

List of Supplements for **OCTAVIA** Workshop Manual

Edition: 08.00

1.6-ltr./74 kW Engine, Simos 2 Fuel Injection and Ignition System

Replaces List of Supplements - Edition: 12.99

| Supplement | Edition | Subject | Article Number |
|------------|---------|--|----------------|
| | 08.96 | Basic Edition of Workshop Manual | S00.5108.50.20 |
| 1 | 05.97 | Supplement to Basic Edition | S00.5108.51.20 |
| 2 | 12.99 | Modifications to Repair Groups 01, 24 and 28 | S00.5108.52.20 |
| 3 | 08.00 | Modifications to Repair Groups 01 and 24 | S00.5108.53.20 |
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Contents ⇒ next page.

Available functions

| Function | Requirement | |
|---------------------------------------|---------------------------------|---------------|
| | Engine not running, ignition on | Engine idling |
| 01 Interrogating control unit version | yes | yes |
| 02 Interrogating fault memory | yes ¹⁾ | yes |
| 03 Final control diagnosis | yes | no |
| 04 Initiating basic setting | yes ²⁾ | no |
| 05 Erasing fault memory | yes | yes |
| 06 Ending output | yes | yes |
| 07 Coding control unit | yes | no |
| 08 Reading measured value block | yes | yes |

- 1) Only if engine does not start (starter is operated for at least 6 seconds).
- 2) Must be carried out after the following operations:
Replacing engine control unit (J220), throttle valve control unit (J338) or engine.

Connecting vehicle system tester V.A.G 1552 and selecting engine electronics control unit

Special tools, testers and aids required

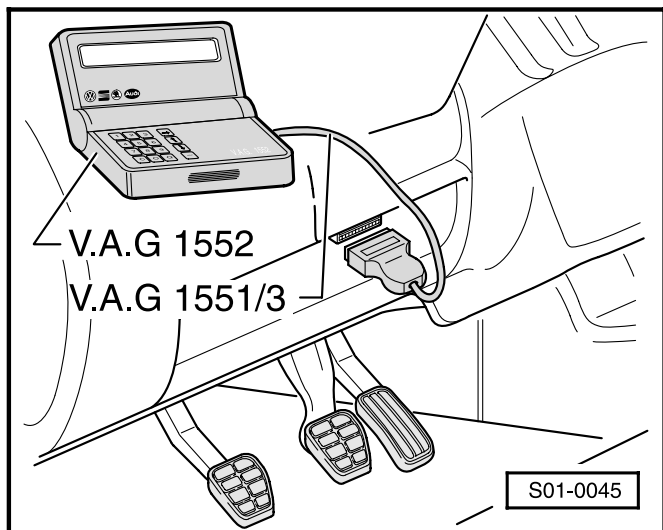
- ◆ Vehicle system tester V.A.G 1552 with cable V.A.G 1551/3

Test conditions

- Battery voltage at least 11 V
- Earth connections at engine and gearbox o.k.
- Fuses according to current flow diagram o.k.

Procedure

- ◀ - Connect the vehicle system tester V.A.G 1552 with cable V.A.G 1551/3.



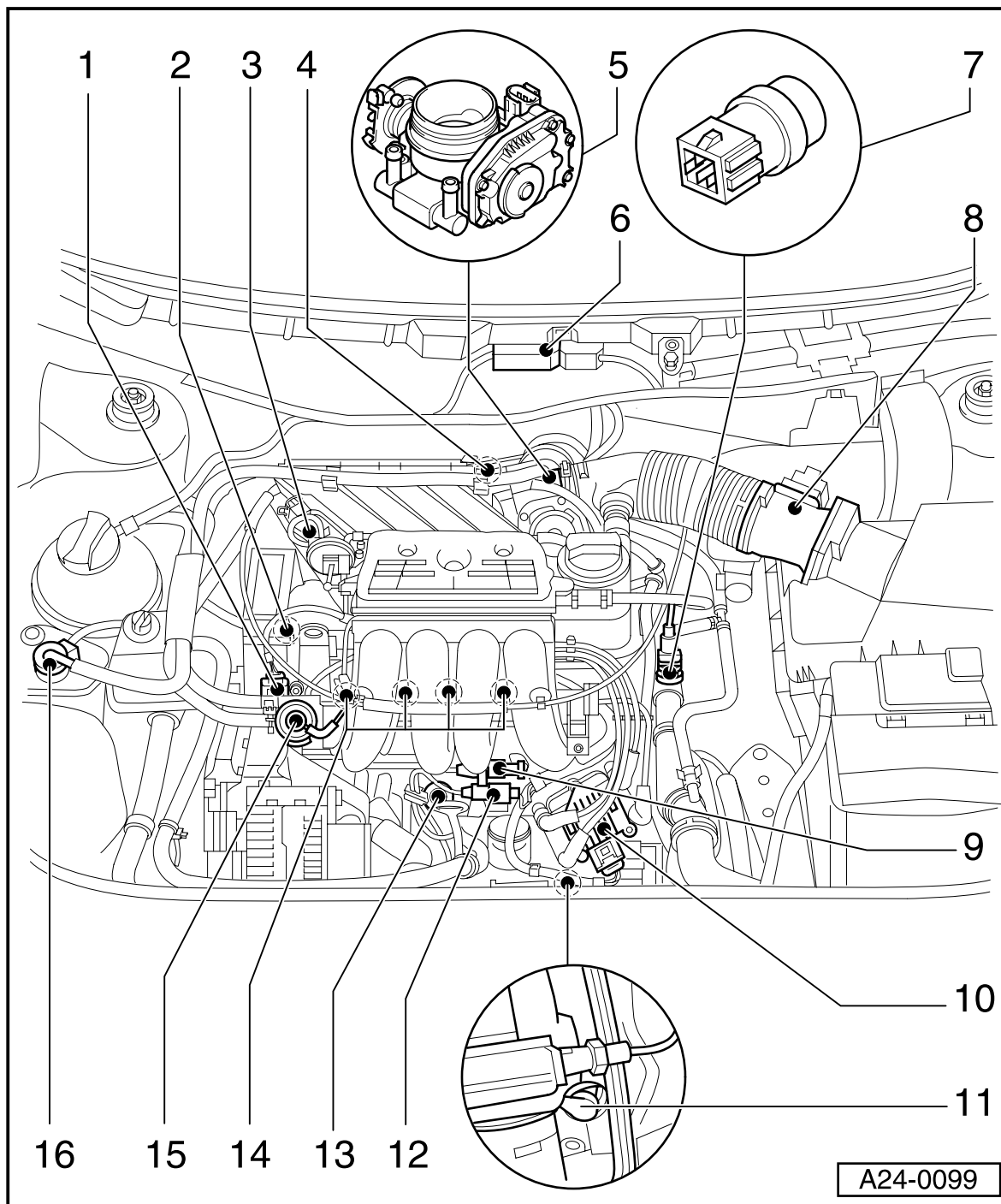
| Readout on V.A.G 1552 | Possible cause of fault | Possible effects | Rectifying fault |
|--|---|--|--|
| Models 08.97 > | | | |
| 01315 Gearbox control unit no communication | ◆ Fault in datalines to gearbox control unit | ◆ Poor driving characteristic (jerky gearshifts, load change jolts) | - Test drive databus ⇒ page 24-84. |
| Models 08.97 > | | | |
| 01316 Brake control unit no communication | ◆ Fault in datalines to ABS control unit | ◆ No driving dynamic control | - Test drive databus ⇒ page 24-84. |
| 01321 Airbag control unit -J234 no communication | ◆ Fault in datalines to airbag control unit | ◆ Fuel pump is not separated in accident in which airbag deployed | - Test databus ⇒ page 24-84. |
| 17978 Engine control unit inhibited | <ul style="list-style-type: none"> ◆ Attempt at manipulation ◆ Open circuit in wiring or short circuit to positive or to earth between engine control unit and immobiliser control unit ◆ Immobiliser control unit faulty ◆ Signal input in engine control unit faulty (control unit faulty) ◆ Attempt at starting with unauthorised ignition key ◆ Engine control unit not adapted to immobiliser control unit | ◆ Engine starts but immediately cuts out again | <ul style="list-style-type: none"> - Rectify open circuit in wiring or short circuit according to CFD. ⇒ Current Flow Diagrams, Fault Finding and Fitting Locations binder - Replace dash panel insert. - Replace engine control unit ⇒ page 24-15. - Adapt ignition keys. ⇒ Electrical System; Repair Group 96; Adaptation - Adapt engine control unit to immobiliser control unit ⇒ page 24-16. |
| 65535 Control unit defective | ◆ Fault within engine control unit | <ul style="list-style-type: none"> ◆ Poor driving characteristics ◆ Engine stops | - Replace engine control unit ⇒ page 24-15. |

Note on fault code 17978:

The immobiliser control unit is located in the dash panel insert and cannot be replaced separately.

Survey of fitting locations

Models ► 07.97



Parts A and B are not shown in the survey of fitting locations

A - Lambda probe -G39- with lambda probe heater -Z19-

- ◆ Immediately upstream of catalytic converter

B - 4-pin connector

- ◆ For lambda probe and lambda probe heater
- ◆ On right on underside of vehicle looking in direction of travel, below a plastic cap

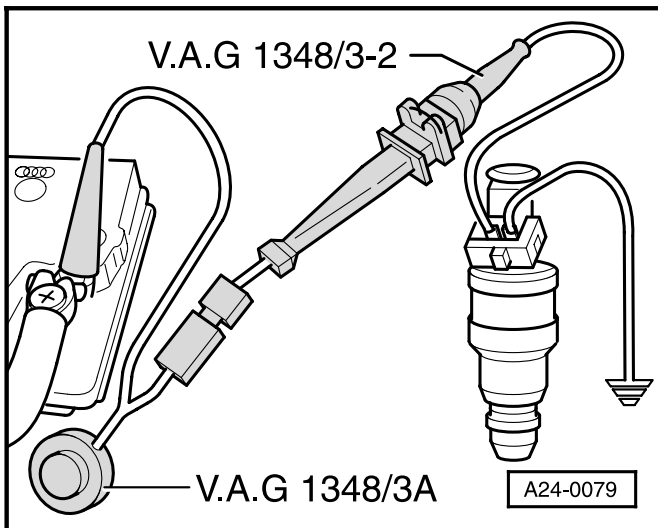
1 - 3-pin connector

- ◆ For Hall sender -G40-
- ◆ black

2 - Hall sender -G40-

- ◆ Below camshaft sprocket

- Unplug connector from intake manifold changeover valve and from Hall sender.
- Unplug spark plug connectors for cylinders two and three.
- Unbolt fuel rail from intake manifold and carefully detach it from the intake manifold together with the injectors.
- Unclip wiring loom from cable guide and remove.
- Carefully pull out fuel rail together with the injectors, fuel feed line and return-flow line as well as activated charcoal filter hose to the right below the intake manifold (away toward activated charcoal filter) and fit the fuel feed line and return-flow line on again (blue marking).



- Insert injector to be tested into a measuring glass, e.g. V.A.G 1602.
- ◀ - Connect one contact of the injector to engine earth using test cable and crocodile clamp from the adapter cable set V.A.G 1594.
- Connect second contact of the injector to battery positive using remote control V.A.G 1348/3 A, adapter cable V.A.G 1348/3-2 and auxiliary cable.
- Initiate final control diagnosis and select activated charcoal filter solenoid valve -N80- ⇒ page 01-25. The fuel pump runs for about 50 s.
- Inspect injectors for leaks (visual inspection). When the fuel pump is running, only 1 to 2 drops may flow out at each injector (during 50 s).
- If the fuel loss is greater, switch off fuel pump (end final control diagnosis) and replace faulty injector.
- Once again initiate final control diagnosis and select activated charcoal filter solenoid valve -N80-.

Note:

Final control diagnosis cannot be initiated again until after the ignition has been switched off for a short time.

- If the irregularities occur before the lambda control is activated, the lambda control can then not be the cause of the fault.
- If the irregularities do not occur until after the lambda control is activated, test operation ⇒ page 24-44.

Note:

If the irregularities become less after the lambda control is activated, the cause of the fault (e.g. unmetered air, faulty injector etc.) is compensated when the lambda control intervenes. This can be recognised by reading the lambda learned values.

- Select function 08 „Read measured value block“ and display group 011.
- Compare the actual values (indicated by tester) with the specified values.

Testing operation of the lambda control

- Select function 08 „Read measured value block“ and display group 001 ⇒ page 01-34.

| | | | |
|-------------------------------|-------|-------|---------|
| Read measured value block 1 → | | | |
| 850 rpm | 90 °C | 0.80V | 0000010 |

◀ Readout in display:

Do not continue with the test until the coolant temperature shown in display zone 2 is at least 80 °C.

The signal voltage of the lambda probe is shown in display zone 3.

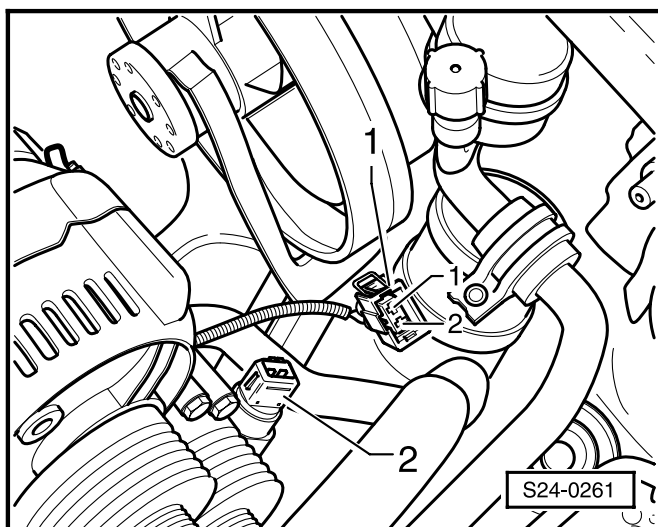
- If the probe voltage varies very slowly (less than 30 times a minute), test lambda probe heater ⇒ page 24-47.
- Press the → key.
- Select function 08 „Read measured value block“ and display group 099 ⇒ page 01-47.

| | | | |
|--------------------------------|-------|------|----------|
| Read measured value block 99 → | | | |
| 850 rpm | 90 °C | +25% | 0001011X |

◀ Readout in display:

The status of the lambda control is shown in display zone 4.

A „0“ or a „1“ may be displayed alternately at the points marked with „X“.



If the specification is not achieved:

- Connect test box V.A.G 1598/22 to the control unit wiring loom.
- ◀ - Unplug the 2-pin connector -1- from the power-assisted steering pressure switch (F88) -2-.
- Test the wiring between test box and 2-pin connector for open circuit as specified in the current flow diagram.
Cable resistance: max. 1.5 Ω

| Contact at 2-pin connector | Test box V.A.G 1598/22 |
|----------------------------|------------------------|
| 1 | 24 |
| 2 | 14 |

- In addition, test all the cables for short circuit to each other.

Specification: $\infty \Omega$

If no fault is found in the wiring:

- Connect the multimeter to the contacts of the pressure switch.
- Start the engine and run at idling speed. Test pressure switch for continuity.

Specification: $\infty \Omega$

- Turn the steering wheel to full lock. The pressure switch must switch to continuity.

If the specifications are not achieved:

- Replace the power-assisted steering pressure switch:
⇒ Running Gear; Repair Group 48; Steering

If the specifications are not achieved:

- Replace the engine control unit
⇒ page 24-15.

Fault table

Notes:

- ◆ The fault table is arranged in accordance with the 5-digit fault code which appears on the left.
Fault code 00282...17841 from page 01-15
Fault code 17842...18261 from page 01-34
- ◆ Explanations on fault types (e.g. open circuit or short to earth):
⇒ Operating instructions of vehicle system tester
- ◆ If components are shown as faulty:
First of all, test all the leads and plug connections to

these components as well as the earth cables of the system according to the current flow diagram. Replace the component only if these tests do not reveal any fault. This applies in particular to faults which are shown as sporadic (SP).

- ◆ When testing senders and other components of the fuel injection system, and when testing electric cables, proceed according to the appropriate current flow diagram ⇒ Current Flow Diagrams, Electrical Fault Finding, Fitting Locations.

Fault table of fault codes 00282...17841

| Readout on V.A.G 1552 | Rectifying fault |
|--|---|
| 00282 Throttle valve positioner -V60¹⁾ <hr/> implausible signal <hr/> control limit exceeded | - Test -V60 ⇒ page 24-15, Testing throttle valve control unit |
| 00515 Hall sender -G40 <hr/> short to earth <hr/> open/short to positive | - Test -G40 ⇒ page 28-3 |
| 00528 Altitude sender -F96 <hr/> signal too large <hr/> signal too small | - Test altitude sender -F96 ⇒ page 24-17 |
| 00532 Supply voltage <hr/> signal too large <hr/> signal too small | - Test supply voltage to engine control unit ⇒ page 24-18 |
| 00543 Maximum engine speed exceeded | - Rectify any mechanical damage |

1) Part of throttle valve control unit -J338.

Notes on fault code 00532:

- ◆ If the fault is displayed as a sporadic fault, ignore fault readout! This fault may be stored if the engine runs for a lengthy period at idling speed with a large number of electrical components switched on and the battery is severely discharged.
- ◆ Fault type „signal too small“ is displayed as soon as the supply voltage is less than 10.8 V for more than 1 second (the control unit does not operate at a voltage of less than 6.0 V).
- ◆ No test is made for „signal too small“ during engine start (the voltage may drop to 10 V during engine start).

Display group 012, fuel consumption:

| Read measured value block 12 → | | | | ◀ Readout in display | | |
|--------------------------------|--------|---------|----------|---|---------------|--------------|
| xxxx rpm | xx.x V | x.x l/h | xx °BTDC | ◀ Display fields | Specification | Analysis |
| 1 | 2 | 3 | 4 | Ignition angle ⇒ display group 001, display field 4 | 9...15° BTDC | ⇒ page 01-47 |
| | | | | Fuel consumption ⇒ display group 011, display field 4 | 0.5...1.5 l/h | ⇒ page 01-47 |
| | | | | Battery voltage ⇒ display group 003, display field 2 | 10...14.5 V | ⇒ page 01-47 |
| | | | | Engine speed (idling speed) | — | ⇒ page 01-53 |

Display group 013, knock control:

| Read measured value block 13 → | | | | ◀ Readout in display | | |
|--------------------------------|-------|-------|-------|---|---------------|----------|
| x °CA | x °CA | x °CA | x °CA | ◀ Display fields | Specification | Analysis |
| 1 | 2 | 3 | 4 | Ignition angle retardation of cylinder 4 by knock control | 0...9 °CA | — |
| | | | | Ignition angle retardation of cylinder 3 by knock control | 0...9 °CA | — |
| | | | | Ignition angle retardation of cylinder 2 by knock control | 0...9 °CA | — |
| | | | | Ignition angle retardation of cylinder 1 by knock control | 0...9 °CA | — |

Notes on display group 013:

- ◆ *The knock control is active from an engine load of 40 % or higher.*
- ◆ *If the engine load is greater than 40 %, the current ignition angle retardation values are displayed; if the engine load is less than 40 %, the values last used are displayed constantly.*
- ◆ *If knocking is audible without any detectable retardation of ignition angle, increase engine speed to more than 3500 rpm for 5 seconds in order to initiate knock sensor fault detection (diagnosis).*
- ◆ *If the ignition angle retardation value of one cylinder differs significantly from the others, the following faults are possible:*
 - loose ancillaries
 - corrosion at plug connection of knock sensor
 - engine damage (e.g. oil consumption because of faulty piston)
- ◆ *If the ignition timing point of all the cylinders is greatly retarded, the following faults are possible:*
 - corrosion at the plug connection of the knock sensor
 - knock sensor not tightened to correct torque (20 Nm)
 - open circuit in wiring
 - knock sensor faulty
 - loose ancillaries
 - poor quality fuel (less than 95 RON)

Display group 070, exhaust reduction - Diagnosis of activated charcoal filter system

Engine codes ARX and AUM

| | | | |
|---|--------|---|------|
| <ul style="list-style-type: none"> • Engine idling • Coolant temperature at least 80 °C • Control unit in function 04 „Initiate basic setting“ | | | |
| System in basic setting 70 → | | | |
| xx % | xx.x % | - | Text |
| 1 | 2 | 3 | 4 |
| ◀ Readout in display | | | |
| ◀ Display fields | | | |
| Result of diagnosis (Test ON/Test OFF/TVV o.k./TVV n.o.k. or Abort) | | | |
| TVV o.k. | | | |
| — | | | |
| Lambda controller variation with TVV diagnosis | | | |
| -7.0 %...7.0 % | | | |
| — | | | |
| On/off ratio of activated charcoal filter solenoid valve | | | |
| 0...100 % | | | |
| — | | | |

Note on display group 070:

- ◆ TVV means tank vent valve (activated charcoal filter solenoid valve). Diagnosis can be initiated only once each time engine is started.

Note on display field 2:

- ◆ During the diagnosis the readout must be less than -7.0 % or greater than 7.0 %.

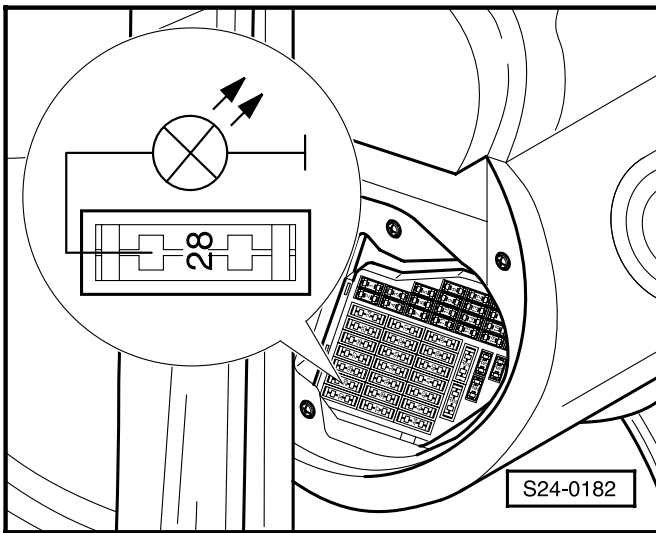
Display group 077, diagnosis of secondary air injection system

Engine codes ARX and AUM

| | | | |
|---|---------|--------|------|
| <ul style="list-style-type: none"> • Engine idling • Control unit in function 04 „Initiate basic setting“ | | | |
| System in basic setting 77 → | | | |
| xxxx rpm | x.x g/s | xx.x % | Text |
| 1 | 2 | 3 | 4 |
| ◀ Readout in display | | | |
| ◀ Display fields | | | |
| Result of test: Test ON/Test OFF/Syst. o.k./Syst. n.o.k./Abort) | | | |
| Syst. o.k. | | | |
| — | | | |
| Air mass ratio, secondary air injection system | | | |
| ▶ 04.01 greater than -20.0 % | | | |
| 05.01 ▶ -100...100 % | | | |
| — | | | |
| Air mass | | | |
| ▶ 04.01 2.0...5.0 g/s | | | |
| 05.01 ▶ 1...10 g/s | | | |
| — | | | |
| Engine speed (idling speed) | | | |
| — ⇒ page 01-85 | | | |

Note on display field 4:

- ◆ If „Syst. n.o.k.“ appears in the display, interrogate fault memory ⇒ page 01-5.

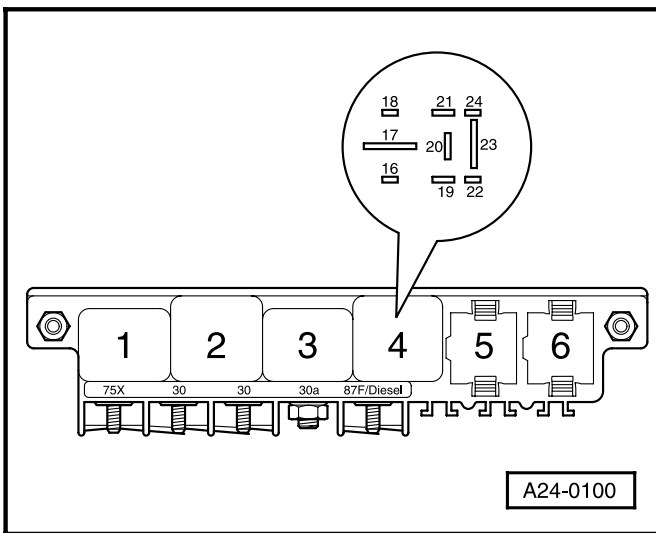


◀ - Take out fuse 28 at fuse holder and connect diode test lamp between earth and one of the two contacts of fuse 28.

- Briefly operate the starter.

The fuel pump relay must operate (can be felt and heard), the diode test lamp must come on.

- If the diode test lamp does not come on although the fuel pump relay operates, repeat the test at the other contact.



◀ - If the diode test lamp again does not come on, test cable connection between contact 23 at relay position 4 and fuse 28 for continuity and rectify any open circuit.

⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations binder

- If no open circuit is found, replace fuel pump relay.

- If the fuel pump relay does not operate, test actuation ⇒ page 24-53.

- If the voltage supply and the actuation are o.k., replace fuel pump relay.

B - Testing voltage supply and actuation of fuel pump relay

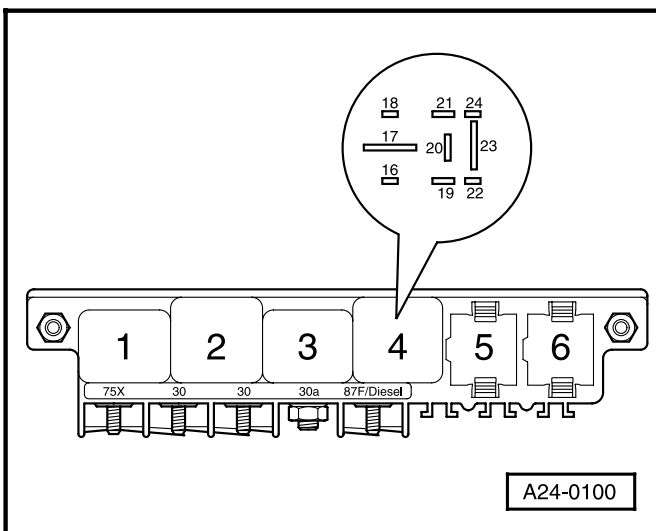
- Remove fuel pump relay J17 from the electrical centre, relay position 4.

Testing voltage supply

- Switch on the ignition.

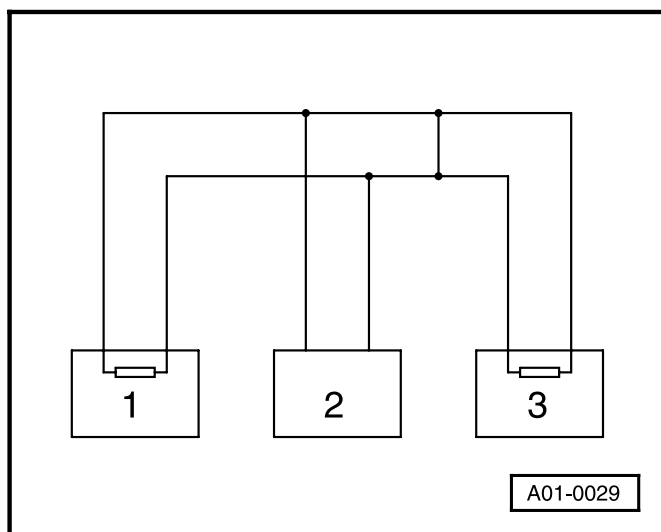
Warning!

Switch on the relevant measuring range and pay attention to the test conditions before connecting the test cables in order to avoid damaging the electronic components.



◀ - Connect the hand-held multimeter in turn to contacts 19 (positive) and earth as well as to 17 (positive) and earth of the relay base.

Specification in each case: approx. battery voltage



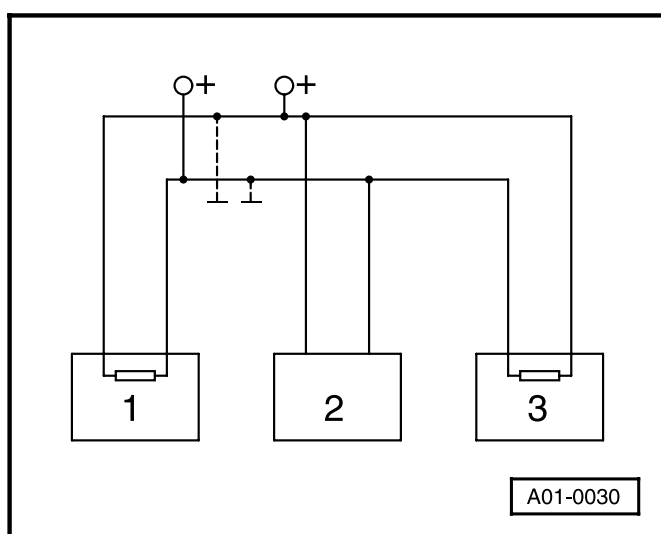
- Repair the operational faults by referring to the fault table in the appropriate workshop manuals.

If all the operational faults have been rectified and there is still a problem with communication of control units, it is then necessary to inspect the bus wires.

- Switch off the ignition.

- ◀ - Unplug the connectors of the control units linked by the bus wires and examine the bus wires to determine whether a short circuit is present.

⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations binder

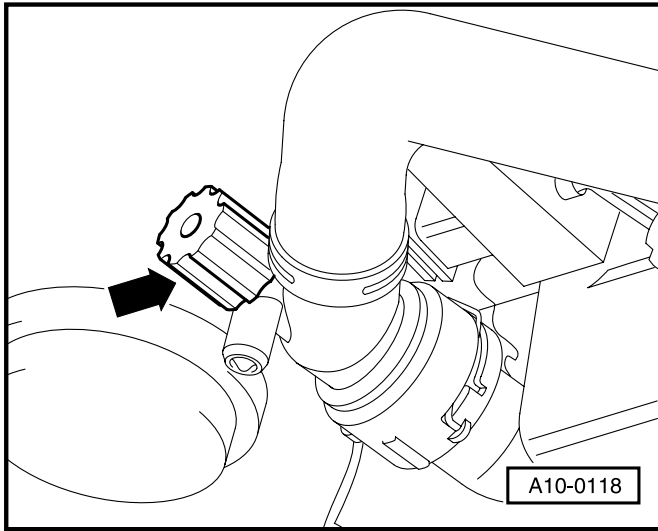


- ◀ - Examine the bus wires to determine whether there is a short circuit to positive or to earth.

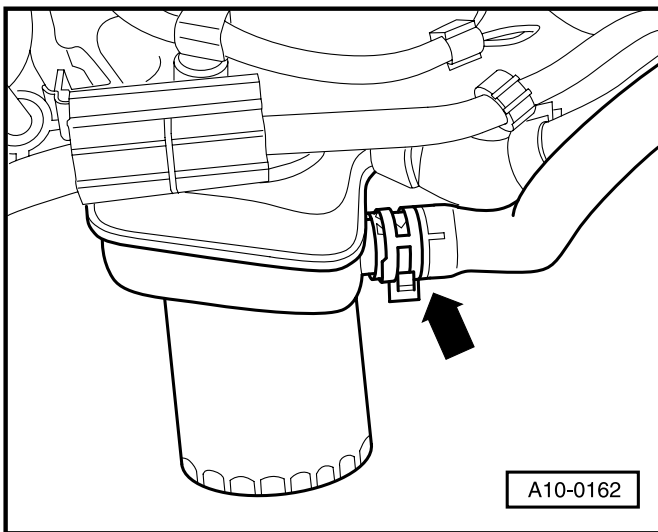
If it is not possible to determine any cause for the fault „Hardware defect” in the bus wires, examine the control units to determine whether one of these is responsible for this fault.

At this stage, plug connections of the control units which use the CAN bus for communication, are still disconnected. The ignition is switched off.

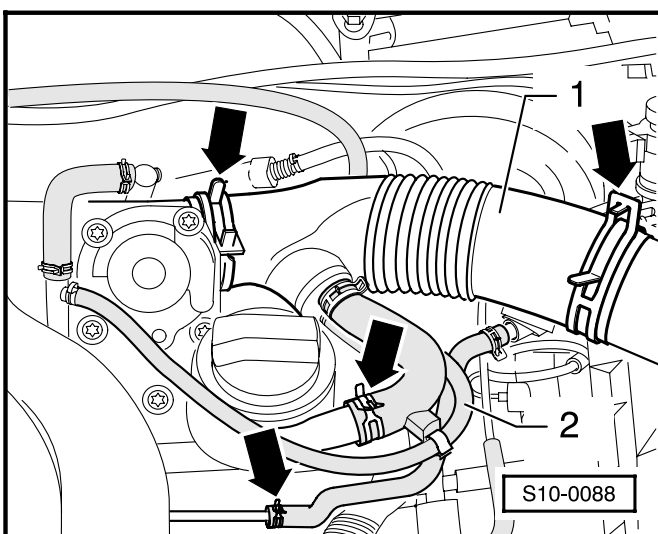
- Connect one of the control units.
- Connect fault reader V.A.G 1552.
- Switch on the ignition and erase the fault memory of the control unit you have just connected.
- Press keys 0 and 6 for the function „End output” and confirm the entry with the key Q.
- Switch off the ignition and on again.
- Leave the ignition switched on for 10 seconds. After this, read the fault memory of the control unit you have just connected with the fault reader V.A.G 1552.
- If the fault „Hardware defect” is present, replace the control unit you have just connected.
- If the fault „Hardware defect” is not present, connect the next control unit and repeat the test procedure.



- Place drip tray (e.g. V.A.G 1306) below the engine.
- Open the cap of the coolant expansion reservoir.
- ◀ - Turn drain plug -arrow- at the radiator to the left and pull it back; fit hose onto the connection, if necessary.



- ◀ - In addition, detach front coolant hose at oil cooler -arrow- and allow the remaining coolant to flow out.
- Remove air filter.
- Remove battery and battery rack.
- ⇒ Electrical System; Repair Group 27; Removing and installing battery



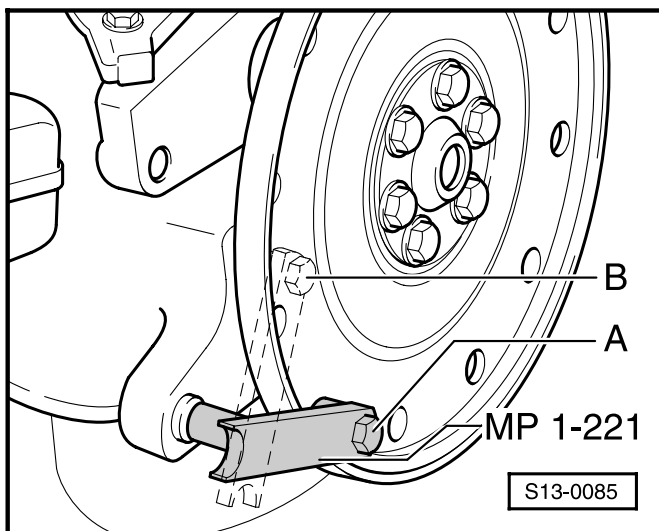
- Remove the top part of the intake manifold as follows:
 - ◀ - Detach intake hose -1- (arrows). Vent hose -2- remains connected.
 - Remove throttle cable and unplug connector from the throttle valve control unit -J338-.
 - Separate coolant hoses to throttle valve control unit (straight connection at quick-coupling at heat exchanger).
 - Detach vacuum hose for fuel pressure regulator.
- Unscrew front bolts attaching top part and bottom part of intake manifold (tightening torque: 10 Nm).

Removing and installing drive plate

Special tools, testers and aids required

- ◆ Torque wrench
- ◆ Counterholder MP 1-221
- ◆ Depth gauge

Slackening and tightening drive plate

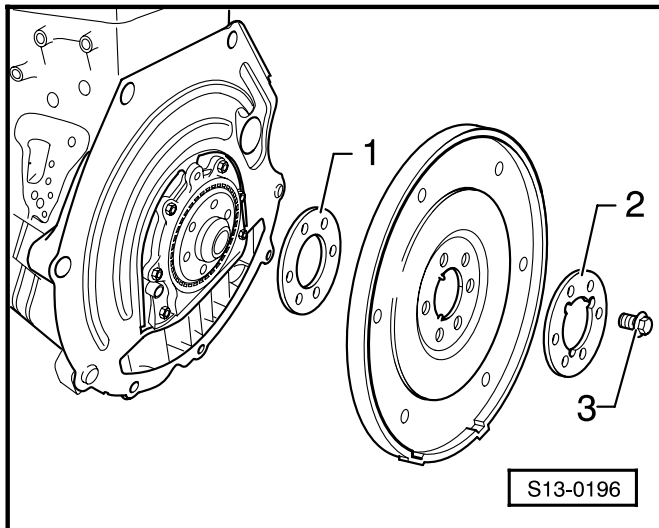


- ◀ - Attach counterholder MP 1-221 with hexagon screw M8x45 to the drive plate. Insert two M10 hexagon nuts between the counterholder and the drive plate.

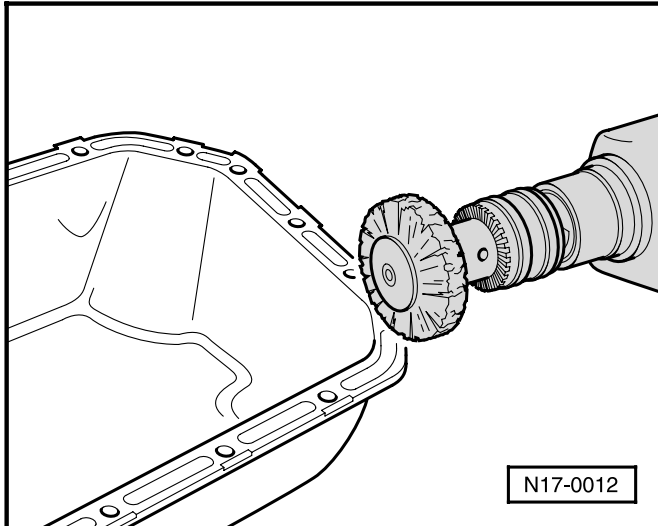
Fitting location of counterholder:

- ◆ A - for slackening
- ◆ B - for tightening

Installing drive plate



- ◀ - Insert the drive plate using the washer with recesses -2-.
- Insert at least 3 new bolts -3- and tighten to 30 Nm.

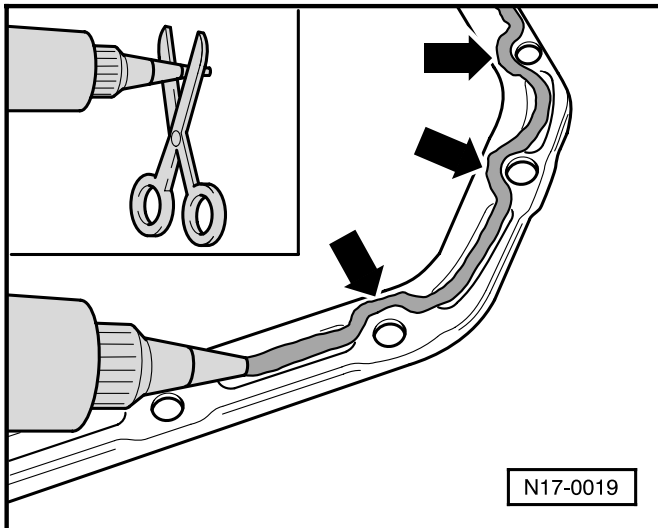


- Take off oil pan; detach with light blows with a rubber-headed hammer if necessary.
- Use a flat scraper to remove sealant residues at the cylinder block.
- ◀ - Use a rotating plastic brush to remove sealant residues on the oil pan (wear eye protection).
- Clean sealing surfaces; they must be free of oil and grease.

Installing

Notes:

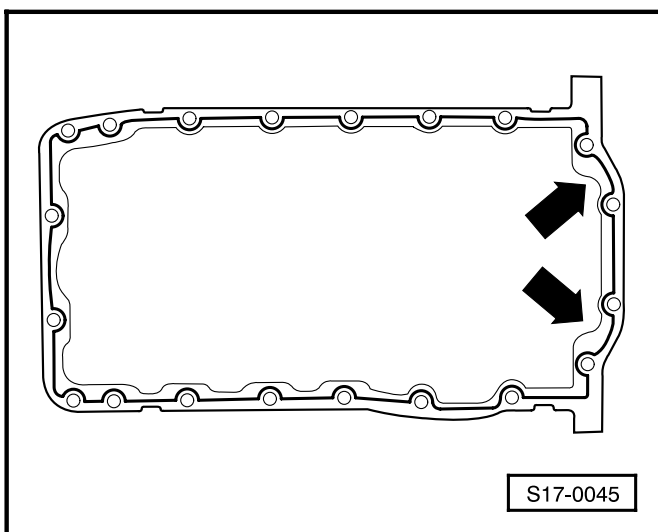
- ◆ The oil pan must be installed within 5 minutes after applying the silicone sealant.
- ◆ Use wrench socket 3249 to feed in the oil pan bolts of the flywheel side and tighten fully with hinged wrench 3185.
- ◆ A second person is required for installing the oil pan.



- ◀ - Cut off tip of tube of silicone sealant "D 176 404 A2" at the front marking (\varnothing of nozzle approx. 3 mm).
 - ◆ Thickness of sealant bead: 2 ... 3 mm
 - ◆ Run past the area of the bolt holes on the inside -arrows-.

Note:

The sealant bead must not be thicker than 3 mm otherwise excess sealant may get into the oil pan and block the strainer in the oil suction pipe.



- ◀ - Apply silicone sealant to the clean sealing surface of the oil pan, as shown in the illustration.

Note:

Apply sealant bead with particular care in the area of the sealing flange at the rear -arrows-.