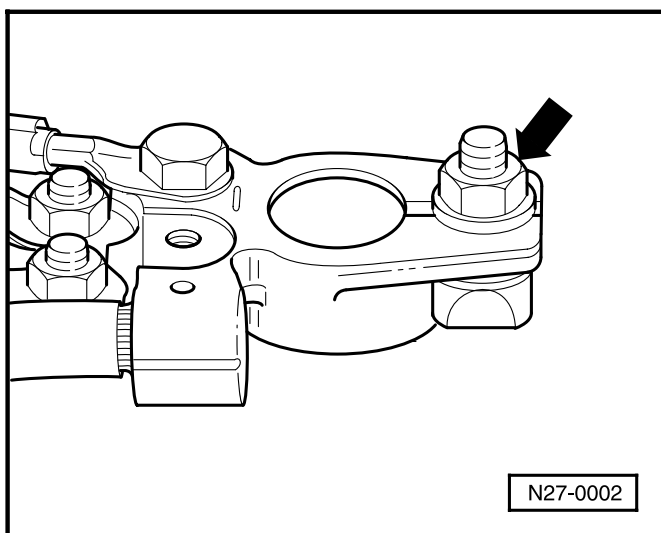
- Carry out coding on radio sets fitted with anti-theft coding ⇒ Operating instructions of car radio.
- Set clock ⇒ Inspection and Maintenance.
- Initialise power windows ⇒ Body Fitting Work, Repair Group 57.
- Carry out automatic test sequence ⇒ Inspection and Maintenance.

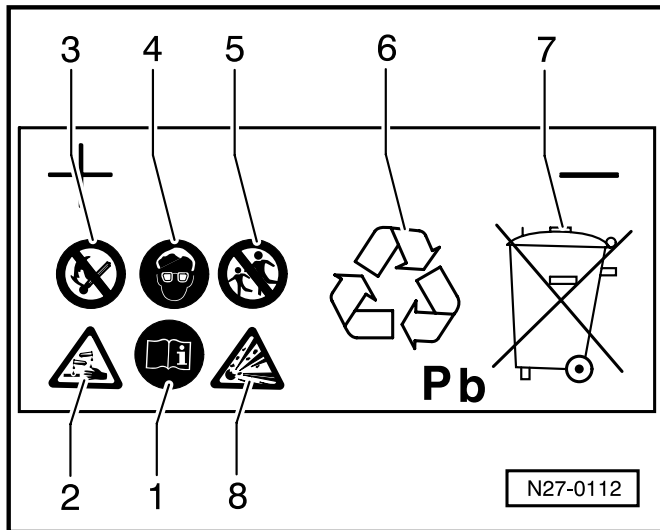
### Note:

*If the fault memory of the engine control unit is erased, generate readiness code ⇒ Fuel Injection and Ignition System of appropriate engine.*

### Warning instructions and safety precautions relating to lead-acid batteries

- 1 - Follow instructions on battery, in Workshop Manual Electrical System and in the Owner's Manual.





#### 2 - Risk of caustic burns:

- Battery acid is extremely caustic. For this reason, wear protective gloves and eye protection.
- Do not tilt battery; battery acid may flow out of the vent openings.

#### 3 - Fire, sparks, naked flames and smoking prohibited:

- Avoid producing sparks when handling cables and electrical equipment.
- Avoid short circuits.

#### 4 - Wear eye protection.

#### 5 - Keep batteries and battery acid away from children.

#### 6 - Disposal:

- Dispose of old batteries in an official collection point.

#### 7 - Never dispose of old batteries in domestic waste!

#### 8 - Risk of explosion:

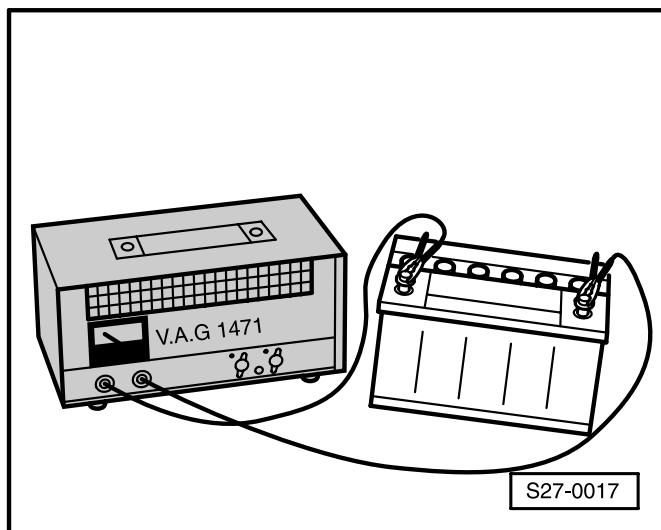
- A highly explosive gas mixture is produced when charging batteries.

### Checking electrolyte level

- Pour in distilled water only if the electrolyte level is below the „MIN“ marking.

#### Notes:

- ◆ *If the electrolyte level is above the „MAX“ marking, electrolyte may flow out of the battery during operation (extract excess electrolyte). If the electrolyte level is too low (below the „MIN“ marking) this will shorten the life of the battery, top up distilled water.*
- ◆ *Battery plugs must always be screwed in when charging battery, measuring voltage and measuring battery under load.*
- ◆ *After checking the electrolyte density, always screw in plugs with O-rings.*



## Measuring voltage under load

### Note:

Before disconnecting the battery, determine the code of a radio set fitted with anti-theft code.

- Disconnect earth strap of battery.
- ◀ - The voltage under load can be measured with a battery tester, e.g. V.A.G 1498.

The load current and the minimum voltage differs according to the capacity of the battery and is indicated on the sticker affixed to the tester or is shown in the table below.

Battery capacity	Cold test current	Load current	Minimum voltage (limit)
[Ah]	[A]	[A]	[V]
36	175	100	10.0
40-49	220	200	9.2
50-60	265-280	200	9.4
61-80	300-380	300	9.0
81-110	380-500	300	9.5

- If the voltage is less than the specified minimum voltage, replace battery.

Explanations regarding battery load test:

As a result of the high battery load during this test (a current flows), the battery voltage drops.

If the battery is faulty or has only a slight charge, the battery voltage will drop very rapidly below the specified minimum voltage.

After completing the test, this low voltage level is retained for a lengthy period. The voltage rises again only slowly.

If the voltage measured is below the minimum specified voltage during 5...10 seconds of a load test, the battery is discharged or faulty. Check the electrolyte density.

### Testing electrolyte density

- ◆ The electrolyte density, in combination with the voltage measurement (under load), provides accurate information regarding the charge state of a battery. Use a hydrometer for the test.
- ◆ The greater the density of the electrolyte extracted from the battery, the more the float rises. The electrolyte density can be read off on the scale as a specific weight (in kg/dm<sup>3</sup>).

The following measurements must be achieved:

Charge state in moderate climatic zones	Specific density in (kg/dm <sup>3</sup> )
discharged	1.15
half charged	1.22
well charged	1.28

Charge state in tropical climatic zones	Specific density in (kg/dm <sup>3</sup> )
discharged	1.08
half charged	1.16
well charged	1.23

**Battery care:**

Batteries which have not been used for a considerable time (e.g. in stock vehicles), discharge and in addition a sulphate coating may form on the plates. If such batteries are quick-charged with traditional chargers, they do not accept any charge current or the charger indicates too soon that they are "fully charged" as a result of so-called surface charging. The batteries are apparently faulty.

- Before considering such batteries as faulty, carry out the following check:
  - ◆ If the electrolyte density in all the cells does not differ by more than  $0.04 \text{ kg/dm}^3$  (e.g. 1.15...1.11) from each other, the battery should be charged. After completing charging of the battery, test the battery by conducting a load test. The battery is faulty only if this test reveals that the test specifications are not met.
  - ◆ If the electrolyte density in one or two adjacent cells is significantly lower (e.g. five cells indicate 1.16 and one cell 1.08), the battery has a short circuit and is faulty.

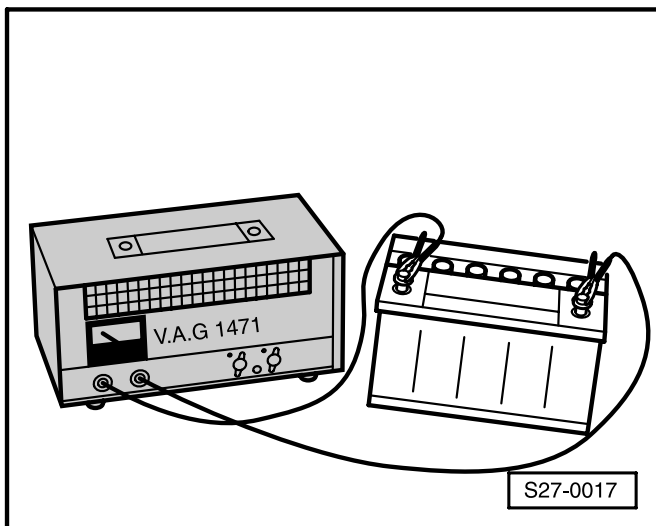
**Charging battery****Notes:**

- ◆ Do not enter areas in which batteries are being charged with a naked light or when smoking. Keep precision tools away from such areas.
- ◆ The battery should have a temperature of at least  $10 \text{ }^\circ\text{C}$  before being charged.

◀ The battery charger V.A.G 1471 can be used to standard-charge up to four 12V batteries and also batteries with different capacities (Ah = amperehours) and rated voltages. If the batteries being charged have different capacities and charge states, charging should be properly supervised.

**Note:**

It is essential to switch off the charger before connecting a battery.



- Always disconnect the battery earth strap/cable and the positive cable at the battery.
- Connect the positive terminal of the battery to the positive terminal of the charger, and the negative terminal of the battery to the negative terminal of the charger.
- Switch on charge current. The charge current varies according to the capacity of the battery. It should be about 10 % of the battery capacity, e.g. 45 Ah battery = 4.5 A with a max. charge voltage of  $U_{\max} = 14.4$  V.
- If the battery voltage has dropped below 11.6 V, the charging time will be about 24 hours.

### Quick-charging/jump-starting

- Quick-charging can be carried out with the battery tester and charger VW 1266 whereas the battery-starter charger V.A.G 1472 can also be used for jump-starting.

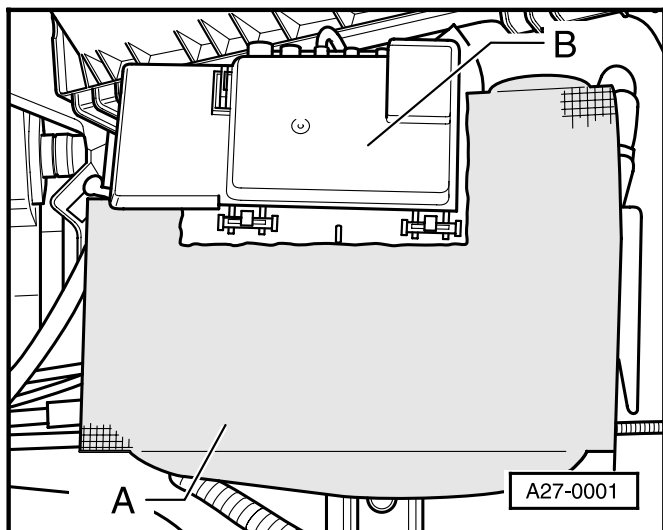
#### Note:

- ◆ Batteries should be quick-charged only in exceptional cases.
- ◆ Batteries are damaged as a result of quick-charging.

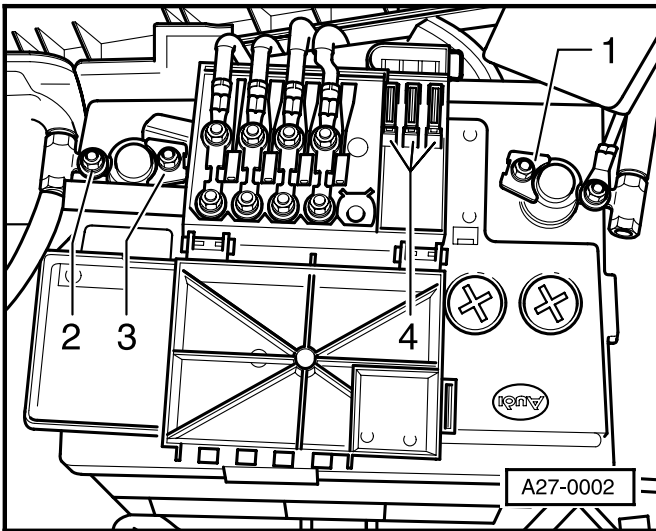
### Removing and installing battery

#### Removing:

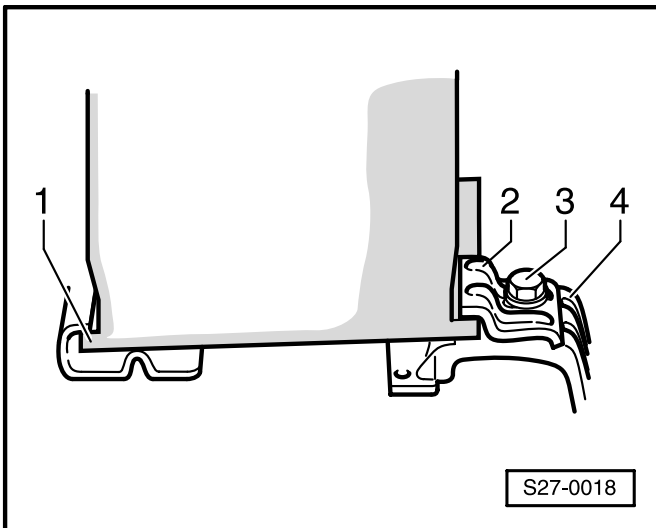
- ◀ - Remove battery protective cover -A- (Velcro fastener).
- Open main fuse box -B- to the front.







- ◀ - Disconnect battery earth strap at the battery negative terminal by slackening the hexagon nut -1-.
- Unscrew hexagon nut -2- and take off the main fuse box.
- Disconnect battery positive cable by slackening the hexagon nut -3-.



- ◀ - Unscrew the hexagon bolt -3- and take off the securing plate -2-.
- Pull the battery out of the clamping strip -1- and lift it up and out of the engine compartment.

#### Installing:

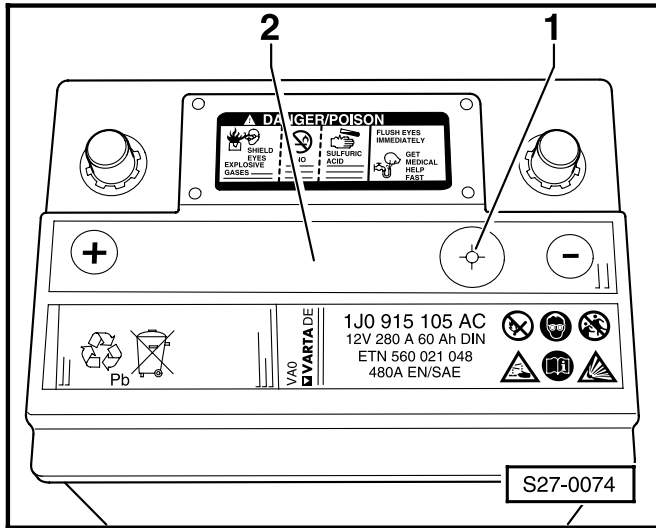
- Carry out installation in the same way in the reverse order.
- Tighten the hexagon bolt -3- to 20 Nm at the securing bracket -4-.

#### Notes:

- ◆ *The battery terminals must no longer be greased.*
- ◆ *The tightening torque for the battery terminals is 6 Nm.*
- ◆ *If the battery is not properly attached, this can result in damage to the grid plates of the battery.*

After installing the battery:

- On a car fitted with a coded radio, enter the anti-theft coding.
  - Adjust the clock to the correct time.
  - On models with power windows, perform initialising.
- ⇒ Inspection and Maintenance



## Battery with magic eye

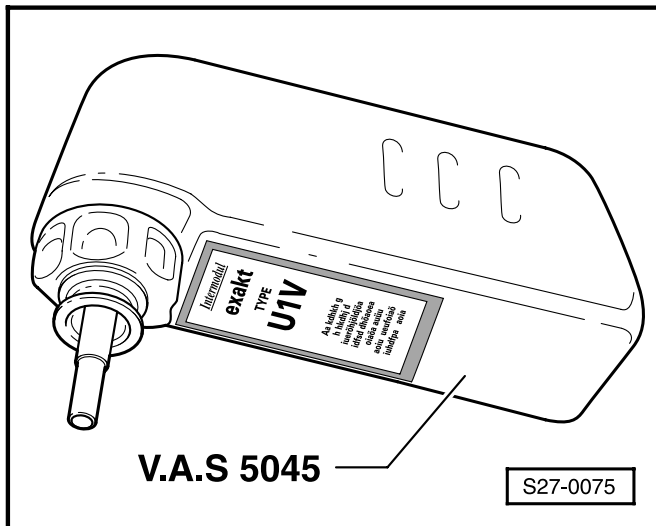
### Identification characteristics

- ◆ The magic eye -item 1- provides information on the electrolyte level and on the charge state of the battery.
- ◆ The magic eye may have three different colours:

green - battery inadequately charged

black - battery is discharged

colourless or yellow - critical electrolyte level, top up distilled water ⇒ page 27-5.1



## Replenishing electrolyte level

### Special tools, testers and aids required

- ◆ Filler bottle V.A.S 5045

### Notes:

- ◆ The neck of the filler bottle V.A.S 5045 prevents the battery being overfilled when topping up with distilled water.
- ◆ Observe safety precautions when working on the battery ⇒ page 27-1.

- Pull protective sheet -item 2- off the battery.
- Unscrew plug.
- Fill filler bottle V.A.S 5045 with distilled water.
- Top up battery using filler bottle V.A.S 5045.
- Screw in plug.
- Stick on protective sheet -item 2-.



## Removing and installing alternator

### **Important!**

**Disconnect battery earth strap before carrying work on the electrical system.**

### Models with petrol engine

#### Removing:

##### **Note:**

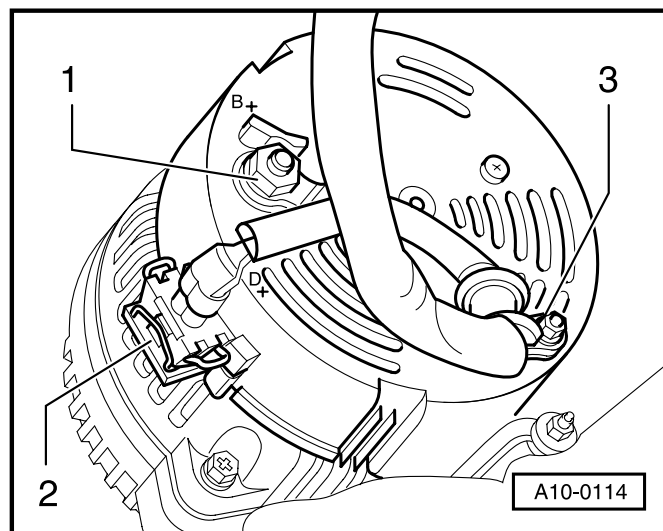
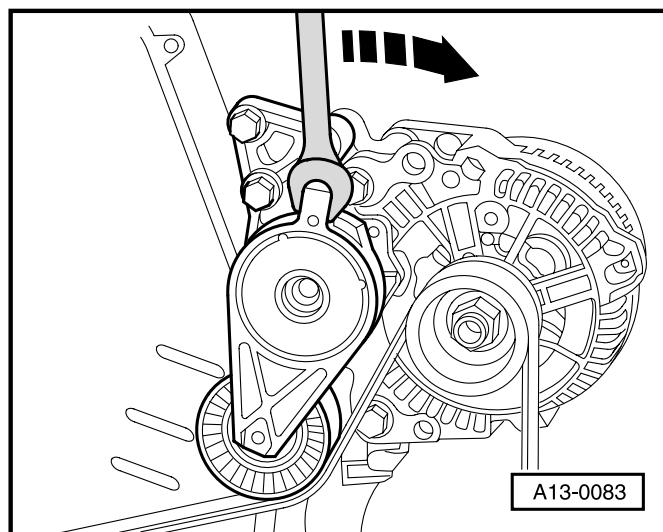
Before disconnecting the battery, check whether radio set is provided with anti-theft code and determine code.

- First of all disconnect battery earth strap at the negative terminal of the battery.

##### **Note:**

Before removing the ribbed V-belt, mark the direction of running for reinstalling.

- ◀ Swivel tensioning pulley in direction of arrow for slackening the ribbed V-belt.
- Take off ribbed V-belt.



- ◀ Unbolt the cable -1- (B+) and unplug the connector -2-.
- Unscrew cable clip -3- (is provided only for attaching the cable).
- Remove the bolts attaching the alternator.

#### Installing:

##### **Note:**

Knock back the threaded bushes for the bolts for attaching the generator about 1 mm before reinstalling.

- Please carry out installation in the reverse order.
- After installing, carry out the anti-theft coding as stated in the operating instructions for the radio.