

## Workshop Manual Audi A8 2003 ➤

Fuel supply system, diesel engines							
Engine ID	ASB	ASE	BNG	BVN	BMC		

Edition 12.2013



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## List of Workshop Manual Repair Groups

### Repair Group

00 - Technical data

20 - Fuel supply system



# Audi

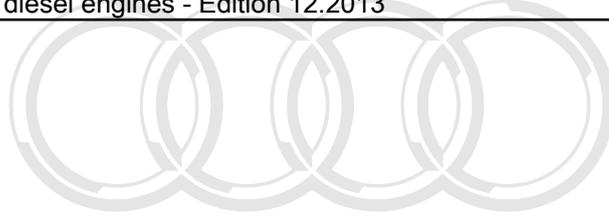
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Technical information should always be available to the foremen and mechanics, because their careful and constant adherence to the instructions is essential to ensure vehicle road-worthiness and safety. In addition, the normal basic safety precautions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

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## 00 – Technical data

### 1 Safety precautions

(ARL003638; Edition 12.2013)

⇒ [“1.1 Safety precautions when working on the fuel system”, page 1](#)

⇒ [“1.2 Safety precautions when using testers and measuring instruments during a road test”, page 2](#)

#### 1.1 Safety precautions when working on the fuel system

When working on the fuel system note the following warnings:

	<b>WARNING</b>
<i>Risk of injury - fuel system operates under pressure.</i>	
<ul style="list-style-type: none"> <li>◆ <i>Wrap a cloth around the connection before opening the fuel system. Then release pressure by carefully loosening the connection.</i></li> <li>◆ <i>Wear protective gloves.</i></li> <li>◆ <i>Wear safety goggles.</i></li> </ul>	
<i>The fuel can become extremely hot. This can cause injuries.</i>	
<ul style="list-style-type: none"> <li>◆ <i>In extreme cases the temperature of the fuel lines and the fuel can be up to 100 °C after the engine is switched off. Allow the fuel to cool down before disconnecting the lines - danger of scalding.</i></li> <li>◆ <i>Wear protective gloves.</i></li> <li>◆ <i>Wear safety goggles.</i></li> </ul>	
<i>Health risk: avoid skin contact with fuel.</i>	
<ul style="list-style-type: none"> <li>◆ <i>Avoid skin contact with fuel. Wear fuel-resistant gloves.</i></li> </ul>	

Perform the following steps before starting work on the fuel system:

- ◆ Fuel tank must not be full. The amount of fuel which can be left in the fuel tank is indicated in the corresponding procedure description. Drain fuel tank if necessary ⇒ [page 7](#) .
- ◆ Before commencing work, switch on exhaust extraction system and place an extraction hose close to the opening in the fuel tank to extract escaping petrol fumes.
- ◆ If no exhaust extraction system is available, a radial fan with a displacement of at least 15 m<sup>3</sup>/h can be used (the fan motor must be clear of the air stream).

	<b>WARNING</b>
<i>Risk of accident caused by weight of fuel tank</i>	
<ul style="list-style-type: none"> <li>◆ <i>Fuel tank must be empty when installing and removing to reduce weight. Drain fuel tank if necessary ⇒ <a href="#">page 7</a> .</i></li> </ul>	

**Observe the following points to prevent personal injuries and damage to the injection and glow plug system:**

- ◆ Persons wearing a cardiac pacemaker must at all times maintain a safe distance from high-voltage components such as injectors and gas-discharge headlights.
- ◆ Always switch off the ignition before connecting or disconnecting tester cables or electrical wiring for the injection or glow plug system.
- ◆ Do not open any fuel line connections while the engine is running.
- ◆ Always switch off ignition before washing engine.
- ◆ When installing, note colour coding of plug-in connectors.
- ◆ Plug-in connectors should engage audibly when connecting.
- ◆ Pull plug-in connectors to check that they are correctly engaged.
- ◆ Erase any entries in event memory resulting from testing or installation ⇒ Vehicle diagnostic tester, Guided Functions, then Interrogate event memory.

**Caution**

*To prevent irreparable damage to the electronic components when disconnecting the battery:*

- ◆ *Observe notes on procedure for disconnecting the battery.*
- ◆ *Always switch off the ignition before disconnecting the battery ⇒ **Electrical system; Rep. gr. 27.***

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## 1.2 Safety precautions when using testers and measuring instruments during a road test

Note the following if testers and measuring instruments have to be used during a road test:

**WARNING**

*Accidents can be caused if the driver is distracted by test equipment while road-testing, or if test equipment is not properly secured.*

*Persons sitting in the front passenger's seat could be injured if the airbag is triggered in an accident.*

- *The use of test equipment while driving causes distraction.*
- *There is an increased risk of injury if test equipment is not secured.*
- ◆ *Test equipment must always be secured on the rear seat with a strap and operated from the rear seat by a second person.*

## 2 Repair instructions

⇒ [“2.1 Rules for cleanliness”, page 3](#)

⇒ [“2.2 Test conditions”, page 3](#)

⇒ [“2.3 Contact corrosion”, page 3](#)

⇒ [“2.4 Routing and attachment of pipes, hoses and wiring”, page 4](#)

### 2.1 Rules for cleanliness

Even small amounts of dirt can cause malfunctions. When working on the fuel supply system and injection system, pay careful attention to the following basic rules:

- ◆ Carefully clean connection points and the surrounding area with engine cleaner or brake cleaner and dry thoroughly before opening.
- ◆ Immediately seal open lines and connections with clean plugs, for example from engine bung set - VAS 6122- .
- ◆ Place parts that have been removed on a clean surface and cover them over. Use only lint-free cloths.
- ◆ Carefully cover or seal open components if repairs cannot be carried out immediately.
- ◆ Only install clean components; replacement parts should only be unpacked immediately prior to installation. Do not use parts that have not been stored in their packing (e.g. in tool boxes etc.).
- ◆ When the system is open, do not work with compressed air and do not move the vehicle.
- ◆ Protect unplugged electrical connectors against dirt and moisture and make sure connections are dry when attaching.
- ◆ Make sure that no diesel fuel comes into contact with other components in the engine compartment. If necessary, clean immediately.

### 2.2 Test conditions

- Battery in standby mode ("Stützbetrieb") ⇒ Electrical system; Rep. gr. 27 .
- Fuses for fuel pump/ fuel pump relay - J17- / fuel pump control unit - J538- OK ⇒ Current flow diagrams, Electrical fault finding and Fitting locations. Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability for errors in this document. Copyright by AUDI AG.
- Fuel pump relay - J17- OK ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Fuel pump control unit - J538- OK; checking in Guided Fault Finding ⇒ Vehicle diagnostic tester.
- Fuel tank at least  $\frac{1}{4}$  full.
- Fuel filter OK.
- Fuel lines OK (not obstructed or crushed).
- Ignition off.

### 2.3 Contact corrosion

Contact corrosion can occur if unsuitable fasteners are used (e.g. bolts, nuts, washers, etc.).



For this reason, only fasteners with a special surface coating are used.

Additionally, all rubber and plastic parts and all adhesives are made of non-conductive materials.

Always install new parts if you are not sure whether used parts can be re-fitted ⇒ Electronic parts catalogue .

**Note the following:**

- ◆ We recommend using only genuine replacement parts; these have been tested and are compatible with aluminium.
- ◆ We recommend the use of Audi accessories.
- ◆ Damage caused by contact corrosion is not covered under warranty.

## 2.4 Routing and attachment of pipes, hoses and wiring



**Caution**

*Risk of damage to pipes/hoses/wiring.*

- ◆ *The original routing must be restored when installing any kind of pipes/hoses/wiring.*
- ◆ *Due to the restricted space in the engine compartment, it is important to ensure sufficient clearance from all moving or hot components.*



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## 20 – Fuel supply system

### 1 Fuel supply system

⇒ [“1.1 Fuel tank with components - exploded view”, page 5](#)

⇒ [“1.2 Draining fuel tank”, page 7](#)

⇒ [“1.3 Removing and installing fuel tank with attached components”, page 10](#)

⇒ [“1.4 Routing of pipes/hoses \(inside fuel tank\) - overview”, page 16](#)

⇒ [“1.5 Fuel delivery unit \(left-side\) with fuel system pressurisation pump G6 ; fuel gauge sender G and fuel gauge sender 3 G237 - exploded view of components”, page 17](#)

⇒ [“1.6 Removing and installing fuel delivery unit \(left-side\) with fuel system pressurisation pump G6 ”, page 18](#)

⇒ [“1.7 Fuel delivery unit \(right-side\) with fuel pump G23 ; fuel gauge sender 2 G169 and fuel gauge sender 4 G393 - exploded view of components”, page 27](#)

⇒ [“1.8 Removing and installing fuel delivery unit \(right-side\) with fuel pump G23 ”, page 29](#)

⇒ [“1.9 Checking fuel pump delivery rate”, page 38](#)

⇒ [“1.10 Suction-jet pumps: operation”, page 40](#)

⇒ [“1.11 Removing and installing suction-jet pump \(left-side\)”, page 41](#)

⇒ [“1.12 Removing and installing suction-jet pump \(right-side\)”, page 43](#)

#### 1.1 Fuel tank with components - exploded view



**1 - Securing strap**

- With spacer, installation position => [page 7](#)

**2 - 22 Nm**

**3 - Fuel supply line**

- To fuel filter
- Mark before removing
- Clip onto fuel tank

**4 - Fuel return line**

- From fuel cooler
- Mark before removing
- Clip onto fuel tank

**5 - Supply line**

- To auxiliary heater

**6 - Earth connection**

- To eliminate electrostatic charge
- Installation position / test procedure => [page 7](#)
- Make sure that connector is securely fitted
- After installation, use an ohmmeter to check the electrical connection between the fuel filler neck and a bare metal part on the body. Specification: approx. 0 Ω

**7 - Filler cap**

**8 - Seal**

- Renew if damaged

**9 - 22 Nm**

**10 - Fuel tank**

- Removing and installing => [page 10](#)

**11 - Bush**

**12 - Fuel tank bracket**

**13 - 22 Nm**

**14 - Rubber buffer**

**15 - Washer**

**16 - 22 Nm**

**17 - 22 Nm**

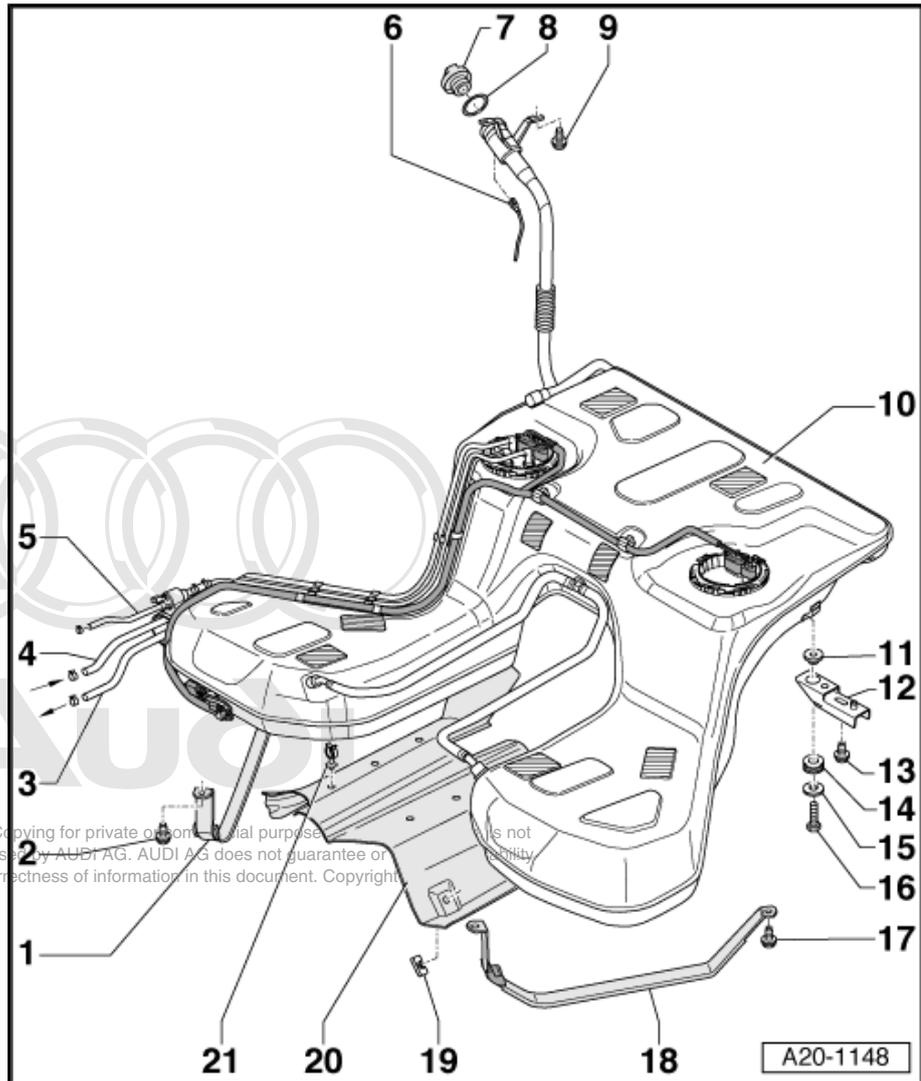
**18 - Securing strap**

- With spacer, installation position => [page 7](#)

**19 - Retaining clip for heat shield**

**20 - Heat shield**

**21 - Retaining clip for heat shield**



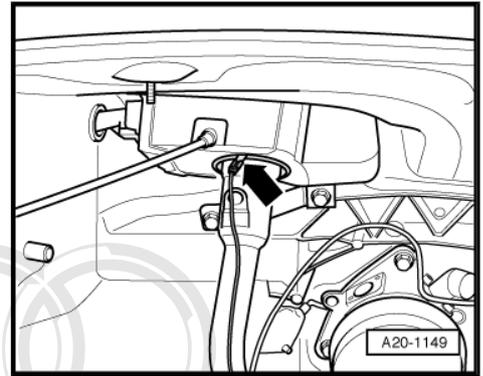
### Installation position of earth connection

- Route earth connection as shown in illustration.
- Ensure that connector for earth connection is securely fitted on metal ring on fuel filler neck -arrow-.

**Caution**

*After installation, use an ohmmeter to check the electrical connection between the metal ring on the fuel filler neck and a bare metal part on the body:*

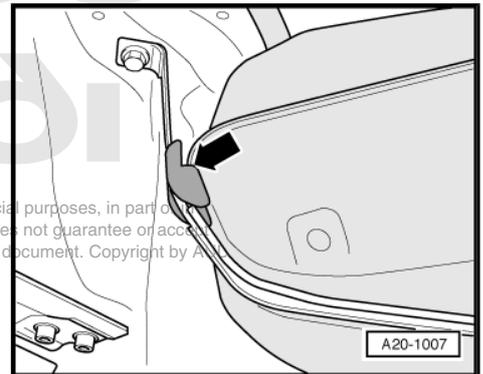
- *Specification: approx. 0 Ω.*



### Installation position of spacers

- Make sure that the securing strap spacers are located directly under seam of fuel tank -arrow-.

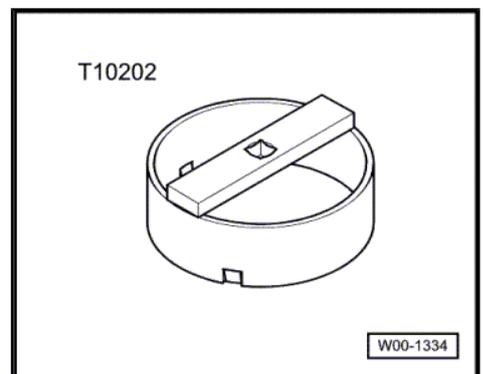
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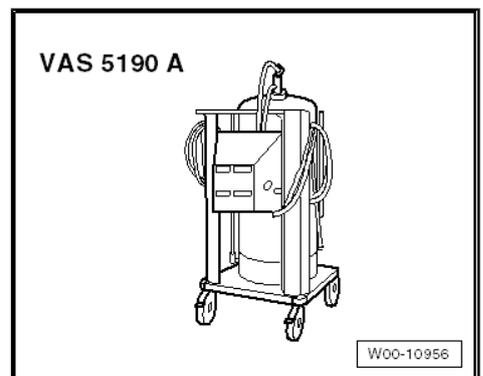
## 1.2 Draining fuel tank

### Special tools and workshop equipment required

- ◆ Wrench - T10202-



- ◆ Fuel extractor - VAS 5190A-



### Procedure

Observe safety precautions ⇒ [page 1](#) .

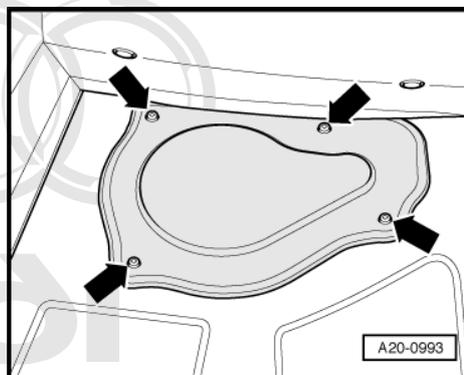
Observe rules for cleanliness => [page 3](#) .



**WARNING**

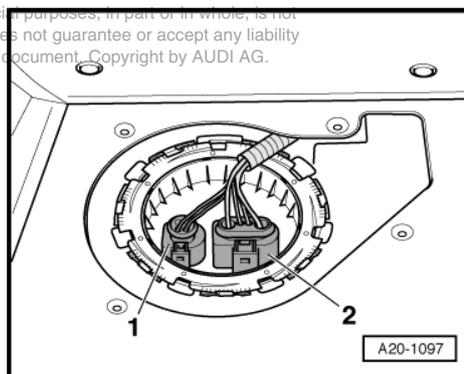
*Switch off ignition and remove ignition key to stop ignition being switched on inadvertently whilst working.*

- Remove luggage compartment floor lining.
- Detach cover for flange (left-side) -arrows-.

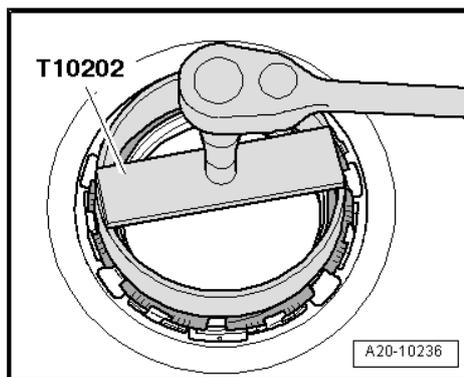


- Unplug electrical connectors -1- and -2- at flange.

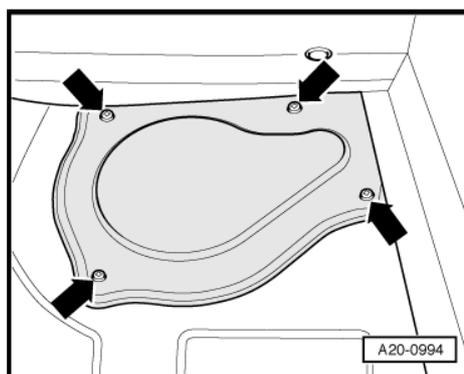
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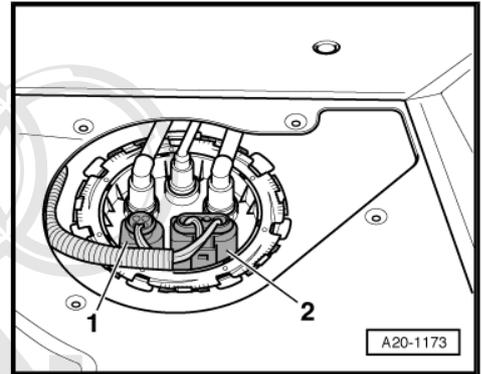
- Unscrew locking ring using wrench - T10202- .



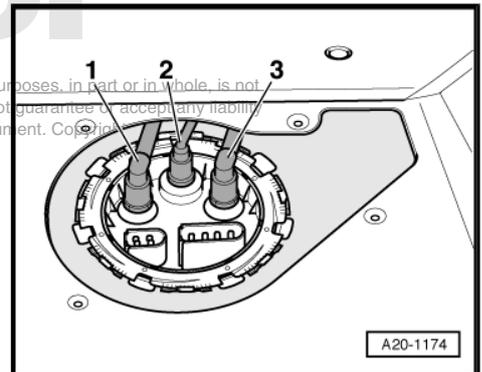
- Unscrew cover for flange (right-side) -arrows-.



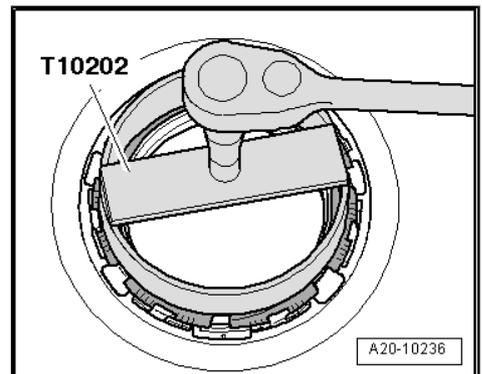
- Unplug electrical connectors -1- and -2- at flange.



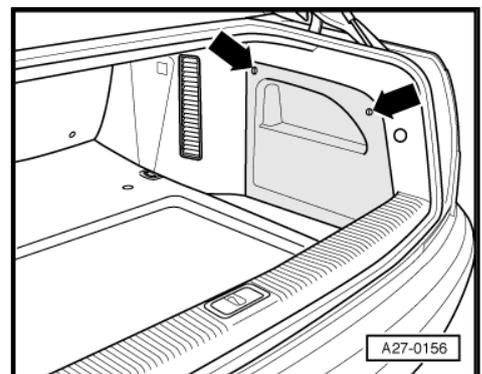
- Mark fuel return line -1- and fuel supply line -3-.
- Detach both lines from flange (press release tabs).
- In addition, disconnect fuel line -2- leading to metering pump for auxiliary heater (press release tab).



- Unscrew locking ring using wrench - T10202- .

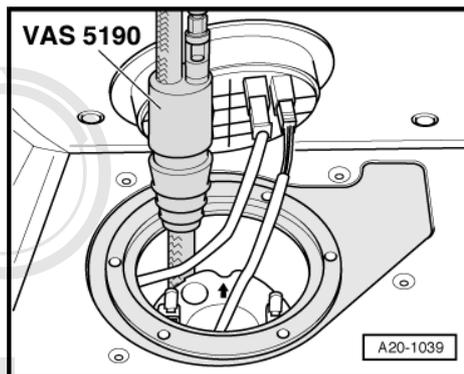


- Remove luggage compartment side trim cover (right-side) -arrows-.
- Connect earth wire of fuel extractor -VAS 5190A- to earth stud of energy management control unit - J644- .

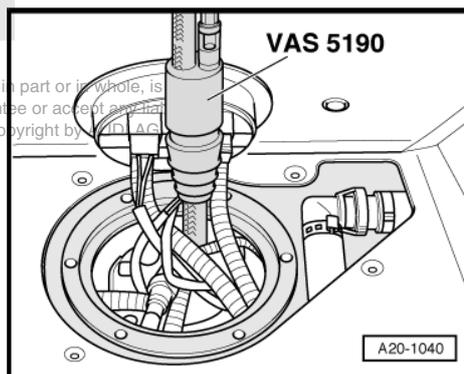




- Remove flange (left-side) and lay it aside with electrical wires connected.
- Remove seal.
- Extract fuel from left fuel tank chamber through fuel tank opening using fuel extractor - VAS 5190A- .



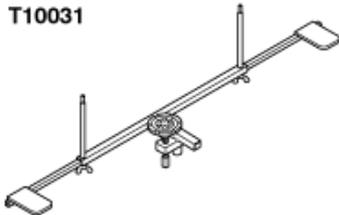
- Remove flange (right-side) and lay it aside with electrical wires and fuel lines connected.
- Remove seal.
- Extract fuel from right fuel tank chamber through fuel tank opening using fuel extractor unit - VAS 5190A- .
- Re-install flange: left-side => [page 53](#) , right-side => [page 59](#) .



### 1.3 Removing and installing fuel tank with attached components

**Special tools and workshop equipment required**

- ◆ Hose clip pliers - V.A.G 1275-
- ◆ Engine and gearbox jack - V.A.G 1383 A-
- ◆ Support - T10031-

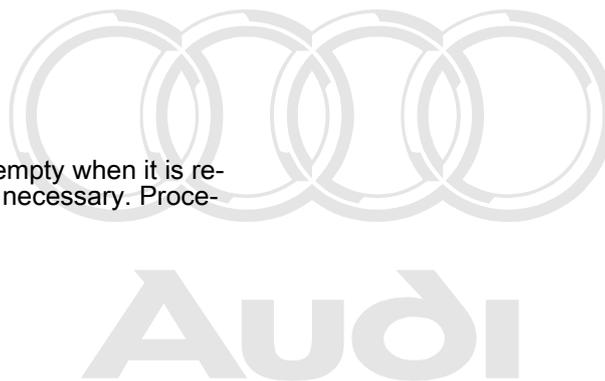
<p><b>V.A.G 1275</b></p> 	<p><b>V.A.G 1383 A</b></p> 
<p><b>T10031</b></p> 	
	<p style="text-align: right;"><b>G20-0046</b></p>

**Removing**

Observe safety precautions ⇒ [page 1](#) .

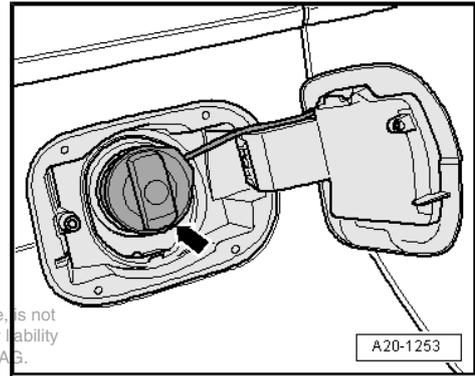
Observe rules for cleanliness ⇒ [page 3](#) .

- To reduce weight, the fuel tank must be empty when it is removed from the vehicle. Drain the tank if necessary. Procedure ⇒ [page 7](#)



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- Release the tank flap.
- Clean area around fuel filler neck.
- Remove filler cap -arrow- from fuel filler neck.
- Seal opening of fuel filler neck with a piece of clean foam or similar to prevent dirt from dropping into the tank.
- Remove rear right wheel housing liner => Rep. gr. 66 .

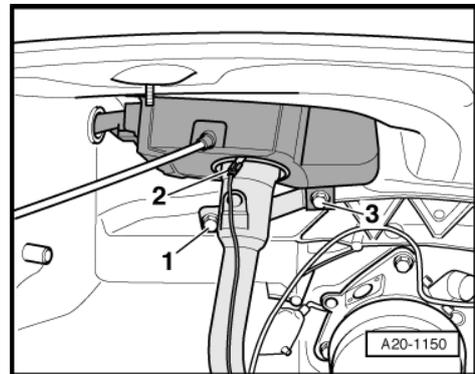


**WARNING**

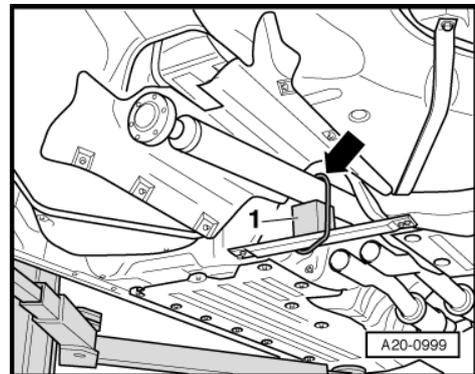
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**BEFORE loosening subframe bolts, take steps to ensure that vehicle does not tip forwards (e.g. put a weight of about 50 kg in luggage compartment).**

- Remove rear axle => Rep. gr. 42 .
- Disconnect earth wire -2- from fuel filler neck.
- Remove bolts -1- and -3- for fuel filler neck.



- Check that propshaft is secured to prevent it falling.
- The propshaft should be placed on a block of wood -1- and secured with wire or a cable tie -arrow-.
- The propshaft should be inclined slightly downwards to ensure there is sufficient space when installing the fuel tank.



**Note**

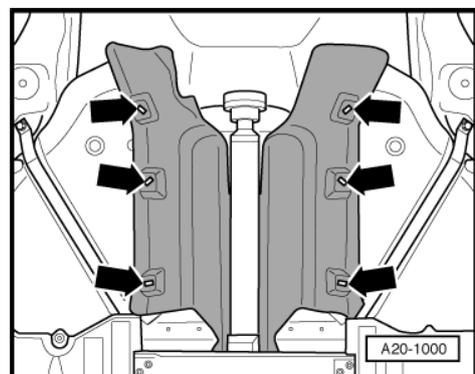
*The propshaft must not be bent more than 8°.*

- Remove heat shield for propshaft -arrows-.

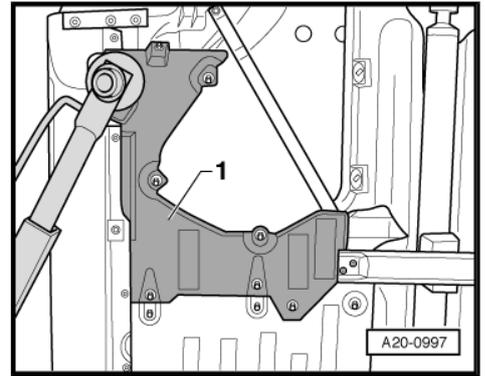


**Note**

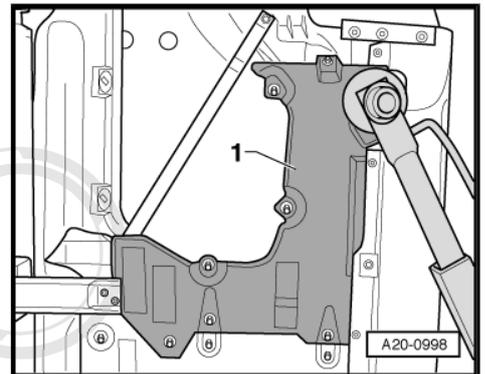
*The heat shield is also clipped in at the top of the breather pipe.*



- Remove cover -1- from underside of vehicle (left-side).



- Remove cover -1- from underside of vehicle (right-side).



- Unplug electrical connectors:

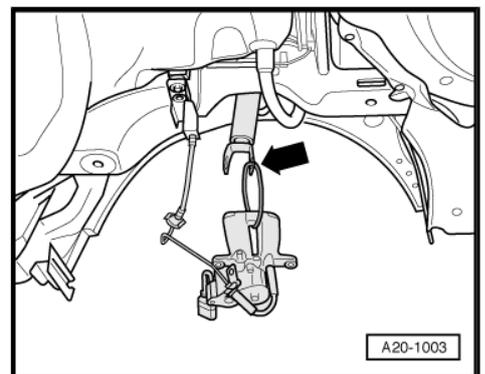
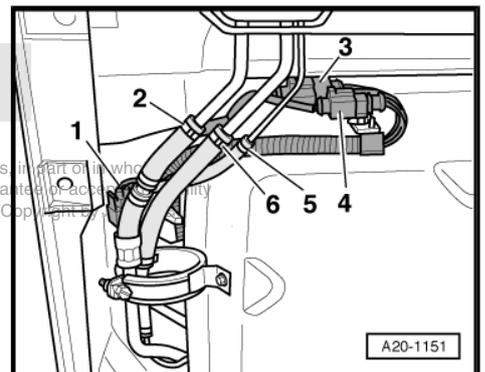
- 1 - To metering pump for auxiliary/additional heater
- 3 - To fuel pumps
- 4 - To fuel gauge senders

- Mark fuel supply line -2- and fuel return line -6-

- Remove hose clips (with lug fasteners) and disconnect both fuel lines.

- Also disconnect fuel line -5- leading to metering pump for auxiliary heater by removing hose clip (with lug fastener).

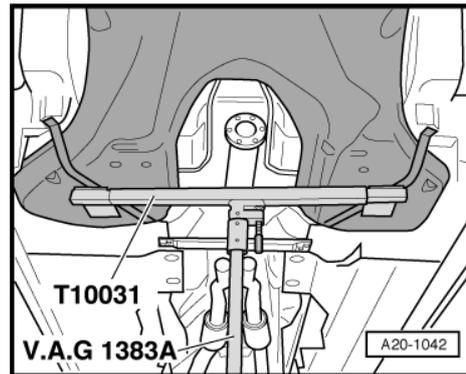
- Attach brake calipers to suspension struts with wire -arrow- (brake calipers were fastened to fuel tank brackets upon removal of rear suspension).



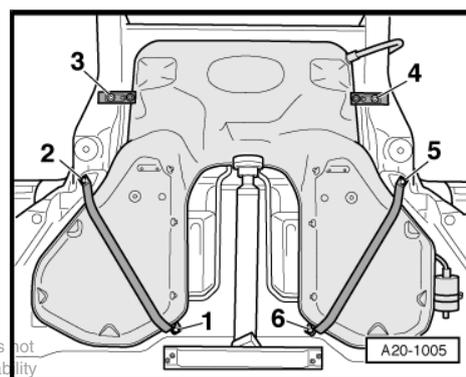


- Position engine and gearbox jack - V.A.G 1383 A- with support - T10031- under vehicle to support tank (do not use threaded rods of support).
- Support fuel tank using engine and gearbox jack - V.A.G 1383 A- and support - T10031- .
- In addition, a 2nd mechanic will be required to support the fuel tank at the rear by hand.

 **WARNING**  
*To reduce weight, fuel tank must be empty upon removal.*



- Unscrew bolts -1 ... 6-; swivel fuel tank brackets forward if necessary.
- First lower fuel tank slightly at the rear so the fuel filler neck can be guided out of the body.
- Then lower fuel tank using engine and gearbox jack - V.A.G 1383 A- , simultaneously guiding fuel tank down by hand.



 **Note**

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*Illustration shows fuel tank without engine and gearbox jack - V.A.G 1383 A-*

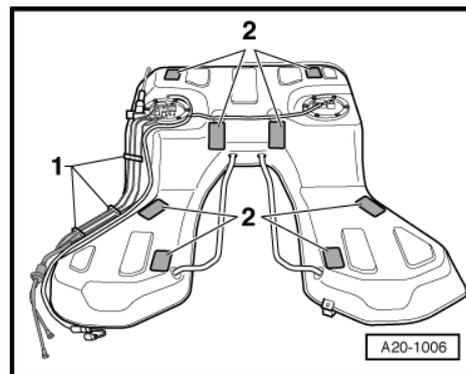
**Installing**

Installation is carried out in the reverse order; note the following:

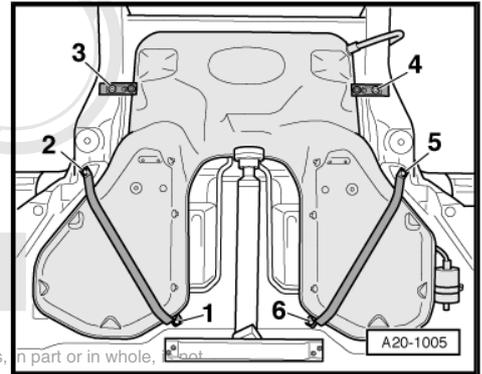
 **Note**

- ◆ *Always renew seals and gaskets when assembling.*
- ◆ *Secure all hose connections with the correct type of hose clips (same as original equipment) → Parts catalogue.*

- Check that fuel pipes and wiring harness for fuel pumps and fuel gauge senders are clipped into brackets -1- on fuel tank.
- Bond pads -2- to fuel tank as shown when installing new fuel tank.

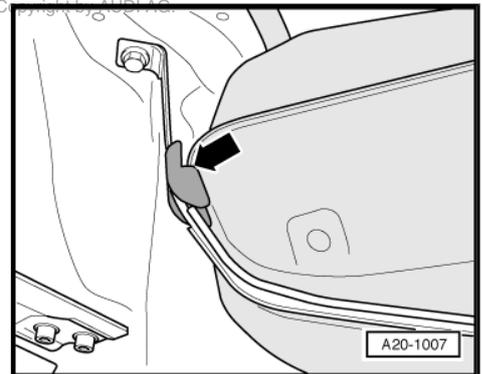


- Position the fuel tank with securing straps and brackets on underbody, using the engine and gearbox jack - V.A.G 1383 A- and support - T10031- .
- When installing fuel tank, make sure that the fuel filler neck is correctly inserted into the opening on the body.
- Secure fuel tank by first tightening bolts at points -1-, -2-, -5- and -6-, then at points -3- and -4-.



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- Make sure that the securing strap spacers are located directly under seam of fuel tank -arrow-.

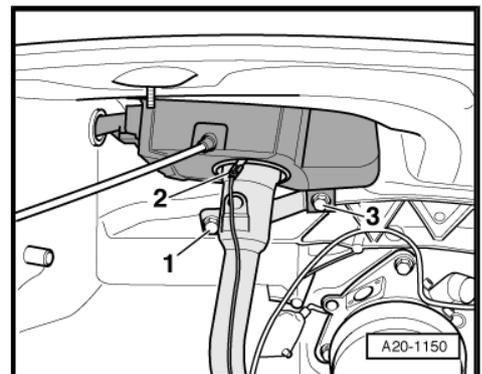


- Secure fuel filler neck using bolts -1- and -3-.
- Check the earth wiring -2- and connector tab for traces of oxidation. Remove any traces of oxidation if necessary.

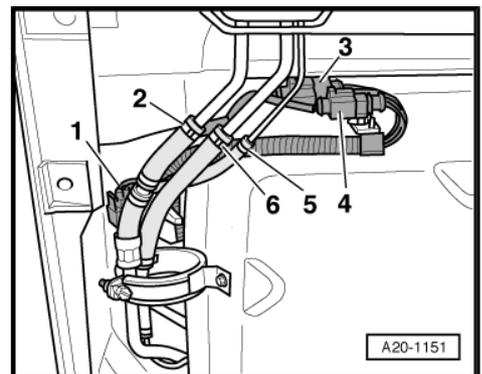
 **Caution**

*After installation, use an ohmmeter to check the electrical connection between the metal ring on the fuel filler neck and a bare metal part on the body:*

- *Specification: approx. 0 Ω.*



- Secure fuel pipes -2-, -5- and -6- using new hose clips (with lug fasteners). Use hose clip pliers - V.A.G 1275- for this purpose.
- Install rear axle ⇒ Rep. gr. 42 .
- Install rear right wheel housing liner ⇒ Rep. gr. 66 .
- Install rear section of exhaust system ⇒ Rep. gr. 26 .



**Tightening torques**

Component	Nm
Securing straps and bracket for fuel tank to body	22
Fuel filler neck to wheel housing	22

## 1.4 Routing of pipes/hoses (inside fuel tank) - overview



### Note

- ◆ The illustration shows the correct routing of pipes/hoses inside the fuel tank (schematic view).
- ◆ It is not necessary to route the pipes/hoses in exactly the same way as shown in the illustration, except for pipes/hoses shown in [⇒ page 17](#). However it is essential to fit the pipes/hoses with sufficient space in relation to each other and to prevent rattling noises.
- ◆ The -arrow- points in direction of travel.

### 1 - Fuel delivery unit (left-side) with fuel system pressurisation pump - G6-

### 2 - Fuel supply line

- From suction-jet pump (left-side) to fuel delivery unit (right-side)

### 3 - Supply line for suction-jet pump

- From fuel pump (left-side) to suction-jet pump (left-side)

### 4 - Suction-jet pump (left-side)

### 5 - Gravity valve

### 6 - Non-return flap

- For fuel filler pipe

### 7 - Primary filling fuel line

- To fuel delivery unit (right-side).
- Ensures that a small amount of fuel is delivered immediately to the fuel delivery unit when the tank is filled for the first time.

### 8 - Suction-jet pump (right-side)

### 9 - Supply line for suction-jet pump

- From fuel pump (right-side) to suction-jet pump (right-side)

### 10 - Fuel supply line

- From suction-jet pump (right-side) to fuel delivery unit (left-side)

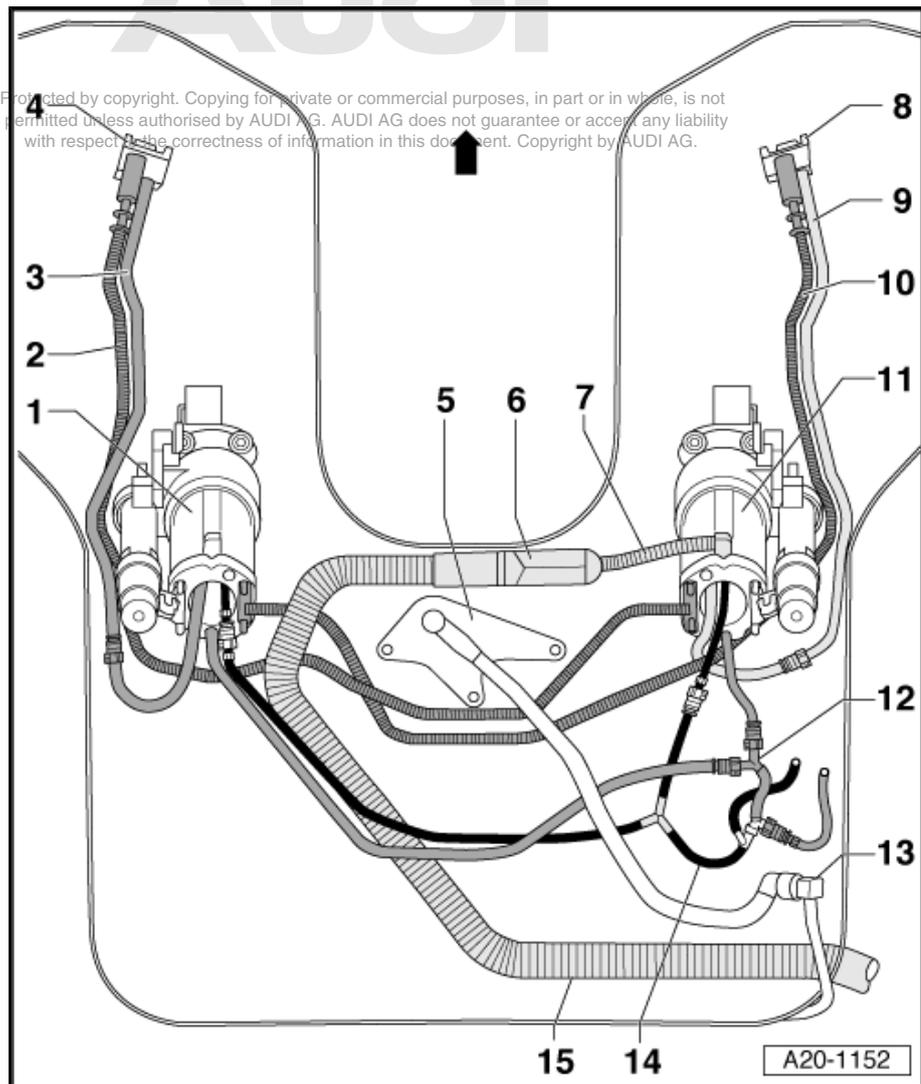
### 11 - Fuel delivery unit (right-side) with fuel pump - G23-

### 12 - Fuel return line

- From flange to fuel delivery units (left and right)

### 13 - Breather line

- From gravity valve
- Open to atmosphere at outside of fuel tank



#### 14 - Fuel supply line

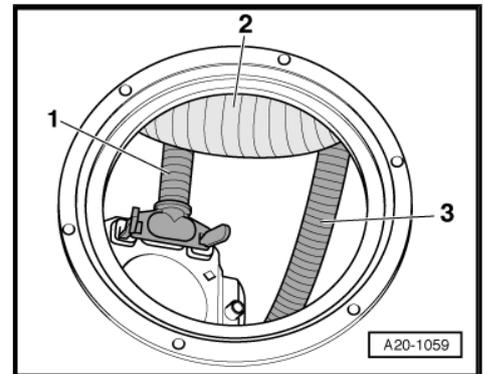
- From fuel pumps (left and right) to flange

#### 15 - Fuel filler pipe

- From fuel filler neck to non-return flap in fuel tank

#### Installation position of fuel supply lines

The supply lines -1- and -3- must be routed below the fuel filler pipe -2- at the left fuel tank opening.



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### 1.5 Fuel delivery unit (left-side) with fuel system pressurisation pump - G6- ; fuel gauge sender - G- and fuel gauge sender 3 - G237- - exploded view of components

#### 1 - Retainer

- For fuel delivery unit

#### 2 - Fuel gauge sender - G-

- Black
- Clipped onto retainer ⇒ [Item 1 \(page 17\)](#)
- Checking resistance values ⇒ [page 45](#)
- Removing and installing ⇒ [page 46](#)

#### 3 - Fuel delivery unit (left-side)

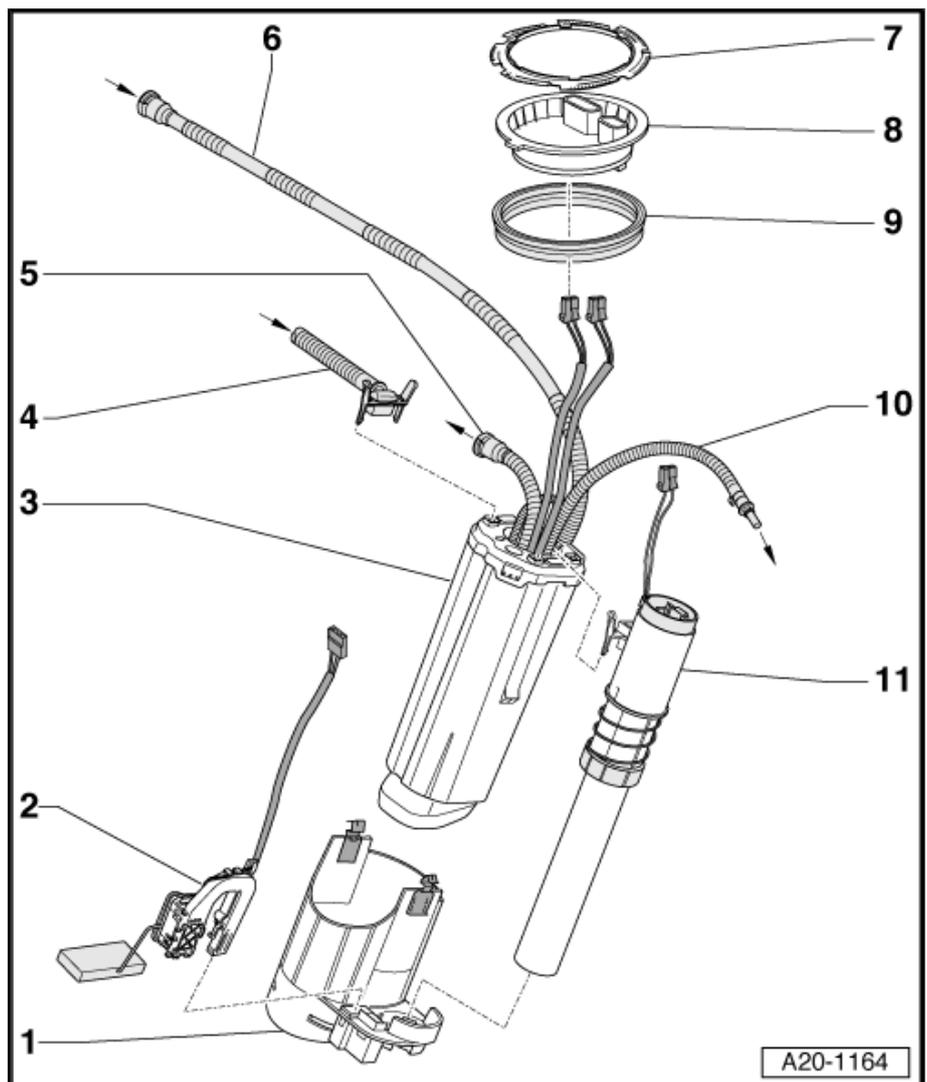
- With fuel system pressurisation pump - G6-
- Clipped onto retainer ⇒ [Item 1 \(page 17\)](#)
- Different versions are available; allocation ⇒ Parts catalogue
- Removing and installing ⇒ [page 18](#)
- Put at least 5 litres of fuel into tank after installing

#### 4 - Fuel supply line

- From suction jet pump (right-side)
- Clipped onto fuel delivery unit ⇒ [Item 3 \(page 17\)](#)

#### 5 - Fuel supply line

- Press release tab on connection piece to dis-



connect

#### 6 - Fuel return line

- The plug connector is located on the right side of the fuel tank
- Press release tab on connection piece to disconnect

#### 7 - Locking ring

- Remove and install using wrench - T10202-
- Tighten to 120 Nm

#### 8 - Flange (left-side)

- Installation position ⇒ [page 18](#)

#### 9 - Seal

- Renew
- Install dry

#### 10 - Supply line for suction-jet pump

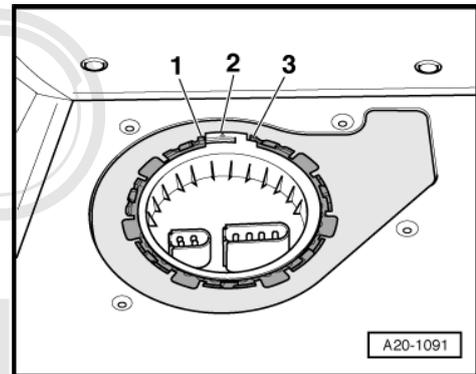
- For suction-jet pump (left-side)
- Press release tab on connection piece to disconnect

#### 11 - Fuel gauge sender 3 - G237-

- Grey
- Clipped onto fuel delivery unit ⇒ [Item 3 \(page 17\)](#)
- Checking resistance values ⇒ [page 49](#)
- Removing and installing ⇒ [page 50](#)

#### Installation position of flange (left-side)

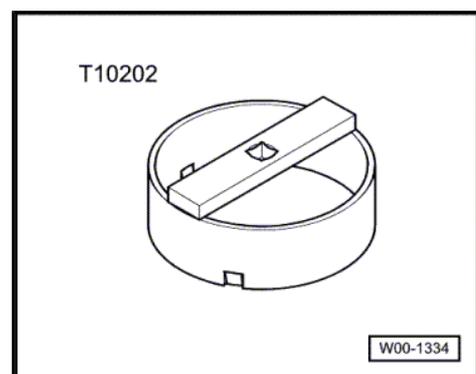
- Fit new seal for flange in fuel tank opening (seal should be dry).
- Fit flange into fuel tank; note correct installation position:
- Lug -2- on flange must be between tabs -1- and -3- on fuel tank.



### 1.6 Removing and installing fuel delivery unit (left-side) with fuel system pressurisation pump - G6-

#### Special tools and workshop equipment required

- ◆ Wrench - T10202-



## Removing

Observe safety precautions ⇒ [page 1](#) .

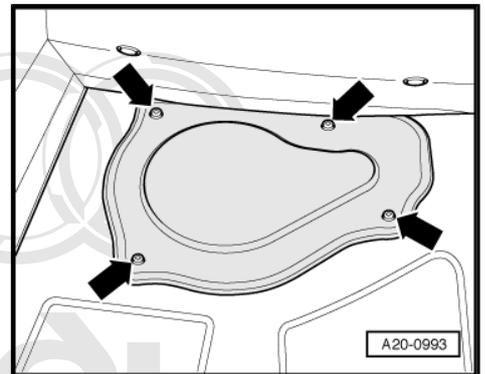
Observe rules for cleanliness ⇒ [page 3](#) .

- The fuel tank must not be more than  $\frac{1}{3}$  full when removing the fuel delivery unit. Drain the tank if necessary. Procedure ⇒ [page 7](#)

### Note

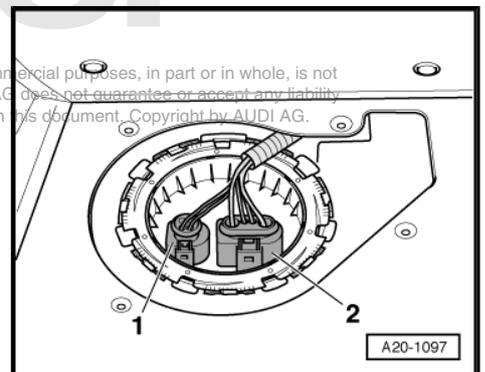
*For removing and installing fuel delivery unit, take tool kit and spare wheel out of luggage compartment. You can then sit or kneel in the spare wheel well.*

- Remove luggage compartment floor lining.
- Detach cover for flange (left-side) -arrows-.

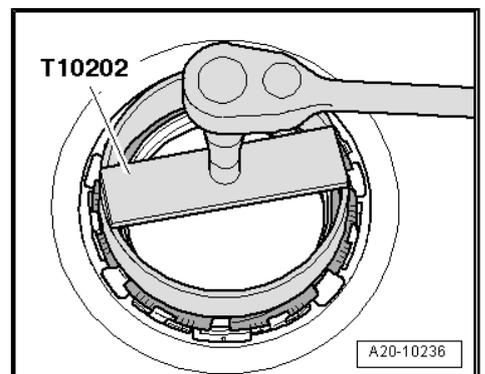


- Unplug electrical connectors -1- and -2- at flange.

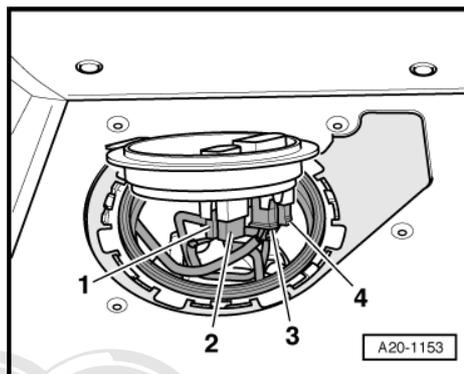
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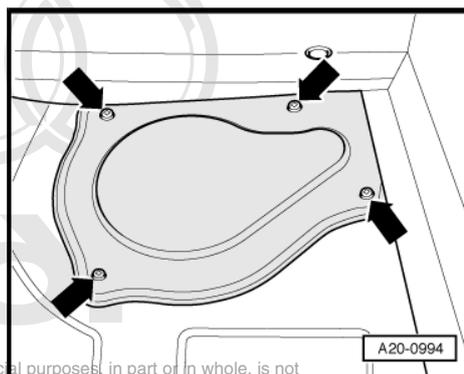
- Unscrew locking ring using wrench - T10202 - .



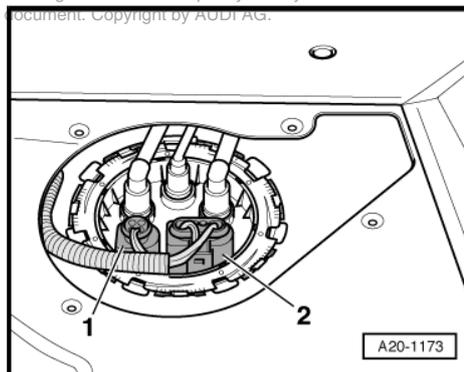
- Detach flange and remove seal.
- Detach electrical connectors -1 ... 4- at underside of flange.



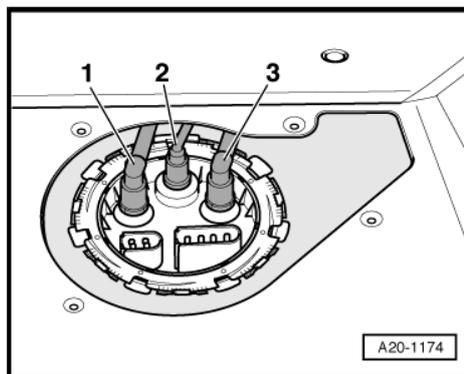
- Unscrew cover for flange (right-side) -arrows-.



- Unplug electrical connectors -1- and -2- at flange.

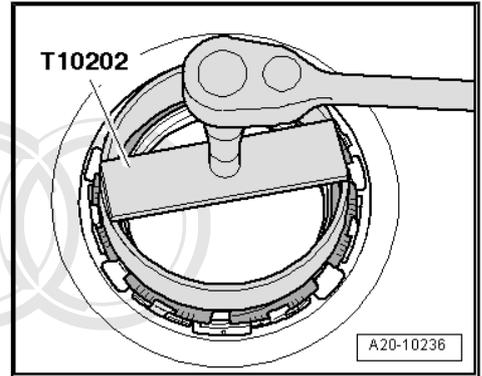


- Mark fuel return line -1- and fuel supply line -3-.
- Detach both lines from flange (press release tabs).
- In addition, disconnect fuel line -2- leading to metering pump for auxiliary heater (press release tab).



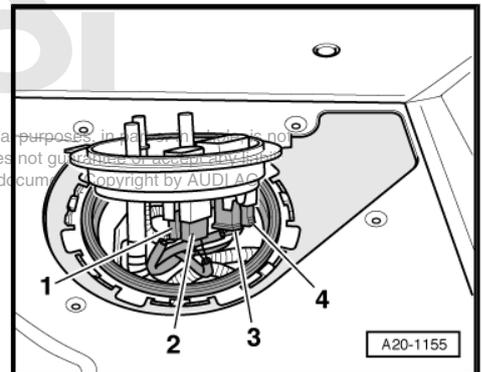
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- Unscrew locking ring using wrench - T10202- .



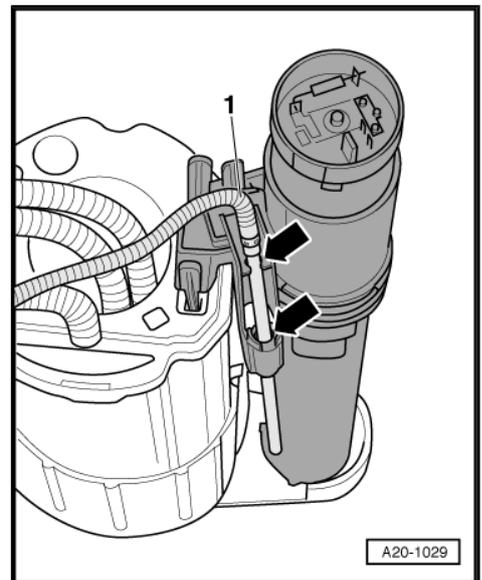
- Detach flange and remove seal.
- Detach electrical connectors -1 ... 4- at underside of flange.

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**i** Note

- ◆ Pull out fuel lines from fuel tank opening prior to disconnecting the pipe connectors mentioned below.
  - ◆ Some of the components are shown removed in the following illustration.
- Pull out suction pipe -1- for auxiliary heater from retainer -arrows- on tubular sender (right-side).



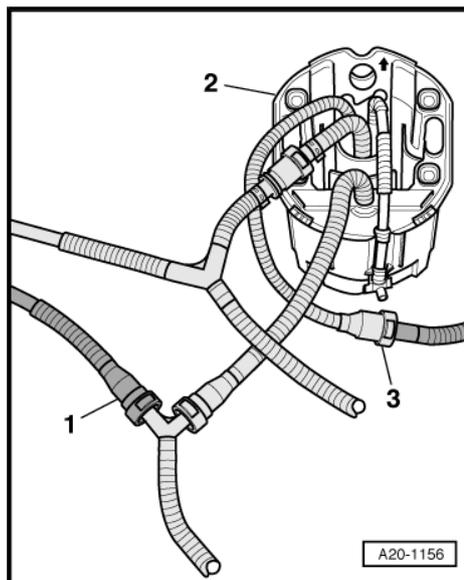


- Working through right fuel tank opening, press release tab and disconnect fuel line -1- going to fuel delivery unit (left-side).
  - Pull disconnected fuel line out of left fuel tank opening.
- 2 - Fuel delivery unit (right-side) with fuel pump - G23- .



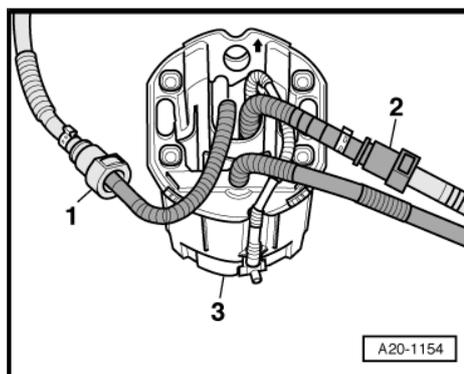
**Note**

Disregard -item 3-.

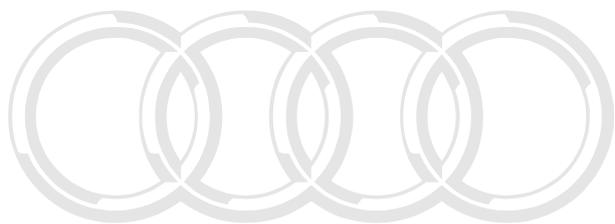
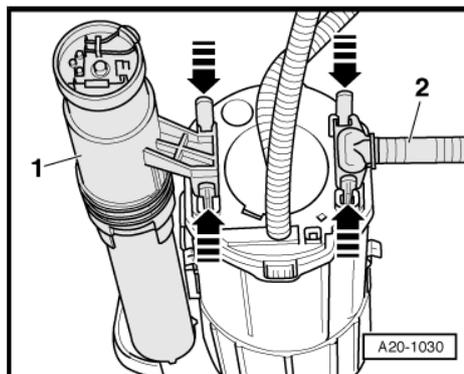


- Working through left fuel tank opening, press release tab and disconnect fuel line -1- going to suction-jet pump (left-side).
- Disconnect fuel line -2- going to fuel delivery unit (right-side) by pressing release tab.

3 - Fuel delivery unit (left-side) with fuel system pressurisation pump - G6- .



- Working through left fuel tank opening, press release tabs -arrows- and detach supply line -2- and fuel gauge sender 3 - G237- -item 1-.
- Move fuel gauge sender 3 - G237- to left side.



**Audi**

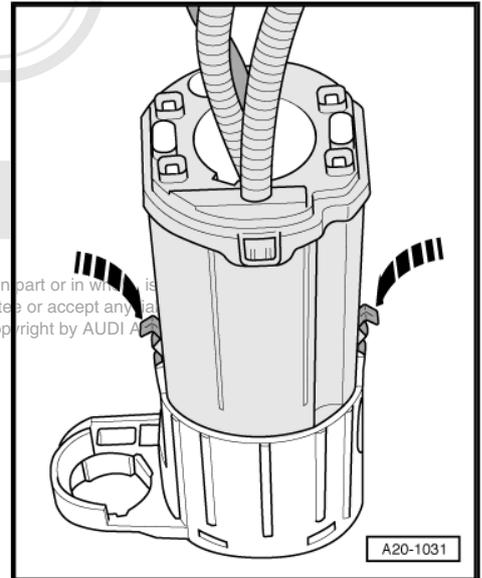
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- Press down both retaining clips on retainer for fuel delivery unit (left-side) -arrows-.
- Remove fuel delivery unit.

 **Note**

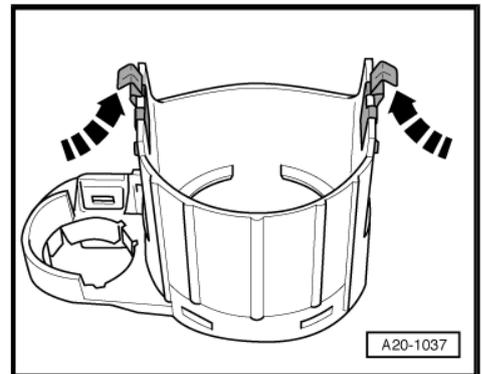
*Keep in mind that the fuel delivery unit still contains fuel.*

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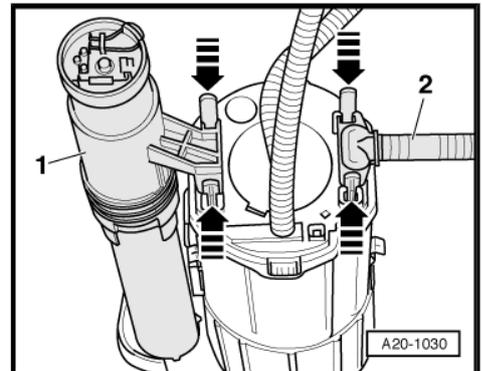


**Installing**

- Pull both retaining clips on retainer upwards -arrows- so that they engage audibly before installing the fuel delivery unit (left-side).
- Then press fuel delivery unit carefully into retainer so that it engages audibly.

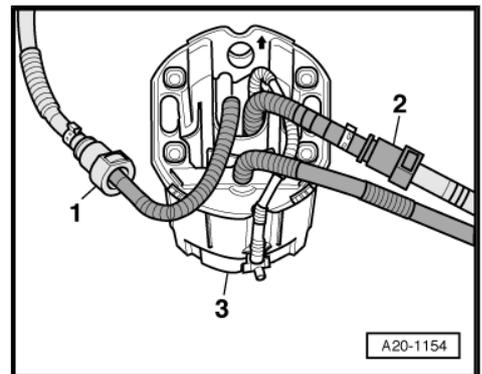


- Fit fuel supply line -2- and fuel gauge sender 3 - G237- -item 1- so that they engage audibly.



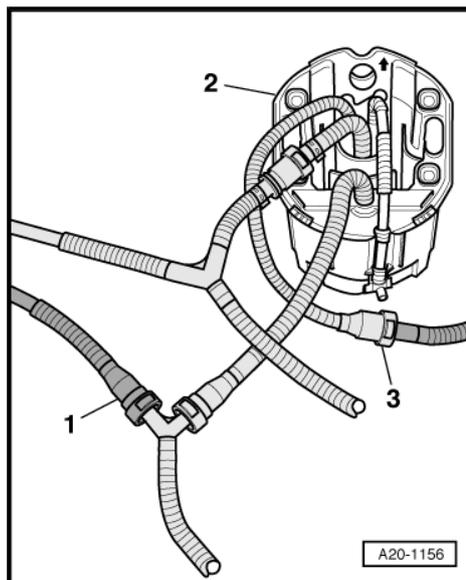
- Fit fuel lines -1- and -2- through left fuel tank opening so that they engage audibly.
- Guide return line for fuel delivery unit (left-side) into fuel tank chamber (right-side).

3 - Fuel delivery unit (left-side) with fuel system pressurisation pump - G6- .

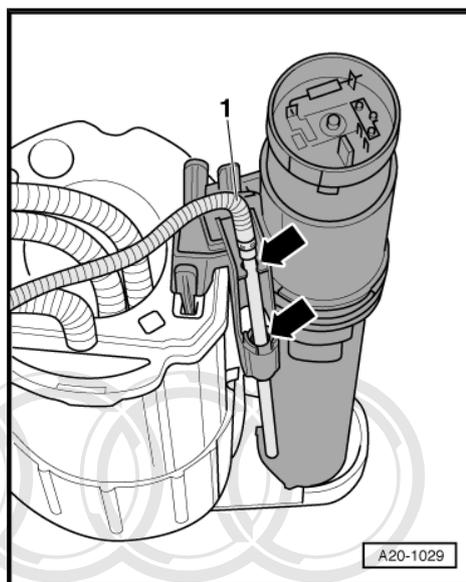




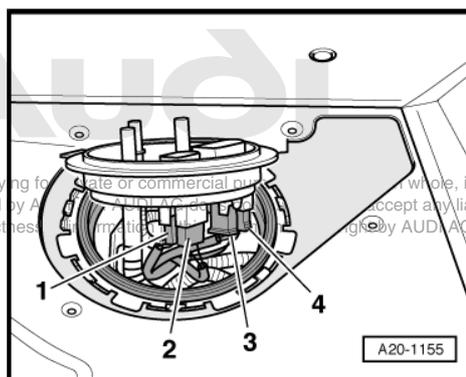
- Working through right fuel tank opening, fit fuel line -1- so that it engages audibly.
- 2 - Fuel delivery unit (right-side) with fuel pump - G23- .



- Fit suction pipe -1- for auxiliary heater into retainers -arrows- on tubular sender (right-side).

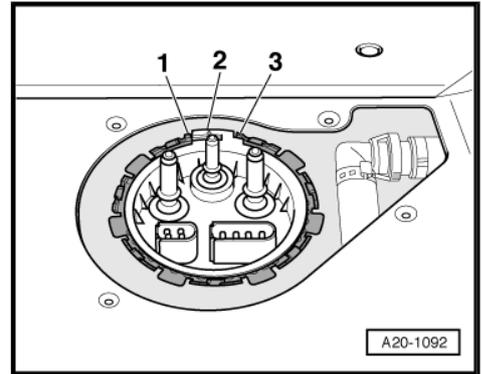


- Connect electrical connectors -1 ... 4- at underside of flange.

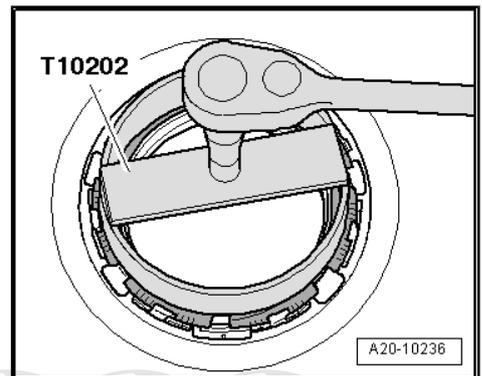


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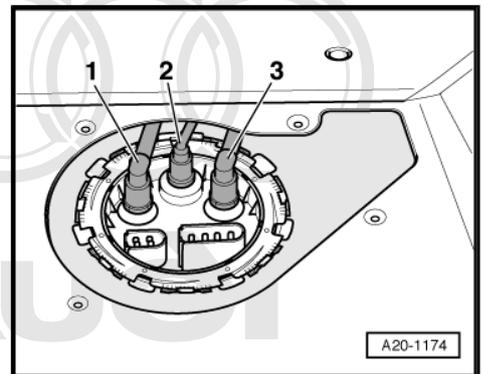
- Fit new seal for flange in fuel tank opening (seal should be dry).
- Fit flange (right-side) into fuel tank; note correct installation position:
  - Lug -2- on flange must be between tabs -1- and -3- on fuel tank.



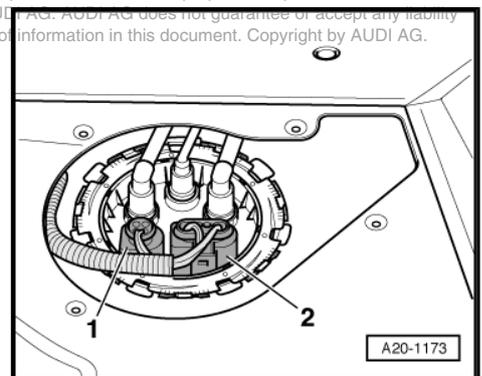
- Tighten locking ring.



- Fit fuel return line -1- and fuel supply line -3- so that they engage audibly.
- Also fit supply line -2- going to auxiliary heater so that it engages audibly.



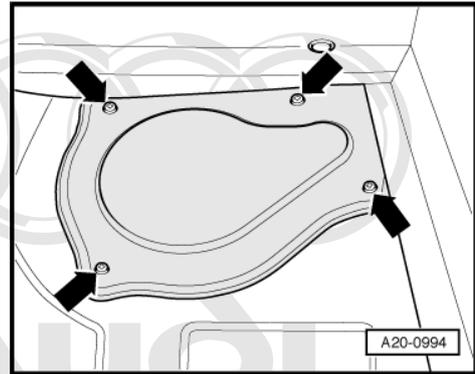
- Attach electrical connectors -1- and -2- at flange



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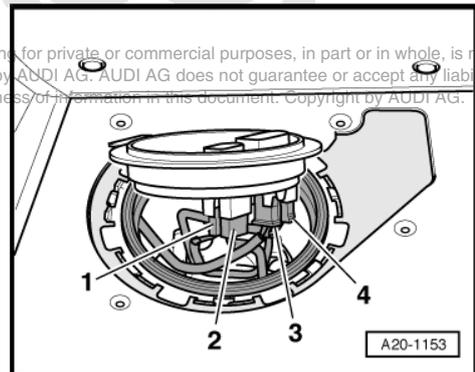


- Secure cover for flange (right-side) -arrows-.

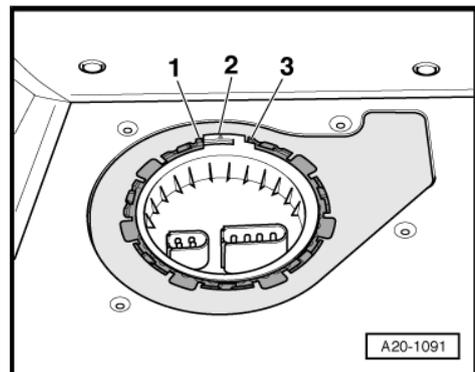


- Connect electrical connectors -1 ... 4- on underside of flange (left-side).

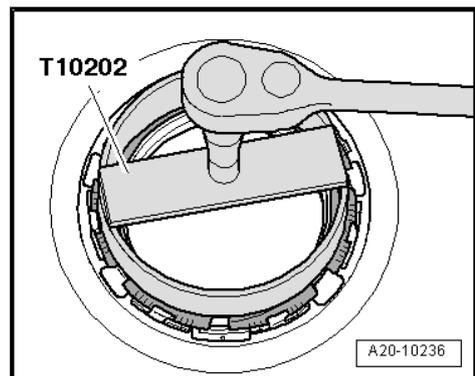
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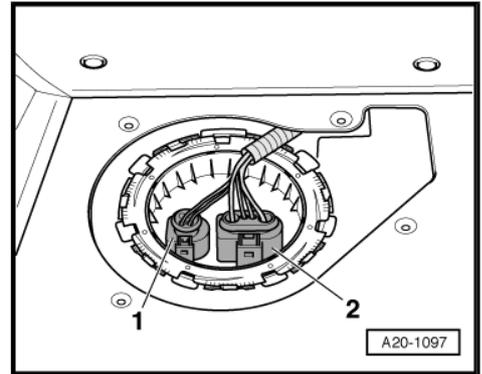
- Fit new seal for flange in fuel tank opening (seal should be dry).
- Fit flange into fuel tank; note correct installation position:
  - Lug -2- on flange must be between tabs -1- and -3- on fuel tank.



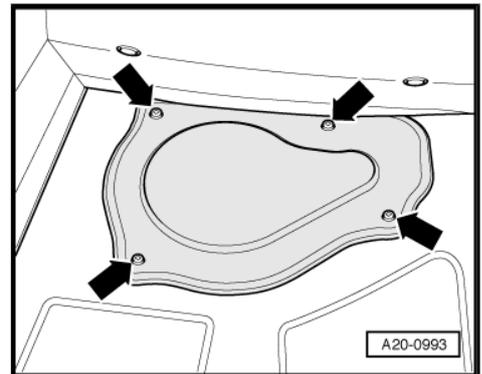
- Tighten locking ring.



- Attach electrical connectors -1- and -2- at flange.



- Secure cover for flange (left-side) -arrows-.
- Put at least 5 litres of fuel into tank after installing fuel delivery unit.
- Vehicles with auxiliary heater: Let auxiliary heater run with full load for 10 minutes to bleed fuel line leading to metering pump.



**Tightening torque**

Component	Nm
Locking ring for fuel delivery unit	120

**1.7 Fuel delivery unit (right-side) with fuel pump - G23- ; fuel gauge sender 2 - G169- and fuel gauge sender 4 - G393- - exploded view of components**



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**1 - Retainer**

- For fuel delivery unit

**2 - Fuel gauge sender 2 - G169-**

- Yellow
- Clipped onto retainer  
⇒ [Item 1 \(page 28\)](#)
- Checking resistance values ⇒ [page 47](#)
- Removing and installing ⇒ [page 48](#)

**3 - Fuel gauge sender 4 - G393-**

- White
- Clipped onto fuel delivery unit  
⇒ [Item 15 \(page 29\)](#)
- Checking resistance values ⇒ [page 54](#)
- Removing and installing ⇒ [page 56](#)

**4 - Supply line for suction-jet pump**

- For suction-jet pump (right-side)
- Press release tab on connection piece to disconnect

**5 - Fuel supply line**

- To fuel filter
- Mark before removing
- Press release tab on connection piece to disconnect
- Do not kink
- Clip onto fuel tank

**6 - Fuel line**

- To auxiliary heater
- Press release tab on connection piece to disconnect
- Do not kink
- Clip onto fuel tank

**7 - Fuel return line**

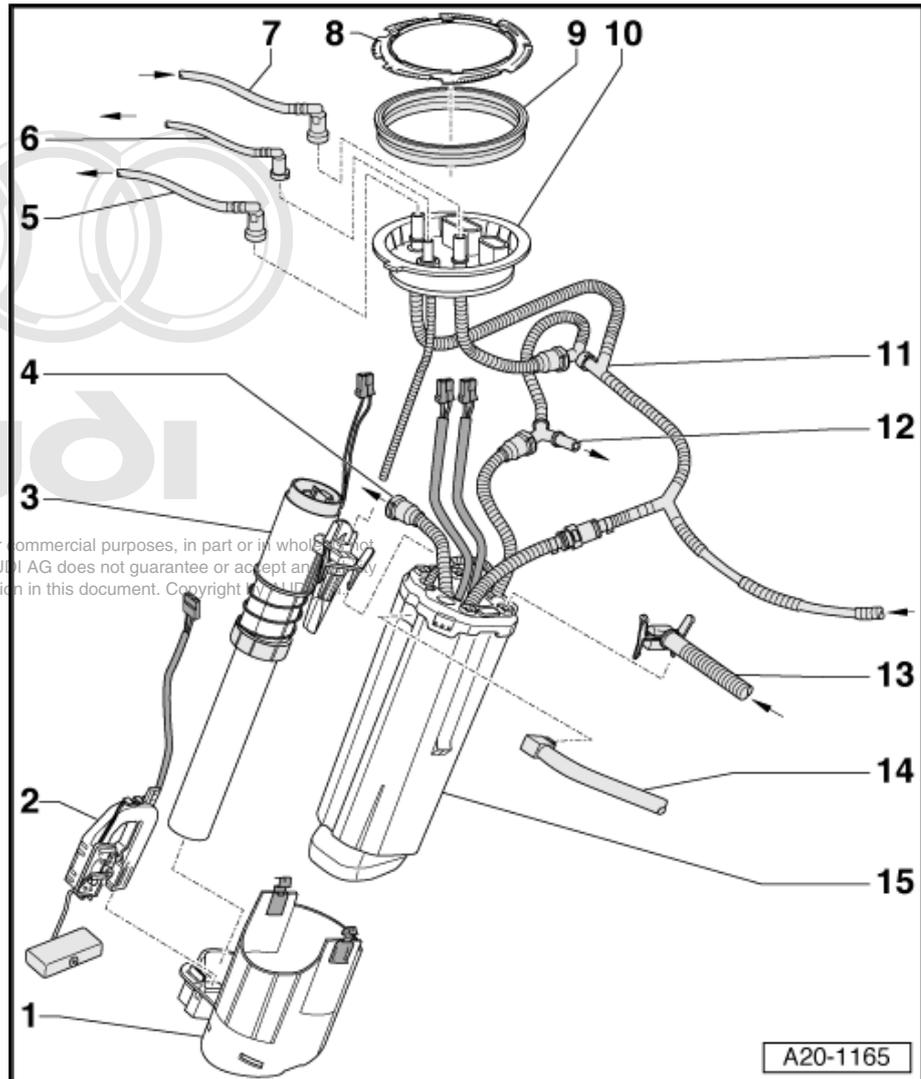
- From fuel cooler
- Mark before removing
- Press release tab on connection piece to disconnect
- Do not kink
- Clip onto fuel tank

**8 - Locking ring**

- Remove and install using wrench - T10202-
- Tighten to 120 Nm

**9 - Seal**

- Renew



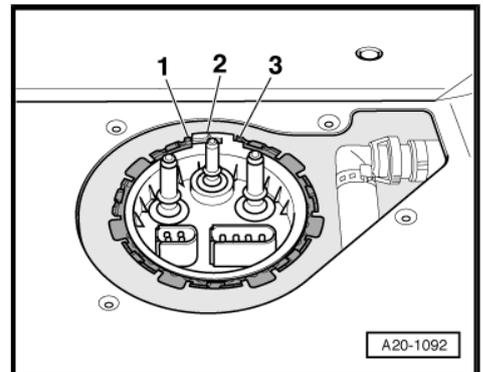
- Install dry
- 10 - Flange (right-side)**
  - Installation position ⇒ [page 29](#)
- 11 - Fuel supply line**
  - From fuel pumps (left and right) to flange
  - Press release tab on connection piece to disconnect
- 12 - Fuel return line**
  - From flange to fuel delivery units (left and right)
  - Press release tab on connection piece to disconnect
- 13 - Fuel supply line**
  - From suction-jet pump (left-side)
  - Clipped onto fuel delivery unit ⇒ [Item 15 \(page 29\)](#)
- 14 - Fuel filler pipe**
  - From filler neck
  - Clipped onto fuel delivery unit ⇒ [Item 15 \(page 29\)](#)
- 15 - Fuel delivery unit (right-side)**
  - With fuel pump - G23-
  - Clipped onto retainer ⇒ [Item 1 \(page 28\)](#)
  - Different versions are available; allocation ⇒ Parts catalogue
  - Removing and installing ⇒ [page 29](#)
  - Put at least 5 litres of fuel into tank after installing

**Installation position of flange (right-side)**

- Fit new seal for flange in fuel tank opening (seal should be dry).

**Fit flange into fuel tank; note correct installation position:**

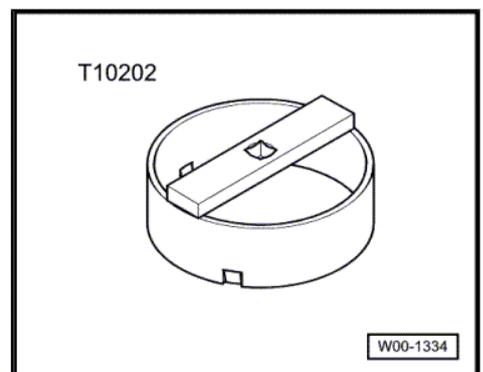
- Lug -2- on flange must be between tabs -1- and -3- on fuel tank.



**1.8 Removing and installing fuel delivery unit (right-side) with fuel pump - G23-**

**Special tools and workshop equipment required**

- ◆ Wrench - T10202-



## Removing

Observe safety precautions ⇒ [page 1](#) .

Observe rules for cleanliness ⇒ [page 3](#) .

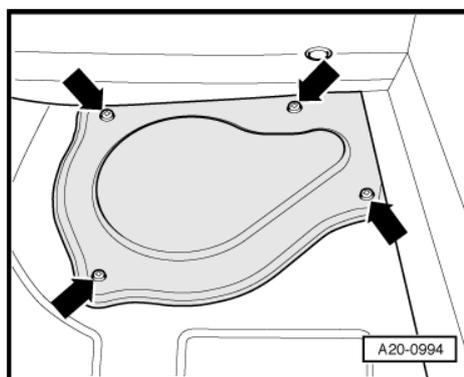
- The fuel tank must not be more than  $\frac{1}{3}$  full when removing the fuel delivery unit. Drain the tank if necessary. Procedure ⇒ [page 7](#)



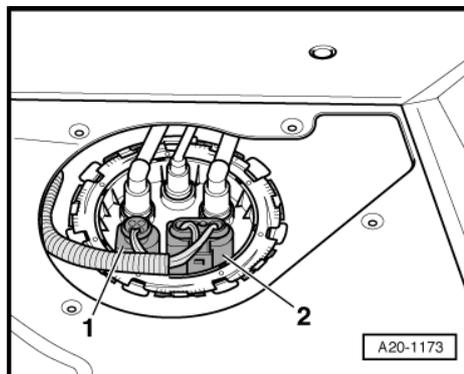
### Note

*For removing and installing fuel delivery unit, take tool kit and spare wheel out of luggage compartment. You can then sit or kneel in the spare wheel well.*

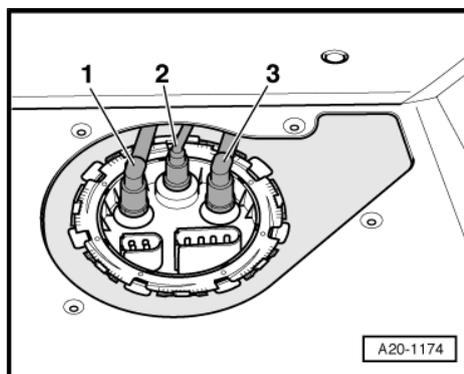
- Remove luggage compartment floor lining.
- Unscrew cover for flange (right-side) -arrows-.



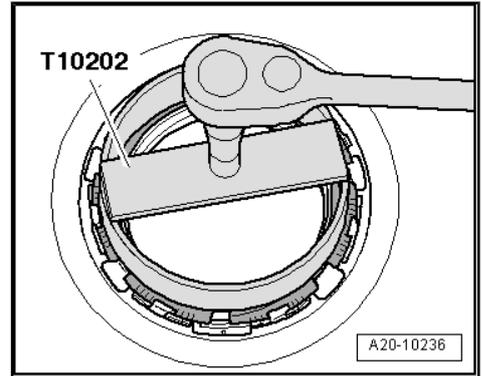
- Unplug electrical connectors -1- and -2- at flange.



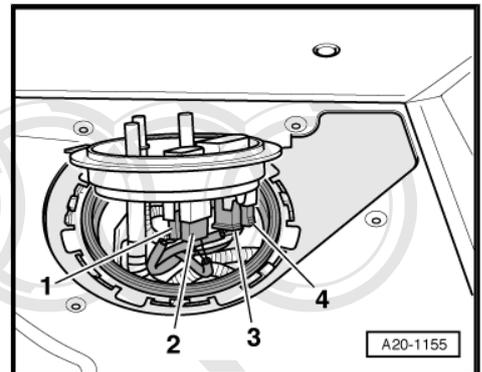
- Mark fuel return line -1- and fuel supply line -3-.
- Detach both lines from flange (press release tabs).
- In addition, disconnect fuel line -2- leading to metering pump for auxiliary heater (press release tab).



- Unscrew locking ring using wrench - T10202- .

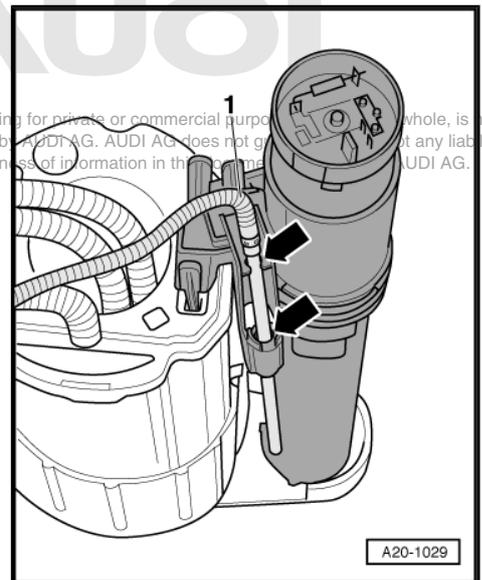


- Detach flange and remove seal.
- Detach electrical connectors -1 ... 4- at underside of flange.



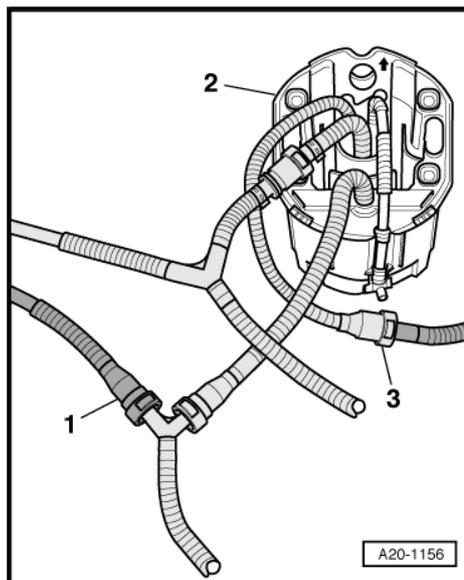
**i** Note

- ◆ *Pull out fuel lines from fuel tank opening prior to disconnecting the pipe connectors mentioned below.*
- ◆ *Some of the components are shown removed in the following illustration.*
- Pull out suction pipe -1- for auxiliary heater from retainer -arrows- on tubular sender (right-side).

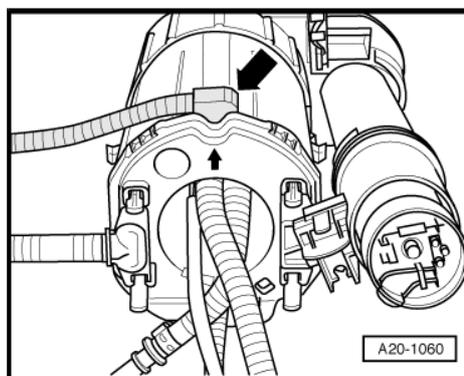




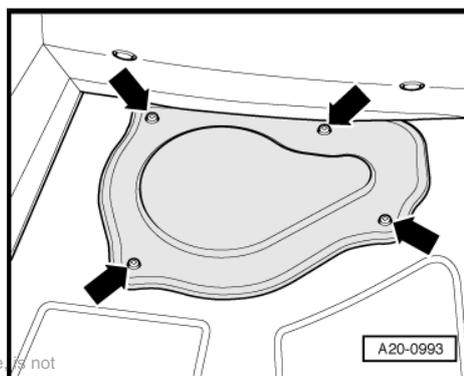
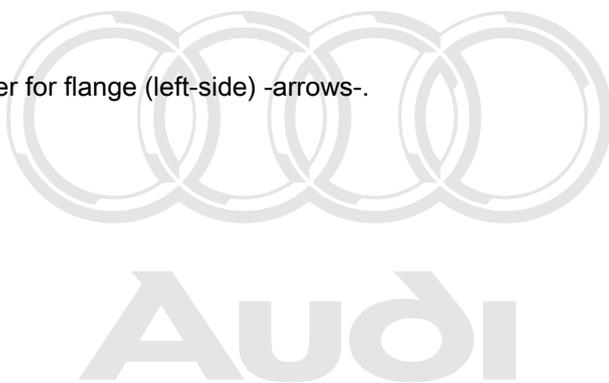
- Working through right fuel tank opening, press release tab and disconnect fuel line -1- going to fuel delivery unit (left-side).
  - Press release tab and disconnect fuel line -3- going to suction jet pump (right-side).
- 2 - Fuel delivery unit (right-side) with fuel pump - G23- .



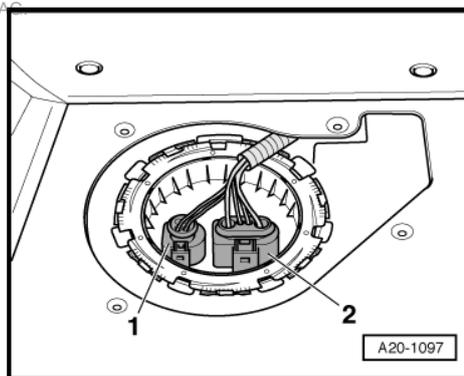
- Unclip fuel filler pipe -arrow- at front of fuel delivery unit (right-side).



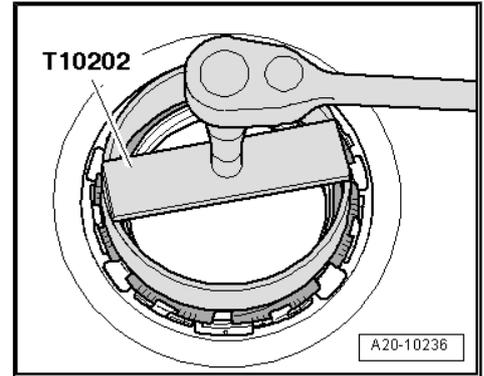
- Detach cover for flange (left-side) -arrows-.



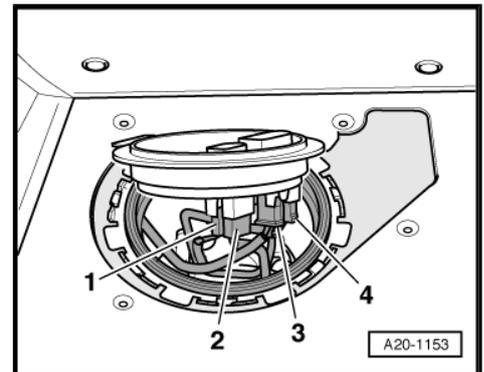
- Unplug electrical connectors -1- and -2- at flange.



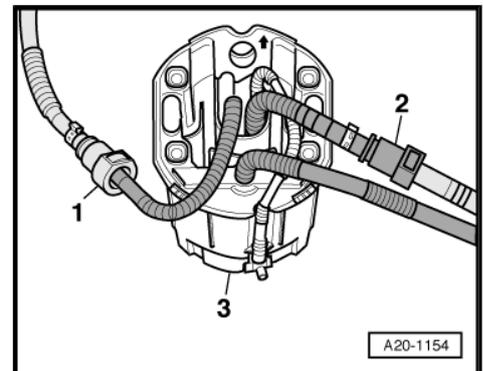
- Unscrew locking ring using wrench - T10202- .



- Detach flange and remove seal.
- Detach electrical connectors -1 ... 4- at underside of flange.



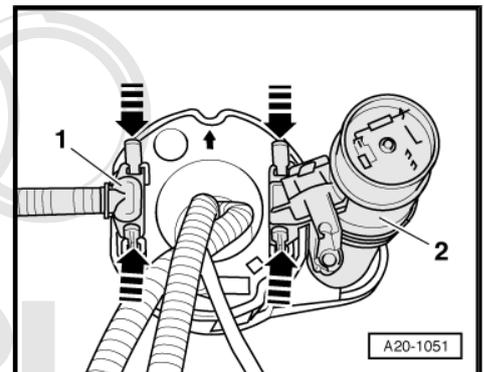
- Working through left fuel tank opening, press release tab and disconnect fuel supply line -2- going to fuel delivery unit (right-side).
- Pull disconnected fuel supply line out of the right fuel tank opening.
- 3 - Fuel delivery unit (left-side) with fuel system pressurisation pump - G6- .



**i** Note

Disregard -item 1-.

- Working through right fuel tank opening, press release tabs -arrows- and detach supply line -1- and fuel gauge sender 4 - G393- -item 2-.
- Move fuel gauge sender 4 - G393- to right side.



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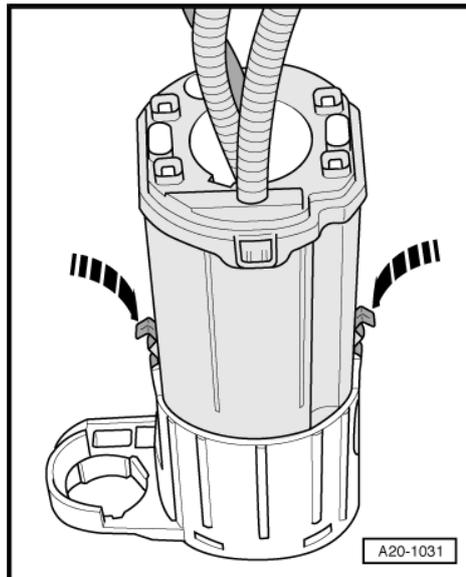


- Press down both retaining clips on retainer for fuel delivery unit (right-side) -arrows-.
- Remove fuel delivery unit.



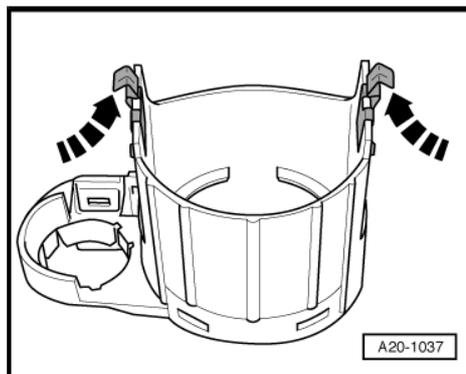
**Note**

Keep in mind that the fuel delivery unit still contains fuel.

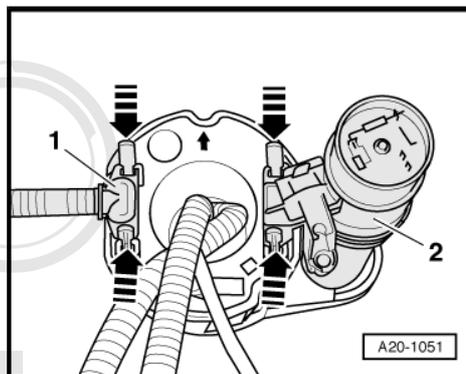


**Installing**

- Pull both retaining clips on retainer upwards -arrows- so that they engage audibly before installing fuel delivery unit (right-side).
- Then press fuel delivery unit carefully into retainer so that it engages audibly.



- Fit fuel supply line -1- and fuel gauge sender 4 - G393- -item 2- so that they engage audibly on fuel delivery unit (right-side).



- Fit fuel lines -2- through left opening on fuel tank so that they engage audibly.

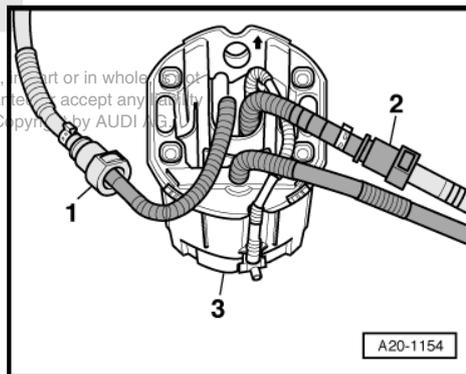
3 - Fuel delivery unit (left-side) with fuel system pressurisation pump - G6- .

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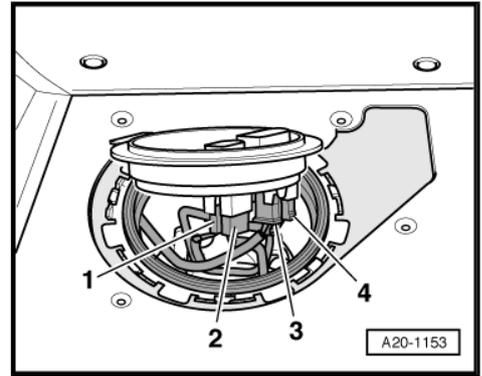


**Note**

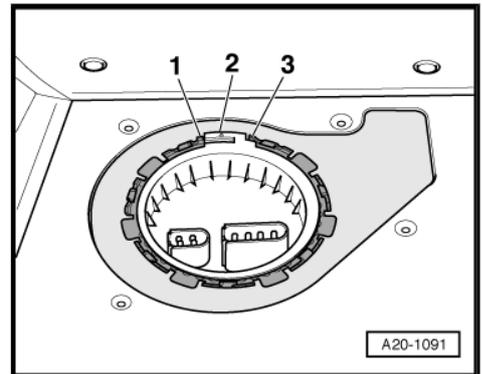
Disregard -item 1-.



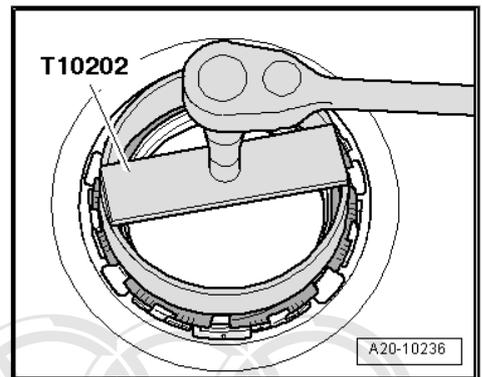
- Connect electrical connectors -1 ... 4- at underside of flange.



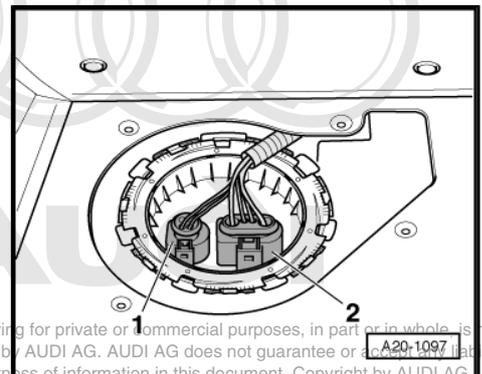
- Fit new seal for flange in fuel tank opening (seal should be dry).
- Fit flange (left-side) into fuel tank; note correct installation position:
  - Lug -2- on flange must be between tabs -1- and -3- on fuel tank.



- Tighten locking ring.

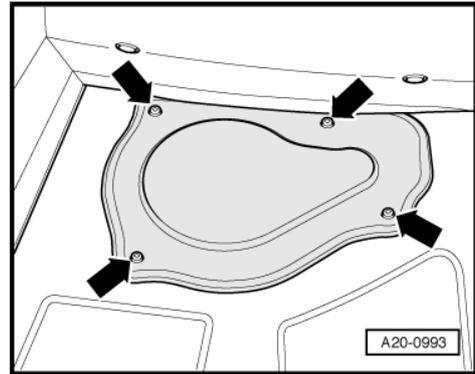


- Attach electrical connectors -1- and -2- at flange.



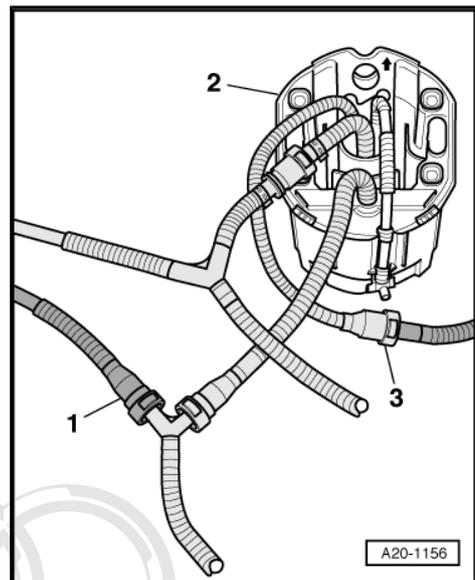
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- Secure cover for flange -arrows-.

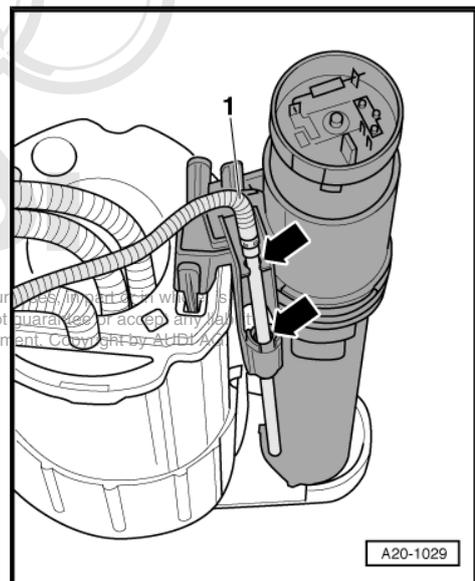


- Fit fuel lines -1- and -3- through right fuel tank opening so that they engage audibly.

2 - Fuel delivery unit (right-side) with fuel pump - G23- .

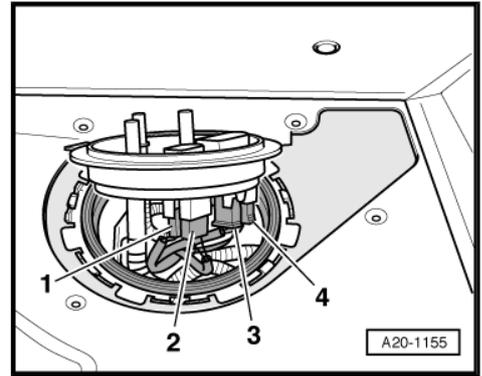
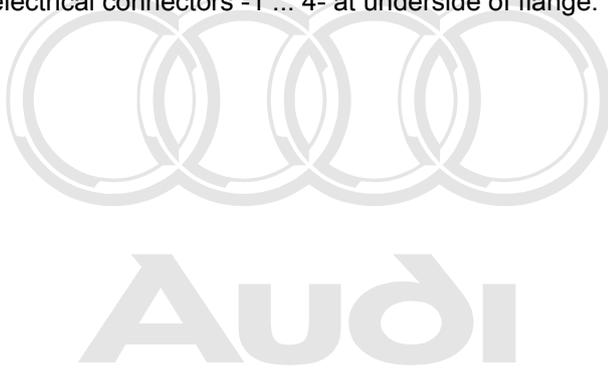


- Fit suction pipe -1- for auxiliary heater into retainers -arrows- on tubular sender (right-side).

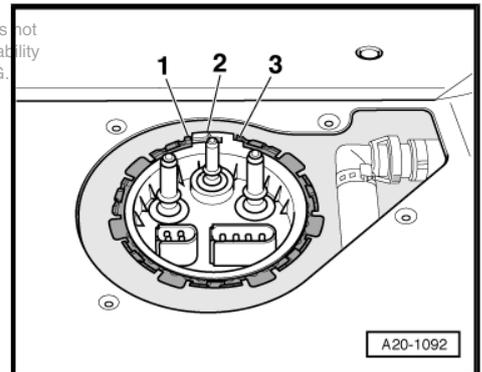


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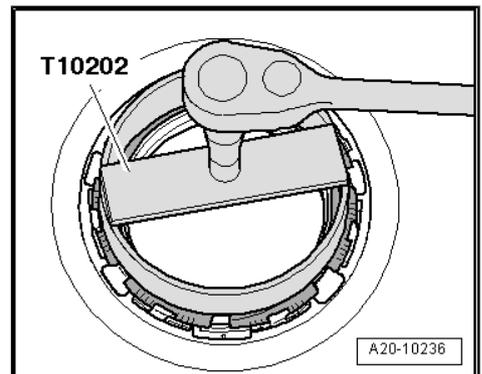
- Connect electrical connectors -1 ... 4- at underside of flange.



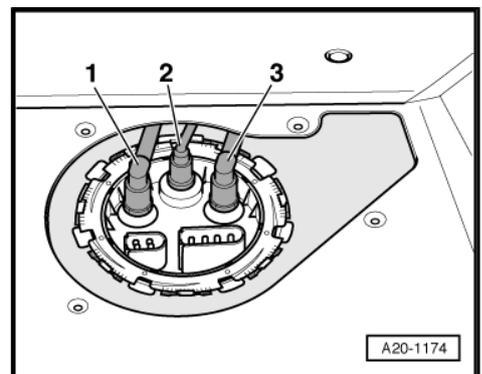
- Fit new seal for flange in fuel tank opening (seal should be dry).
- Fit flange (right-side) into fuel tank; note correct installation position:
  - Lug -2- on flange must be between tabs -1- and -3- on fuel tank.



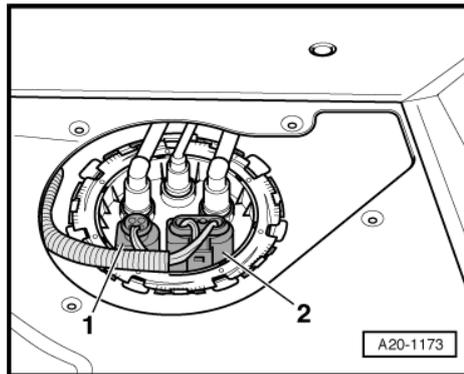
- Tighten locking ring.



- Fit fuel return line -1- and fuel supply line -3- so that they engage audibly.
- Also fit supply line -2- going to auxiliary heater so that it engages audibly.



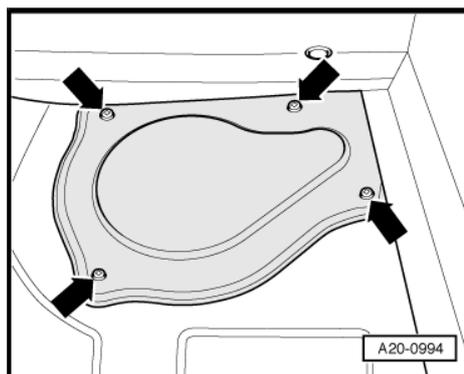
- Attach electrical connectors -1- and -2- at flange.



- Secure cover for flange (right-side) -arrows-.
- Put at least 5 litres of fuel into tank after installing fuel delivery unit.
- Vehicles with auxiliary heater: Let auxiliary heater run with full load for 10 minutes to bleed fuel line leading to metering pump.

**Tightening torque**

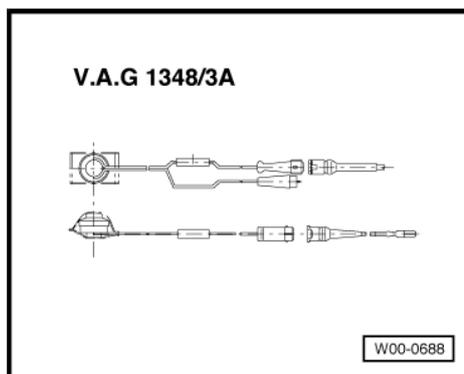
Component	Nm
Locking ring for fuel delivery unit	120



**1.9 Checking fuel pump delivery rate**

**Special tools and workshop equipment required**

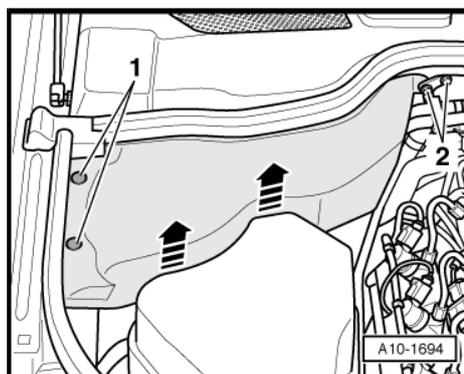
- ◆ Remote control - V.A.G 1348/3A- for V.A.G 1348 with adapter cable - V.A.G 1348/3-2-



- ◆ Fuel-resistant measuring container

**Test sequence**

- Observe test conditions => [page 3](#) .
- If fitted, remove cover for suspension turret (right-side); to do so, detach spreader clips -1- and unscrew bolted joint -2-.
- Pull cover out of retainers -arrows-.



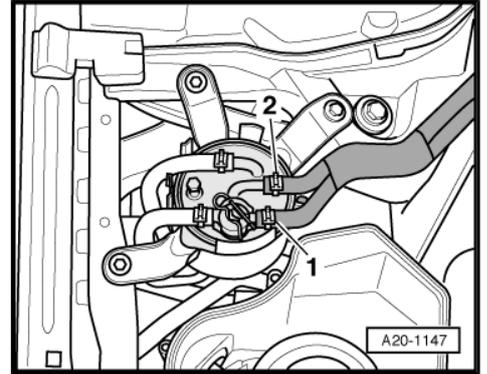
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**Rules for cleanliness when working on the injection system**  
=> [page 3](#) .

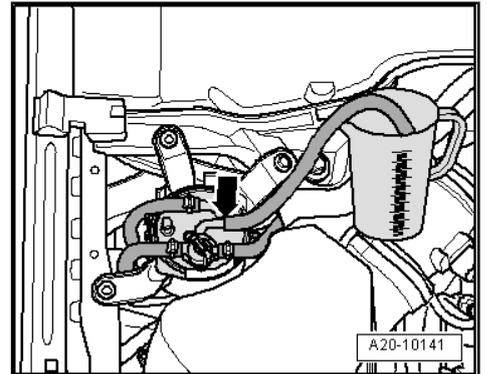
- Disconnect fuel supply line -2- going to engine at fuel filter.

**i** Note

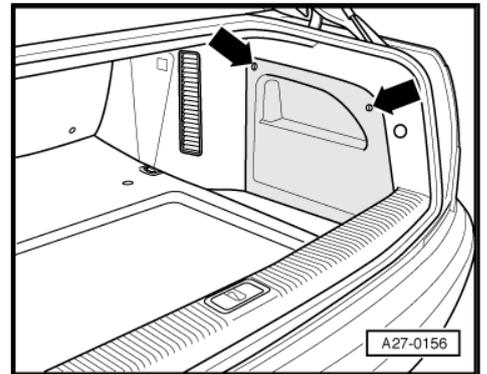
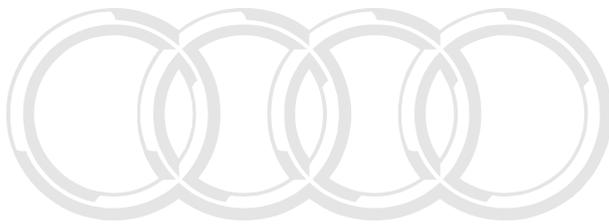
Disregard -item 1-.



- Fit auxiliary hose -arrow- onto connection at fuel filter and hold it into a measuring container to catch fuel.

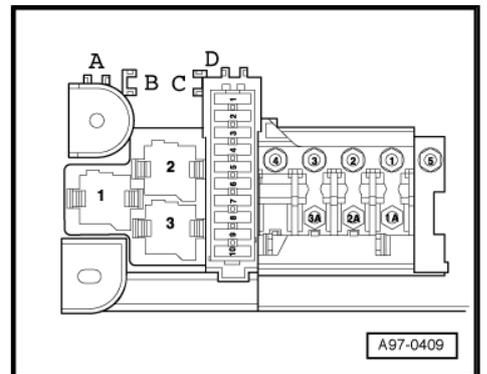


- Remove luggage compartment side trim cover (right-side) -arrows-.



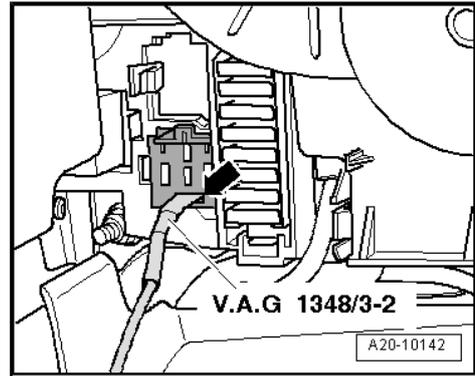
- Disconnect fuel pump relay - J17- located at position -3- on relay and fuse holder in luggage compartment (right-side).

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- Connect remote control - V.A.G 1348/3 A- with adapter cable - V.A.G 1348/3-2- to contact 2 -arrow- in fuel pump relay socket.
- Connect crocodile clip of remote control - V.A.G 1348/3 A- to vehicle battery "+" (positive).



- Press remote control button for 15 seconds.
- Compare amount of fuel delivered with minimum delivery shown in diagram (cm<sup>3</sup>/15 sec.).

**Note**

*Voltage at fuel pump with engine stationary and pump running is approx. 2 volts less than battery voltage.*

If minimum delivery rate is not reached, check for the following causes:

- ◆ Fuel lines have been crushed.
- ◆ Fuel filter is blocked.
- ◆ Fuel pumps are defective.

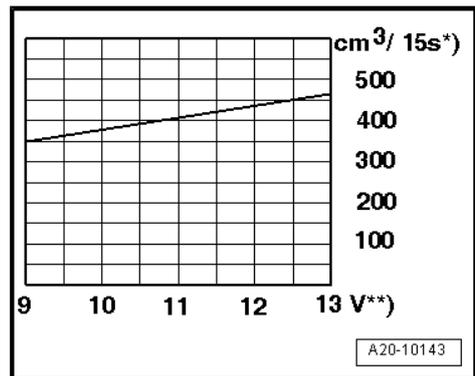
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**Note**

*As there is hardly any difference in the delivery rate if only one of the two fuel pumps is working – because of the hose connections inside the tank – it is difficult to diagnose a defective pump by just measuring the delivery rate.*

In this case proceed as follows:

- Unplug electrical connector for fuel delivery unit (left-side).
- Measure delivery rate.
- Unplug electrical connector for fuel delivery unit (right-side).
- Measure delivery rate.
- If delivery rate differs considerably from specification, renew relevant fuel delivery unit.



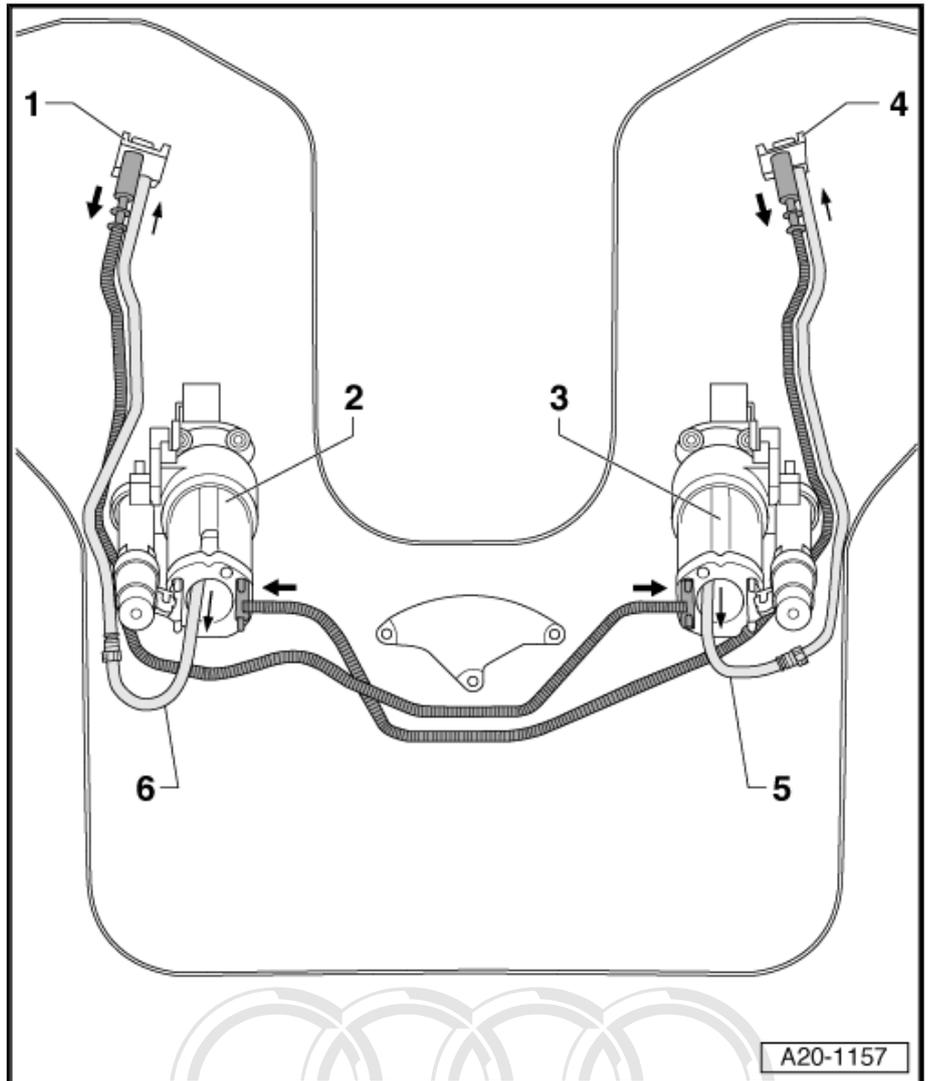
## 1.10 Suction-jet pumps: operation

- 1 - Suction-jet pump (left-side)
- 2 - Fuel delivery unit (left-side)
- 3 - Fuel delivery unit (right-side)
- 4 - Suction-jet pump (right-side)
- 5 - Fuel pump (right-side)
- 6 - Fuel pump (left-side)

**Description of operation**

To ensure a reliable fuel supply in all situations, the fuel pumps must never draw in air, even under extreme driving conditions such as very sharp bends or under heavy braking. This may happen when the fuel sloshes into one of the corners of a partially filled fuel tank.

- ◆ For this reason, the fuel delivery units  
 ⇒ [Item 2 \(page 41\)](#) and  
 ⇒ [Item 3 \(page 41\)](#) incorporate a so-called baffle housing, into which the fuel pumps are inserted, as well as the fuel pumps themselves. The baffle housing is a container permanently filled with fuel, so that the fuel pumps are surrounded with fuel regardless of the fuel level in the tank.
- ◆ Consequently, proper filling of the baffle housings is essential for trouble-free operation of the fuel pumps. This is the purpose of the suction jet pumps.



- ◆ The suction-jet pumps operate according to the principle of fluid entrainment: a stream of fuel from the primary stage of the fuel pump (right-side) ⇒ [Item 5 \(page 41\)](#) or (left-side) ⇒ [Item 6 \(page 41\)](#) is passed through a nozzle in the suction-jet pumps ⇒ [Item 4 \(page 41\)](#) and ⇒ [Item 1 \(page 41\)](#), and is thus accelerated. The accelerated stream of fuel draws off the surrounding fuel and delivers it to the baffle housings in the fuel delivery units. The suction jet pump (right-side) ⇒ [Item 4 \(page 41\)](#) delivers the fuel to the baffle housing (left-side); the suction jet pump (left-side) ⇒ [Item 1 \(page 41\)](#) delivers the fuel to the baffle housing (right-side).

**1.11 Removing and installing suction-jet pump (left-side)**

**Removing**

- Observe safety precautions ⇒ [page 1](#) .
- Observe rules for cleanliness ⇒ [page 3](#) .
- Remove the fuel delivery unit (left-side) ⇒ [page 18](#) .
- Remove fuel gauge sender 3 - G237- (tubular sender, left-side) from fuel tank.



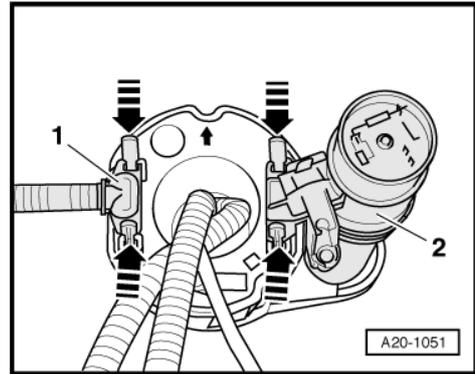
- Working through right fuel tank opening, press release tabs -arrows- and detach fuel supply line -1-.



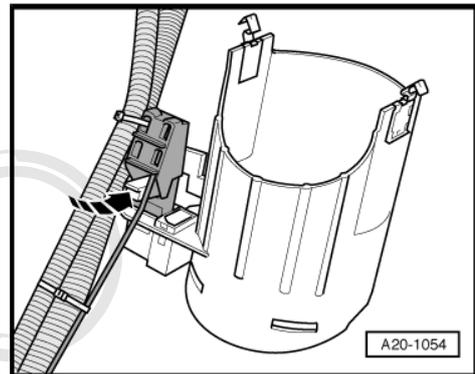
**Note**

Disregard -item 2-.

- Pull out disconnected fuel supply line -1- through left fuel tank opening.

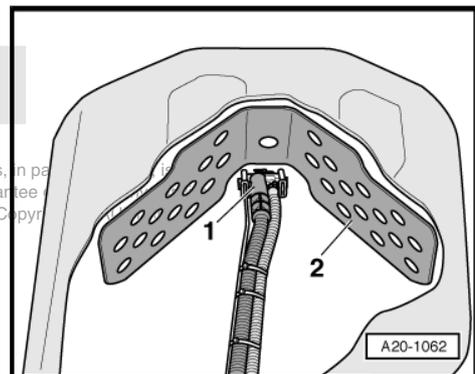


- Working through left fuel tank opening, press release tab -arrow- and detach retaining clip for suction jet lines from retainer.
- Pull out suction-jet pump (left-side) together with lines through left fuel tank opening.



**Installing**

- Insert suction-jet pump (left-side) -1- into fuel tank and place into recess in baffle plate -2- in fuel tank at front, as shown in illustration.
- Then press retaining clip for suction-jet pump into retainer so it engages audibly.

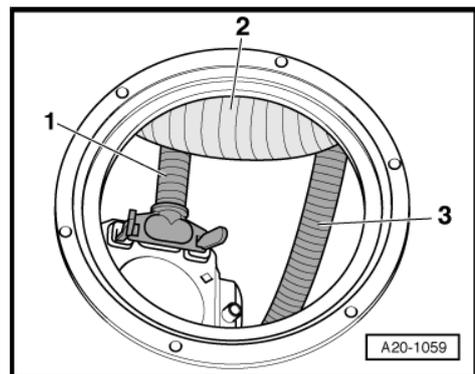


- Push fuel supply line -3- through left fuel tank opening into right fuel tank chamber. Note routing:
  - The supply line -3- must be routed below the fuel filler pipe -2- at the left fuel tank opening.



**Note**

Disregard -item 1-.

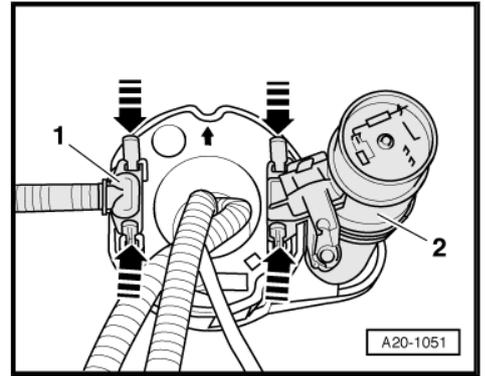


- Fit fuel supply line -1- onto fuel delivery unit (right-side) so that the locking hooks engage audibly.

 **Note**

*Disregard -item 2-.*

- Insert fuel gauge sender 3 - G237- (tubular sender, left-side) into fuel tank.
- Install fuel delivery unit (left-side) ⇒ [page 23](#) .



## 1.12 Removing and installing suction-jet pump (right-side)

### Removing

Observe safety precautions ⇒ [page 1](#) .

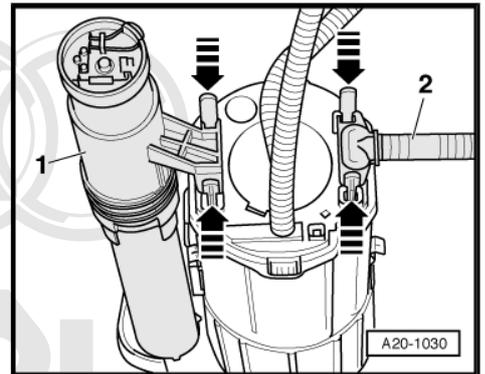
Observe rules for cleanliness ⇒ [page 3](#) .

- Remove fuel delivery unit (right-side) ⇒ [page 29](#) .
- Remove fuel gauge sender 4 - G393- (tubular sender, right-side) from fuel tank.
- Working through left fuel tank opening, press release tabs -arrows- and detach fuel supply line -2-.

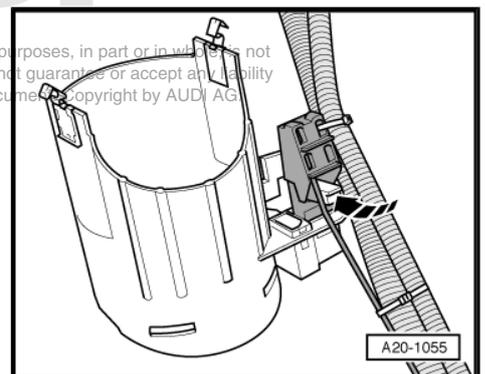
 **Note**

*Disregard -item 1-.*

- Pull out disconnected fuel supply line -2- from right fuel tank opening.



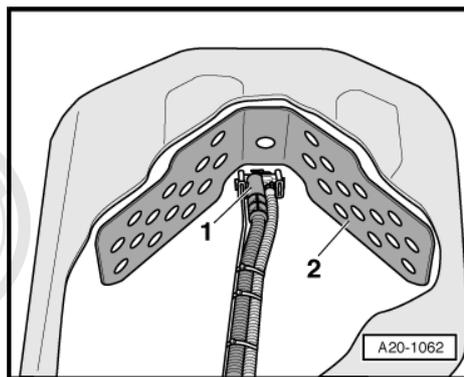
- Working through right fuel tank opening, press release tab -arrow- and detach retaining clip for suction jet lines from retainer.
- Pull suction-jet pump (right-side) together with lines out of right fuel tank opening.



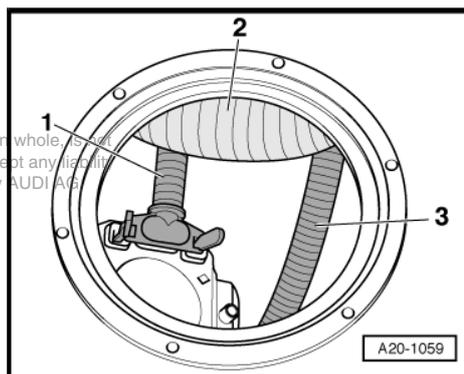


### Installing

- Insert suction-jet pump (right-side) -1- into fuel tank and place into recess in baffle plate -2- in fuel tank at front, as shown in illustration.
- Then press retaining clip for suction-jet pump into retainer so it engages audibly.



- Push fuel supply line -1- through right fuel tank opening into left fuel tank chamber. Note routing:
- The supply line -1- must be routed below the fuel filler pipe -2- at the left fuel tank opening.



**i** Note

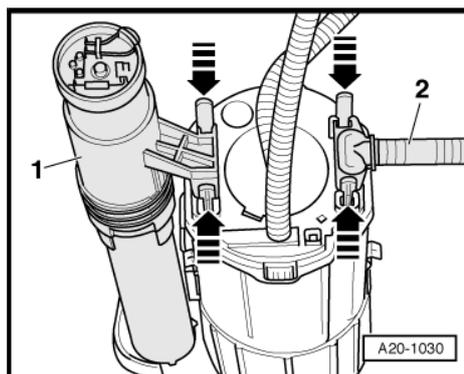
*Disregard -item 3-*.

- Fit fuel supply line -2- onto fuel delivery unit (left-side) so that the locking hooks engage audibly.

**i** Note

*Disregard -item 1-*.

- Insert fuel gauge sender 4 - G393- (tubular sender, right-side) into fuel tank.
- Install fuel delivery unit (right-side) ⇒ [page 34](#) .



## 2 Fuel gauge senders

⇒ [“2.1 Checking fuel gauge sender G \(lever-type sender, left-side\)”, page 45](#)

⇒ [“2.2 Removing and installing fuel gauge sender G \(lever-type sender, left-side\)”, page 46](#)

⇒ [“2.3 Checking fuel gauge sender 2 G169 \(lever-type sender, right-side\)”, page 47](#)

⇒ [“2.4 Removing and installing fuel gauge sender 2 G169 \(lever-type sender, right-side\)”, page 48](#)

⇒ [“2.5 Checking fuel gauge sender 3 G237 \(tubular sender, left-side\)”, page 49](#)

⇒ [“2.6 Removing and installing fuel gauge sender 3 G237 \(tubular sender, left-side\)”, page 50](#)

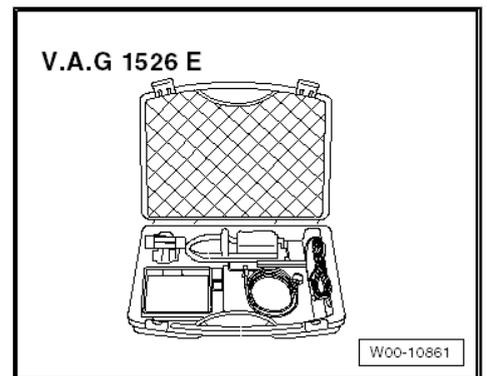
⇒ [“2.7 Checking fuel gauge sender 4 G393 \(tubular sender, right-side\)”, page 54](#)

⇒ [“2.8 Removing and installing fuel gauge sender 4 G393 \(tubular sender, right-side\)”, page 56](#)

### 2.1 Checking fuel gauge sender - G- (lever-type sender, left-side)

Special tools and workshop equipment required

- ◆ Hand-held multimeter - V.A.G 1526 E-



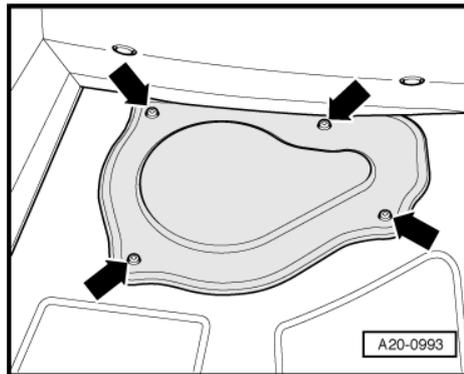
- ◆ Auxiliary measuring set - V.A.G 1594 C-



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**Test sequence**

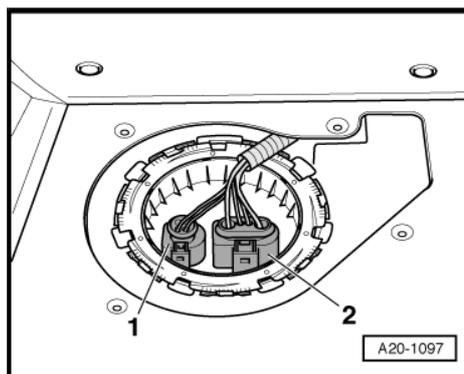
- Remove luggage compartment floor lining.
- Detach cover for flange (left-side) -arrows-.



- Unplug electrical connector -1- at flange.

 **Note**

Disregard -item 2-.



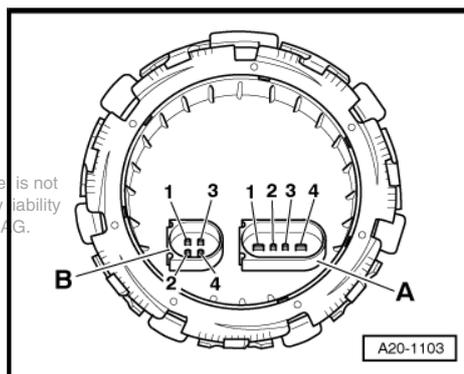
- Connect hand-held multimeter - V.A.G 1526 E- between contacts -2- and -4- of connector -B- to measure resistance.

Sender installed	Sender at lower stop	Sender at upper stop
Fuel gauge sender - G-	approx. 700 Ω	approx. 55 Ω

 **Note**

- ◆ If the resistance is 0 Ω, there is a short circuit. If the resistance is ∞ Ω, there is an open circuit in the wiring.
- ◆ In order to test the maximum and minimum resistance values for "tank full" and "tank empty", remove the fuel gauge sender - G- ⇒ [page 46](#) and move the float all the way to its top or bottom position.
- ◆ The following values are obtained with the fuel gauge sender - G- removed, due to the greater travel of the float arm:

Sender removed	Sender at lower stop	Sender at upper stop
Fuel gauge sender - G-	approx. 990 Ω	approx. 55 Ω



Assemble in reverse order.

**2.2 Removing and installing fuel gauge sender - G- (lever-type sender, left-side)**

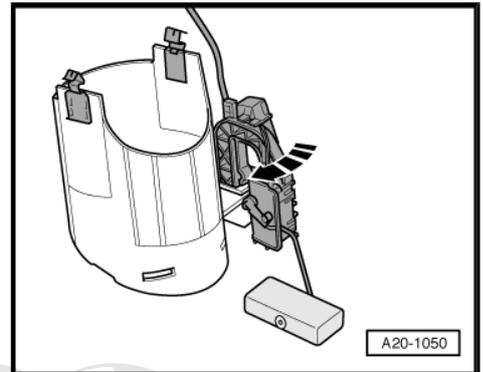
**Removing**

- Observe safety precautions ⇒ [page 1](#) .
- Observe rules for cleanliness ⇒ [page 3](#) .

- The fuel tank must be drained completely before removing the lever-type sender. Procedure for draining the fuel tank ⇒ [page 7](#) .
- Remove the fuel delivery unit (left-side) ⇒ [page 18](#) .
- Remove fuel gauge sender 3 - G237- (tubular sender, left-side) from fuel tank.
- Release fuel gauge sender - G- -arrow- and detach from retainer.

**Installing**

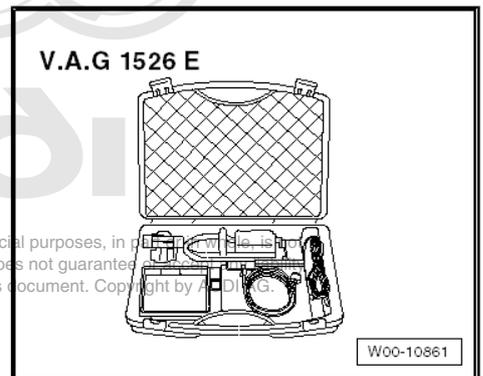
- Press fuel gauge sender - G- into retainer so that it engages audibly.
- Insert fuel gauge sender 3 - G237- into fuel tank.
- Install fuel delivery unit (left-side) ⇒ [page 23](#) .



### 2.3 Checking fuel gauge sender 2 - G169- (lever-type sender, right-side)

**Special tools and workshop equipment required**

- ◆ Hand-held multimeter - V.A.G 1526 E-



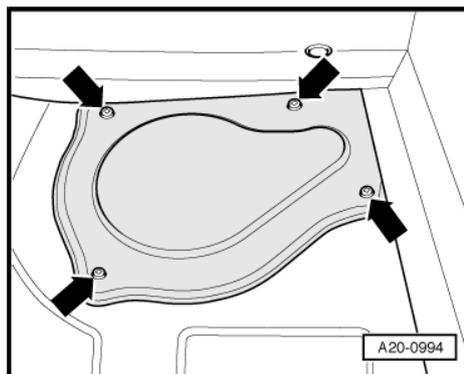
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- ◆ Auxiliary measuring set - V.A.G 1594 C-



### Test sequence

- Remove luggage compartment floor lining.
- Unscrew cover for flange (right-side) -arrows-.

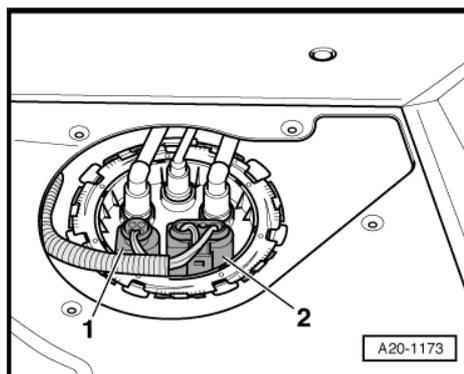


- Unplug electrical connector -1- at flange.



### Note

Disregard -item 2-.



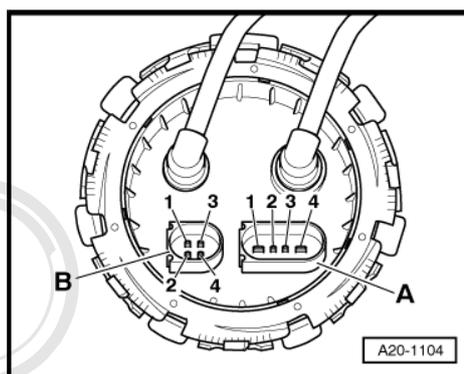
- Connect hand-held multimeter - V.A.G 1526 E- between contacts -2- and -4- of connector -B- to measure resistance.

Sender installed	Sender at lower stop	Sender at upper stop
Fuel gauge sender 2 - G169-	approx. 750 Ω	approx. 55 Ω



### Note

- ◆ If the resistance is 0 Ω, there is a short circuit. If the resistance is ∞ Ω, there is an open circuit in the wiring.
- ◆ In order to test the maximum and minimum values for "tank full" and "tank empty", remove the fuel gauge sender 2 - G169- ⇒ [page 48](#) and move the float all the way to its top or bottom position.
- ◆ The following values are obtained with the fuel gauge sender 2 - G169- removed, due to the greater travel of the float arm:



Sender removed	Sender at lower stop	Sender at upper stop
Fuel gauge sender 2 - G169-	approx. 990 Ω	approx. 55 Ω

## 2.4 Removing and installing fuel gauge sender 2 - G169- (lever-type sender, right-side)

### Removing

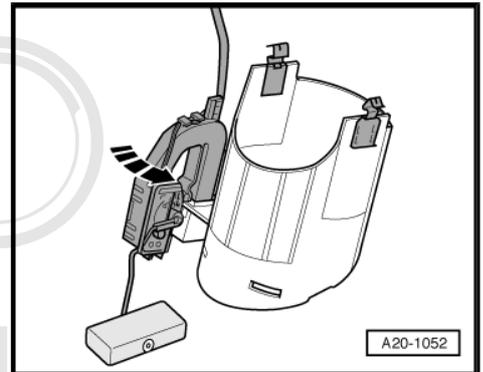
Observe safety precautions ⇒ [page 1](#) .

Observe rules for cleanliness ⇒ [page 3](#) .

- The fuel tank must be drained completely before removing the lever-type sender. Procedure for draining the fuel tank ⇒ [page 7](#) .
- Remove fuel delivery unit (right-side) ⇒ [page 29](#) .
- Remove fuel gauge sender 4 - G393- (tubular sender, right-side) from fuel tank.
- Release fuel gauge sender 2 - G169- -arrow- and detach from retainer.

**Installing**

- Press fuel gauge sender 2 - G169- into retainer so that it engages audibly.
- Insert fuel gauge sender 4 - G393- into fuel tank.
- Install fuel delivery unit (right-side) ⇒ [page 34](#) .

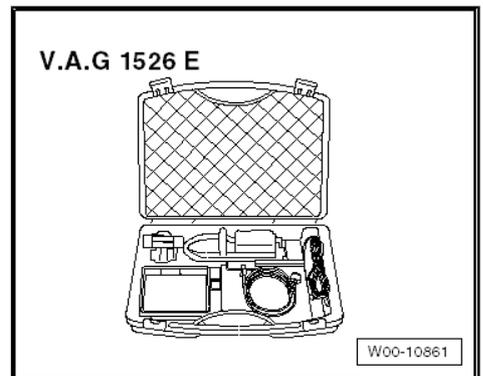


**2.5 Checking fuel gauge sender 3 - G237- (tubular sender, left-side)**

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**Special tools and workshop equipment required**

- ◆ Hand-held multimeter - V.A.G 1526 E-

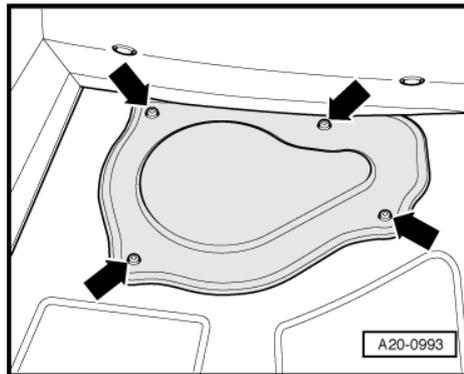


- ◆ Auxiliary measuring set - V.A.G 1594 C-



**Test sequence**

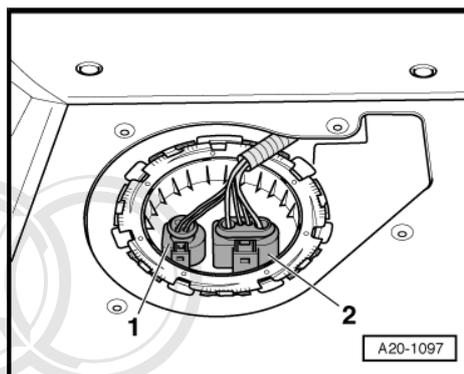
- Remove luggage compartment floor lining.
- Detach cover for flange (left-side) -arrows-.



- Unplug electrical connector -2- at flange.

 **Note**

Disregard -item 1-.

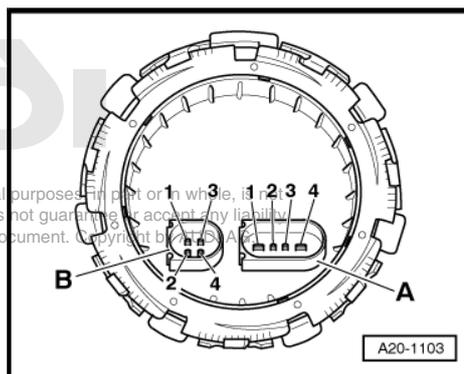


- Connect hand-held multimeter - V.A.G 1526 E- between contacts -2- and -3- of connector -A- to measure resistance.

Sender removed	Sender at lower stop	Sender at upper stop
Fuel gauge sender 3 - G237-	approx. 155 Ω	approx. 70 Ω

 **Note**

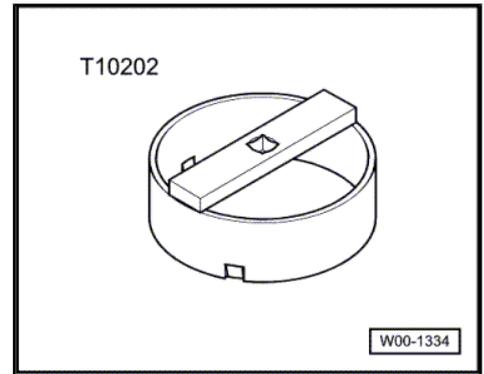
- ◆ If the resistance is 0 Ω, there is a short circuit. If the resistance is ∞ Ω, there is an open circuit in the wiring.
- ◆ In order to test the maximum and minimum values for “tank full” and “tank empty”, remove the fuel gauge sender 3 - G237- ⇒ [page 50](#) and move the float all the way to its top or bottom position.



## 2.6 Removing and installing fuel gauge sender 3 - G237- (tubular sender, left-side)

Special tools and workshop equipment required

- ◆ Wrench - T10202-



### Removing

Observe safety precautions ⇒ [page 1](#) .

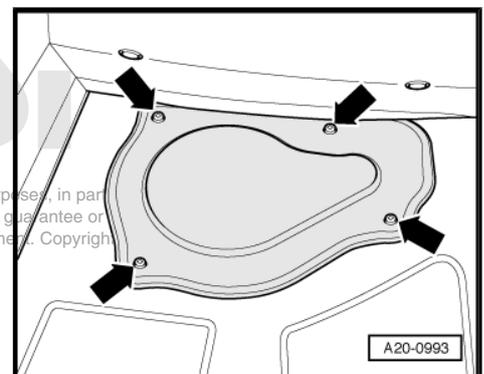
Observe rules for cleanliness ⇒ [page 3](#) .

- The left fuel tank chamber must not be more than  $\frac{1}{3}$  full when removing the tubular sender. Procedure for draining the fuel tank ⇒ [page 7](#) .
- Briefly open filler cap for fuel tank and close again.

### Note

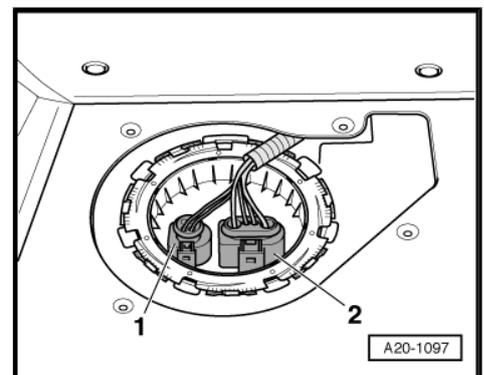
*For removing and installing tubular sender, take tool kit and spare wheel out of luggage compartment. You can then sit or kneel in the spare wheel well.*

- Remove luggage compartment floor lining.
- Detach cover for flange (left-side) -arrows-.

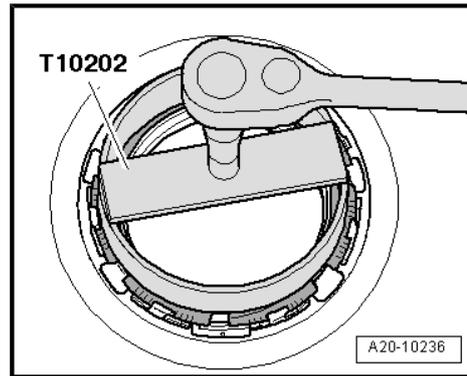


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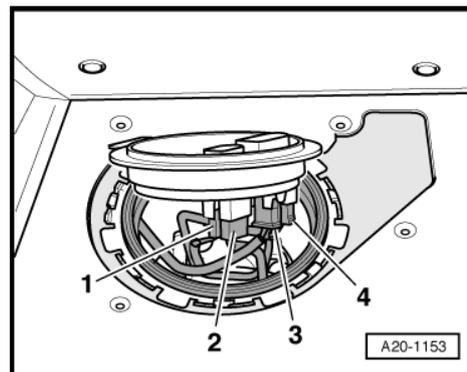
- Unplug electrical connectors -1- and -2- at flange.



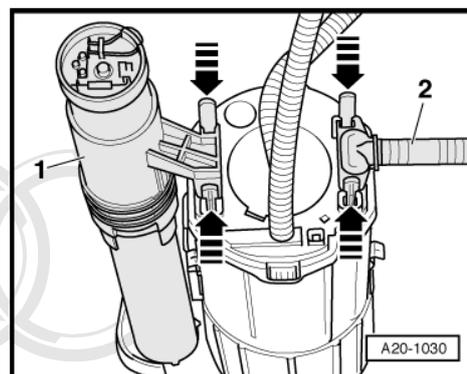
- Unscrew locking ring using wrench - T10202- .



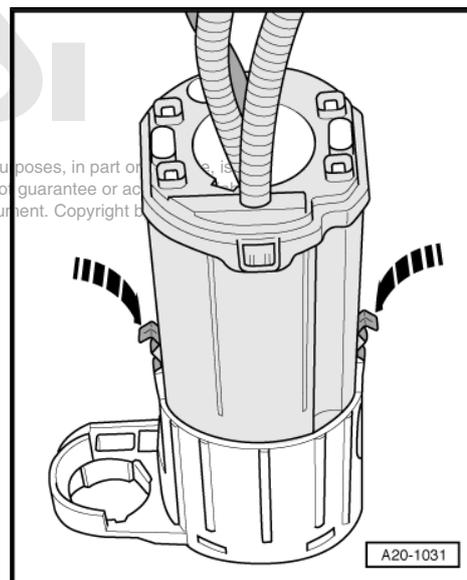
- Detach flange and remove seal.
- Detach electrical connectors -1 ... 4- at underside of flange.



- Working through left fuel tank opening, press release tabs -arrows- and detach supply line -2- and fuel gauge sender 3 - G237- -item 1-.
- Move fuel gauge sender 3 - G237- to left side.



- Press down both retaining clips on retainer for fuel delivery unit (left-side) -arrows-.
- Pull fuel delivery unit slightly upwards and at the same time take out fuel gauge sender 3 - G237- .



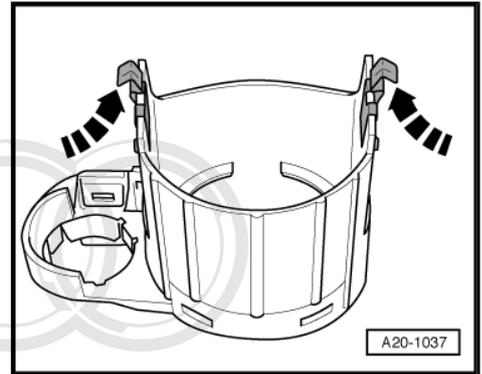
 **Note**

*Keep in mind that the fuel gauge sender 3 - G237- still contains fuel.*

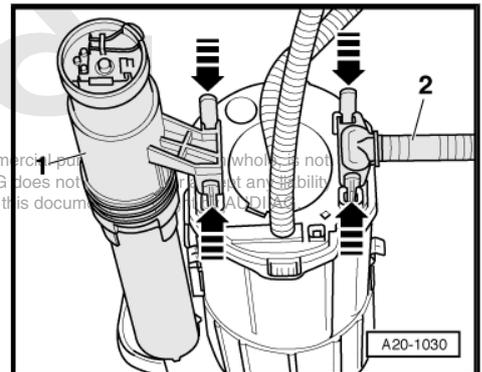
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### Installing

- Pull both retaining clips on retainer upwards -arrows- so that they engage audibly before installing the fuel delivery unit (left-side).
- Then press fuel delivery unit carefully into retainer so that it engages audibly.

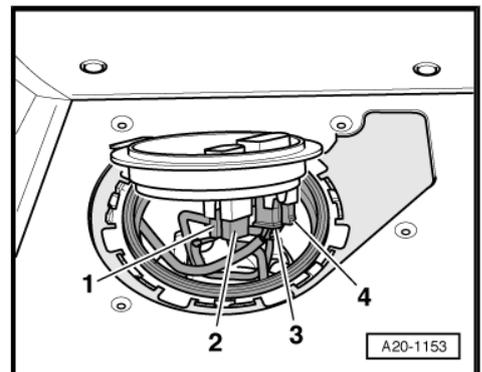


- Fit fuel supply line -2- and fuel gauge sender 3 - G237- -item 1- so that they engage audibly.

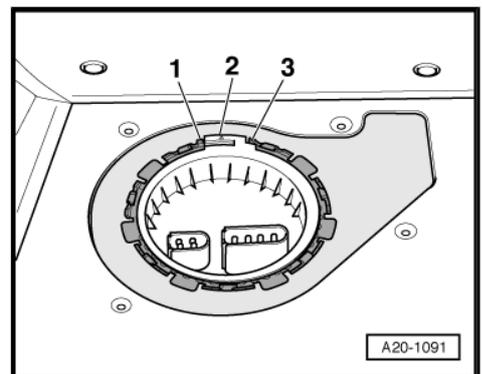


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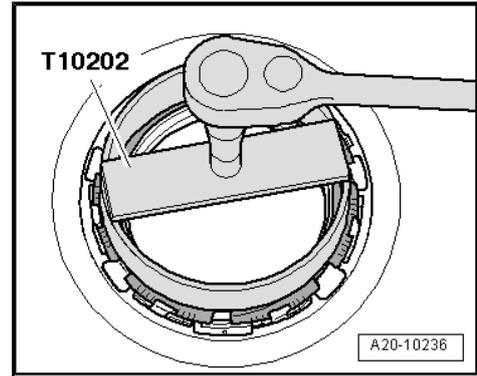
- Connect electrical connectors -1 ... 4- at underside of flange.



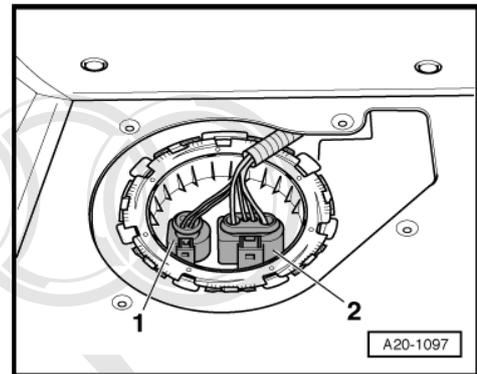
- Fit new seal for flange in fuel tank opening (seal should be dry).
- Fit flange (left-side) into fuel tank; note correct installation position:
  - Lug -2- on flange must be between tabs -1- and -3- on fuel tank.



- Tighten locking ring.



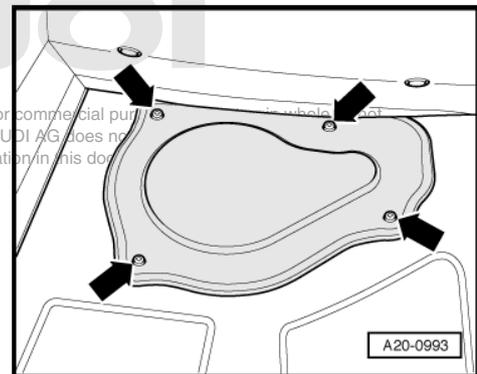
- Attach electrical connectors -1- and -2- at flange.



- Secure cover for flange (left-side) -arrows-.

**Tightening torque**

Component	Nm
Locking ring for fuel delivery unit	120



**2.7 Checking fuel gauge sender 4 - G393- (tubular sender, right-side)**

**Special tools and workshop equipment required**

- ◆ Hand-held multimeter - V.A.G 1526 E-

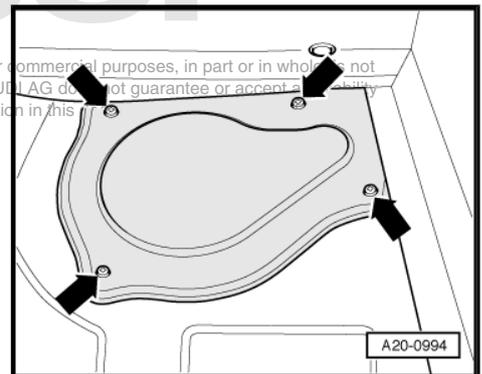


- ◆ Auxiliary measuring set - V.A.G 1594 C-



### Test sequence

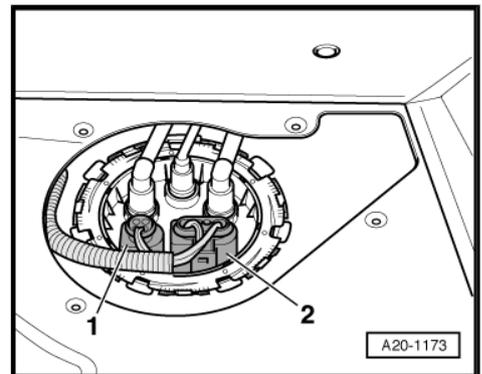
- Remove luggage compartment floor lining.
- Unscrew cover for flange (right-side) -arrows-



- Unplug electrical connector -2- at flange.

 **Note**

Disregard -item 1-.

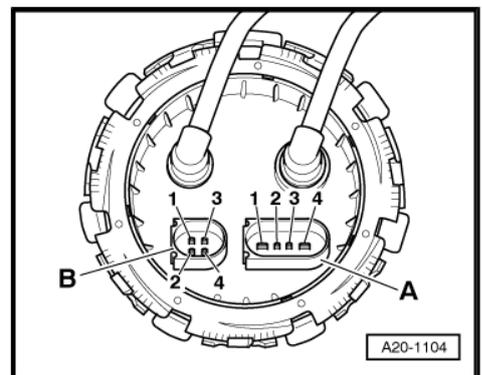


- Connect hand-held multimeter - V.A.G 1526 E- between contacts -2- and -3- of connector -A- to measure resistance.

Sender removed	Sender at lower stop	Sender at upper stop
Fuel gauge sender 4 - G393-	approx. 155 Ω	approx. 70 Ω

 **Note**

- ◆ If the resistance is 0 Ω, there is a short circuit. If the resistance is ∞ Ω, there is an open circuit in the wiring.
- ◆ In order to test the maximum and minimum values for "tank full" and "tank empty", remove the fuel gauge sender 4 - G393- ⇒ [page 56](#) and move the float all the way to its top or bottom position.

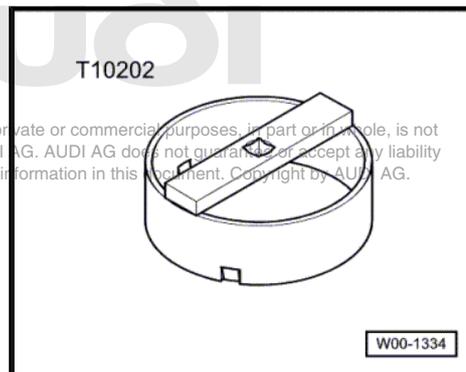


## 2.8 Removing and installing fuel gauge sender 4 - G393- (tubular sender, right-side)

### Special tools and workshop equipment required

- ◆ Wrench - T10202-

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### Removing

Observe safety precautions ⇒ [page 1](#) .

Observe rules for cleanliness ⇒ [page 3](#) .

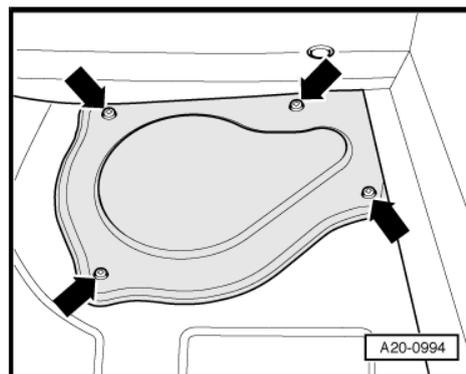
- The right fuel tank chamber must not be more than  $\frac{1}{3}$  full when removing the tubular sender. Procedure for draining the fuel tank ⇒ [page 7](#) .
- Briefly open filler cap for fuel tank and close again.



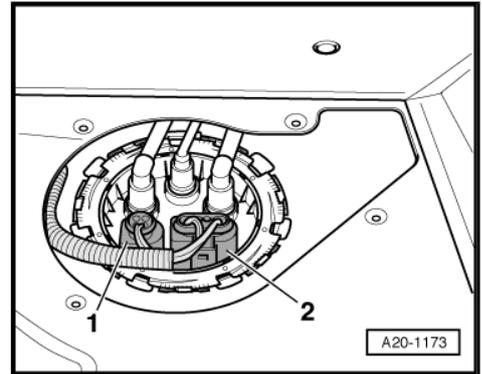
### Note

*For removing and installing tubular sender, take tool kit and spare wheel out of luggage compartment. You can then sit or kneel in the spare wheel well.*

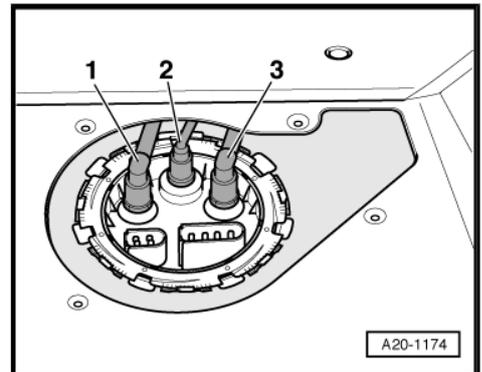
- Remove luggage compartment floor lining.
- Unscrew cover for flange (right-side) -arrows-.



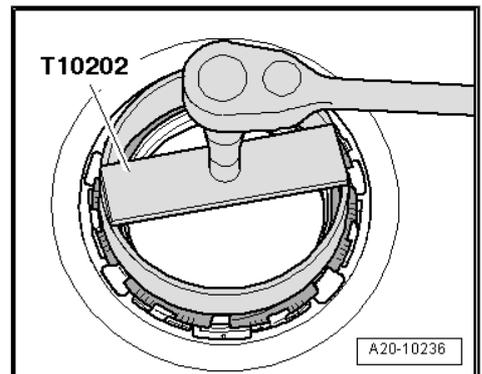
- Unplug electrical connectors -1- and -2- at flange.



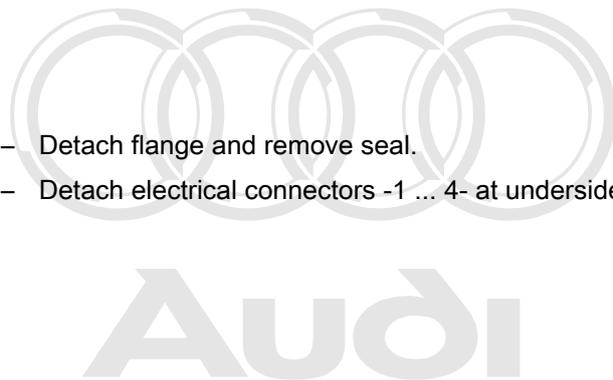
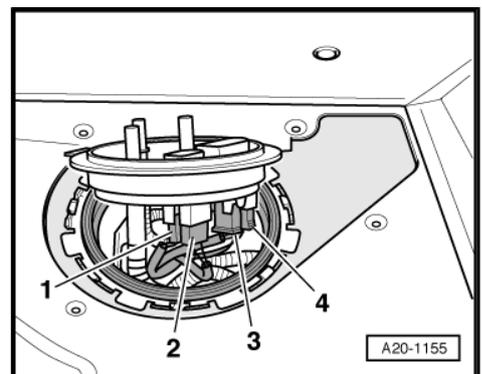
- Mark fuel return line -1- and fuel supply line -3-.
- Detach both lines from flange (press release tabs).
- In addition, disconnect fuel line -2- leading to metering pump for auxiliary heater (press release tab).



- Unscrew locking ring using wrench - T10202- .



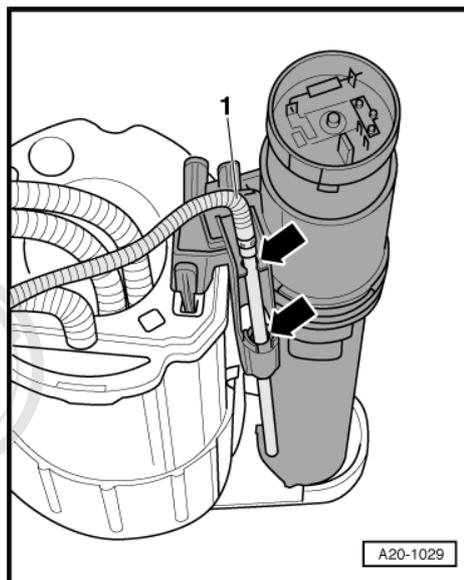
- Detach flange and remove seal.
- Detach electrical connectors -1 ... 4- at underside of flange.



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**i** Note

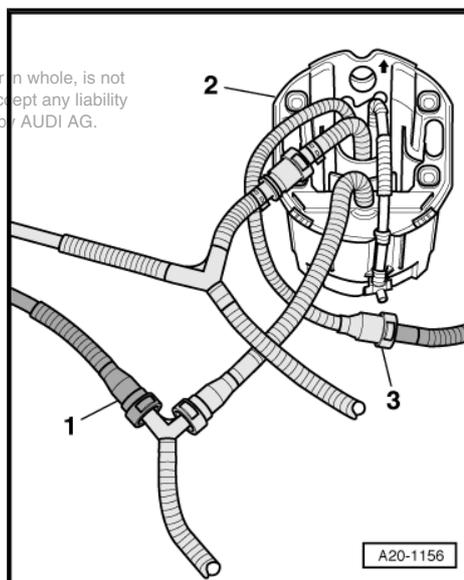
- ◆ Pull out fuel lines from fuel tank opening prior to disconnecting the pipe connectors mentioned below.
  - ◆ Some of the components are shown removed in the following illustration.
- Pull out suction pipe -1- for auxiliary heater from retainer -arrows- on tubular sender (right-side).



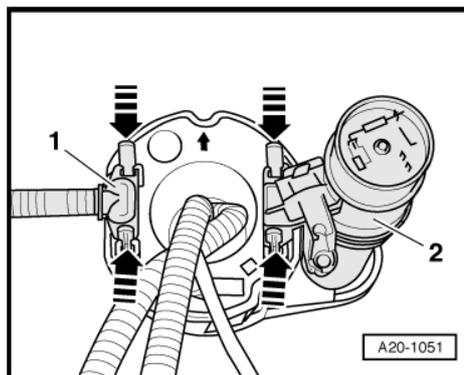
- Working through right fuel tank opening, press release tab and disconnect fuel lines -1- and -3-.

2 - Fuel delivery unit (right-side) with fuel pump -G23-

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- Working through right fuel tank opening, press release tabs -arrows- and detach supply line -1- and fuel gauge sender 4 - G393- -item 2-.
- Move fuel gauge sender 4 - G393- to right side.

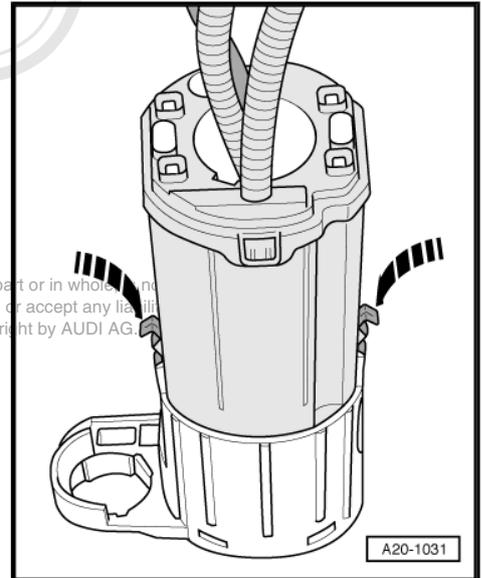


- Press down both retaining clips on retainer for fuel delivery unit (right-side) -arrows-.
- Pull fuel delivery unit slightly upwards and at the same time take out fuel gauge sender 4 - G393- .

**i Note**

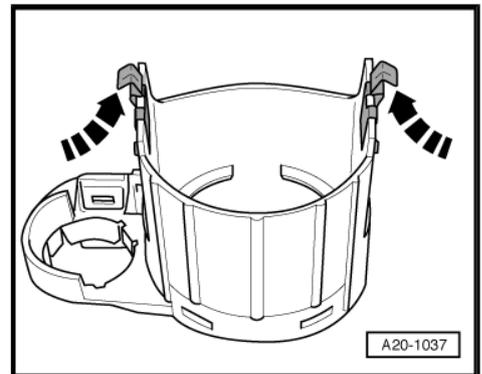
*Keep in mind that the fuel gauge sender 4 - G393- still contains fuel.*

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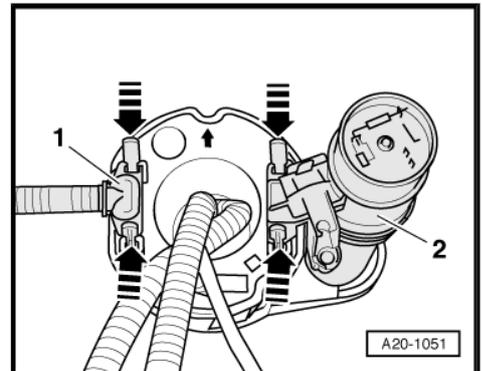


**Installing**

- Pull both retaining clips on retainer upwards -arrows- so that they engage audibly before installing fuel delivery unit (right-side).
- Then press fuel delivery unit carefully into retainer so that it engages audibly.

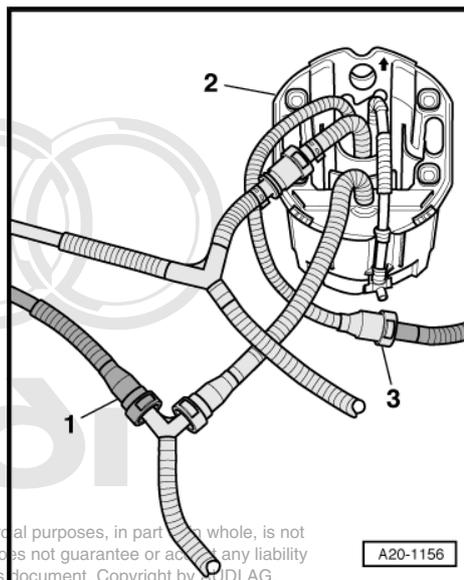


- Fit fuel supply line -1- and fuel gauge sender 4 - G393- -item 2- so that they engage audibly.



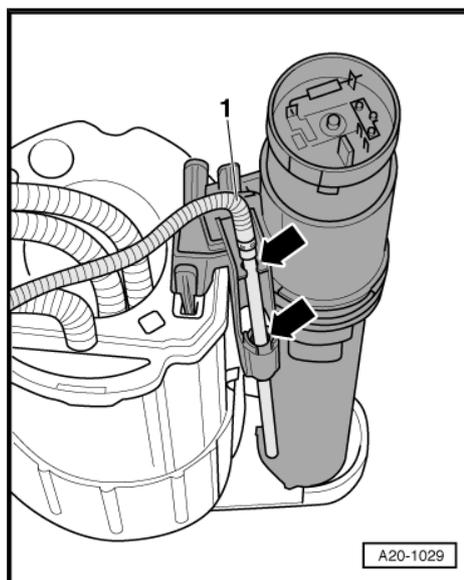


- Fit fuel lines -1- and -3- through right fuel tank opening so that they engage audibly.
- 2 - Fuel delivery unit (right-side) with fuel pump - G23- .

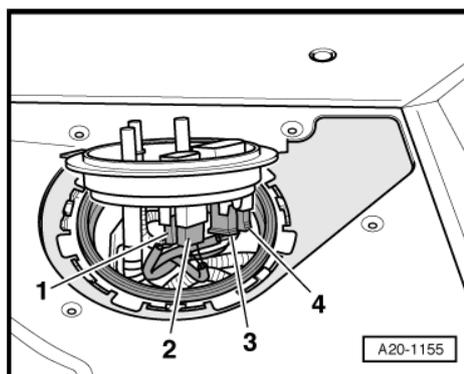


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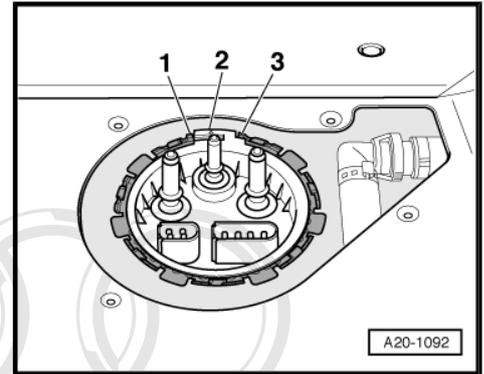
- Fit suction pipe -1- for auxiliary heater into retainers -arrows- on tubular sender (right-side).



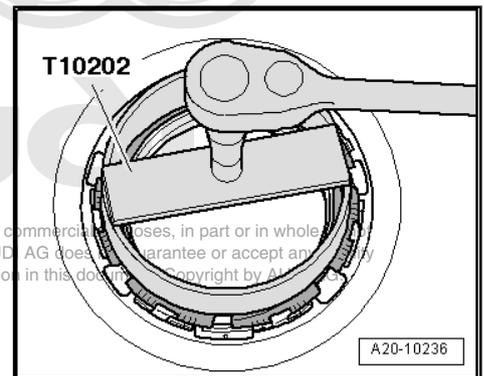
- Connect electrical connectors -1 ... 4- at underside of flange.



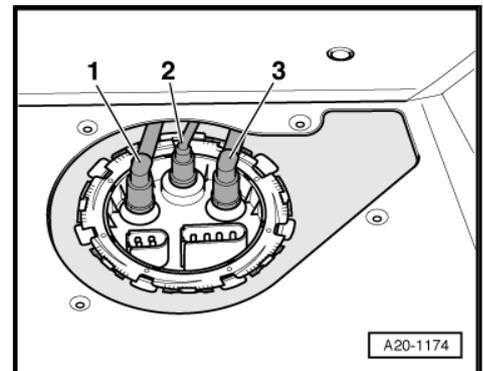
- Fit new seal for flange in fuel tank opening (seal should be dry).
- Fit flange (right-side) into fuel tank; note correct installation position:
  - Lug -2- on flange must be between tabs -1- and -3- on fuel tank.



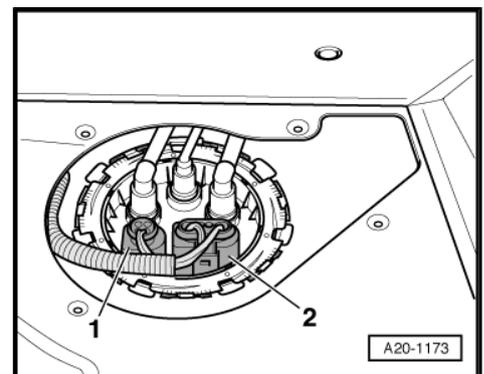
- Tighten locking ring.



- Fit fuel return line -1- and fuel supply line -3- so that they engage audibly.
- Also fit supply line -2- going to auxiliary heater so that it engages audibly.



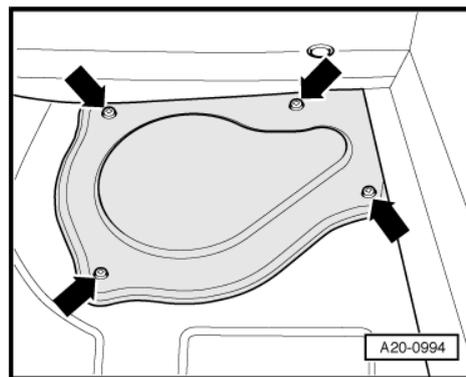
- Attach electrical connectors -1- and -2- at flange.



- Secure cover for flange -arrows-.

**Tightening torque**

Component	Nm
Locking ring for fuel delivery unit	120



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### 3 Fuel cooler

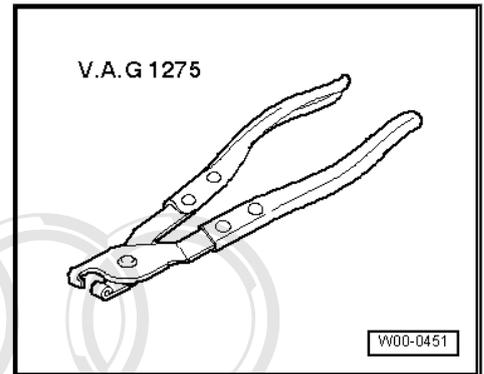
⇒ [“3.1 Removing and installing fuel cooler on underbody”, page 63](#)

⇒ [“3.2 Removing and installing fuel cooler on engine - vehicles with 8-cylinder 4.0 ltr. TDI engine”, page 64](#)

#### 3.1 Removing and installing fuel cooler on underbody

Special tools and workshop equipment required

- ◆ Hose clip pliers - V.A.G 1275-

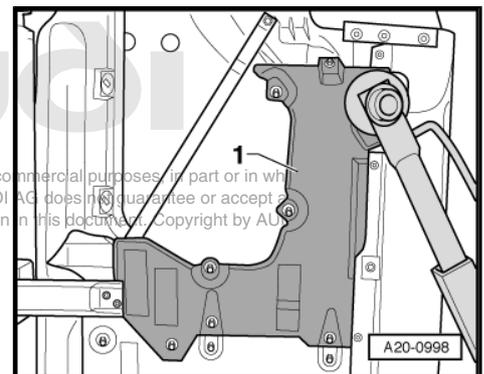


- ◆ Drip tray

#### Removing

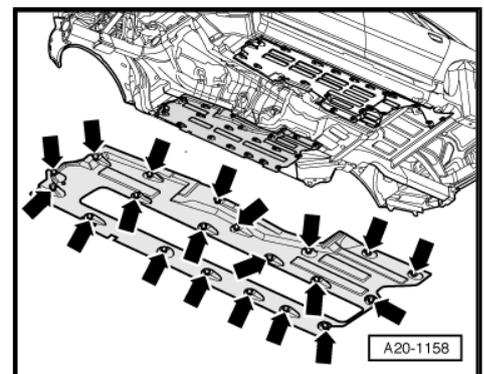
Observe rules for cleanliness ⇒ [page 3](#) .

- Remove cover -1- on rear right side of fuel tank.

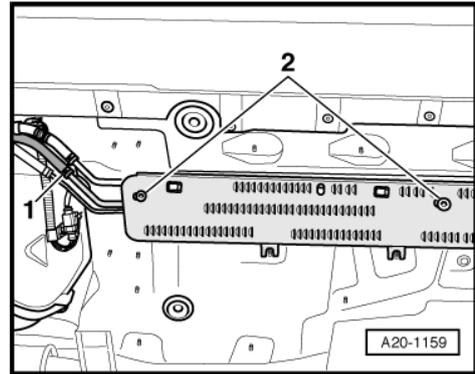


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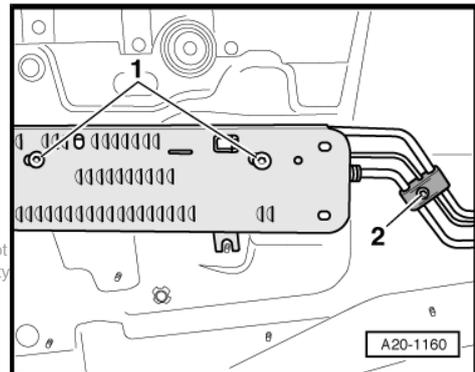
- Remove underbody cover (right-side) -arrows-.



- Place drip tray below underbody.
- Disconnect fuel return line -1- from rear of fuel cooler and catch escaping fuel.
- Remove bolts -2-.



- Unscrew bolt -2- for the front bracket for the fuel lines.
- Remove bolts -1-.



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- Move fuel cooler -2- to side and down and remove fuel return line -1- at front of fuel cooler.
- Unclip fuel supply lines -arrows- using a screwdriver and detach fuel cooler.

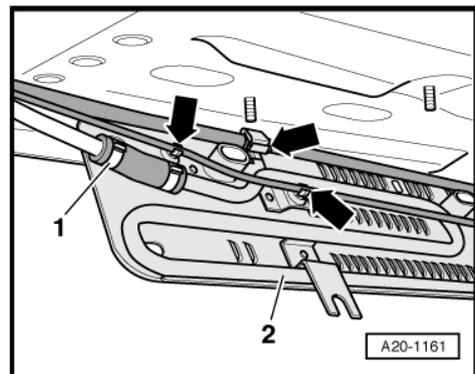
#### Installing

Installation is carried out in the reverse order; note the following:



#### Note

Secure all hose connections with the correct type of hose clips (same as original equipment) ⇒ Parts catalogue.



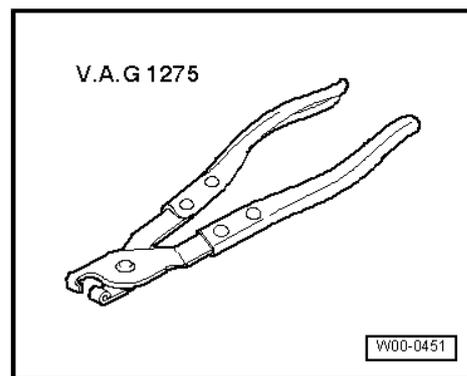
#### Tightening torques

Component	Nm
Fuel cooler to underbody	1.75
Cover to underbody	2.3

### 3.2 Removing and installing fuel cooler on engine - vehicles with 8-cylinder 4.0 ltr. TDI engine

Special tools and workshop equipment required

◆ Hose clip pliers - V.A.G 1275-



### Removing

Observe rules for cleanliness ⇒ [page 3](#) .



#### Note

*The fuel cooler is located under the high-pressure pump (on the engine).*

- Remove high-pressure pump with front bracket ⇒ Rep. gr. 13 .
- Disconnect fuel return hose -1- at fuel cooler.
- Detach coolant hoses -2- and -3- at fuel cooler.
- Remove bolts -arrows-.
- Remove fuel cooler.

### Installing

Installation is carried out in the reverse order; note the following:



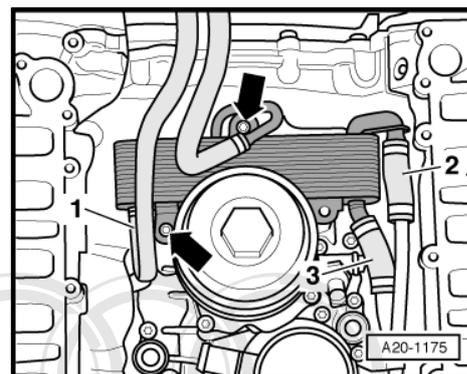
#### Note

- ◆ *Always renew seals and gaskets when assembling.*
- ◆ *Secure all hose connections with the correct type of hose clips (same as original equipment) ⇒ Parts catalogue.*

- Install high-pressure pump with front bracket ⇒ Rep. gr. 13 .

### Tightening torque

Component	Nm
Fuel cooler to mounting plate	10



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## 4 Servicing fuel filter

⇒ "4.1 Fuel filter - exploded view of components", page 66

⇒ "4.2 Removing and installing fuel filter", page 67

### 4.1 Fuel filter - exploded view of components

#### 1 - Bracket

- For fuel filter

#### 2 - 10 Nm

#### 3 - O-ring

- Inserted in filter housing

#### 4 - Regulating valve

- Installation position: arrow points towards fuel tank
- When changing filter, remove retaining clip and take regulating valve off with fuel lines connected
- Make sure O-ring in filter housing is in correct position when fitting regulating valve
- Temperatures below approx. 60 °C: Passage to filter open
- Temperatures above approx. 70 °C: Passage to filter closed

#### 5 - Return line

- To fuel cooler
- Blue marking

#### 6 - Supply line

- From fuel tank
- White marking

#### 7 - Spring-type clip

#### 8 - Bleeder screw, 4 Nm

#### 9 - Seal

- Renew

#### 10 - Retaining clip

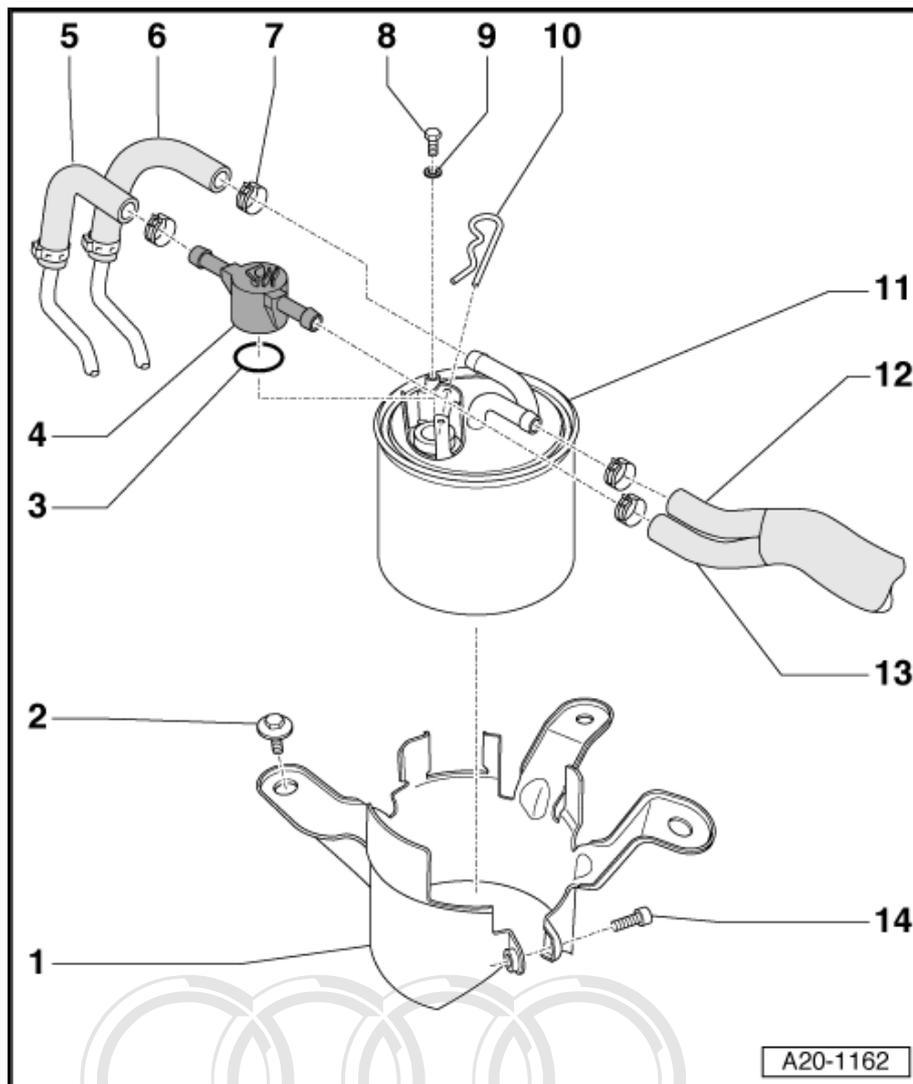
- Renew after removing

#### 11 - Fuel filter

- Flow direction is marked by arrows
- Do not interchange connections
- Renew filter at intervals specified in Service Schedule ⇒ Maintenance, Booklet 404
- With seal for regulating valve

#### 12 - Supply line

- To high-pressure pump
- White marking



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**13 - Return line**

- From engine
- Blue marking

**14 - 10 Nm**

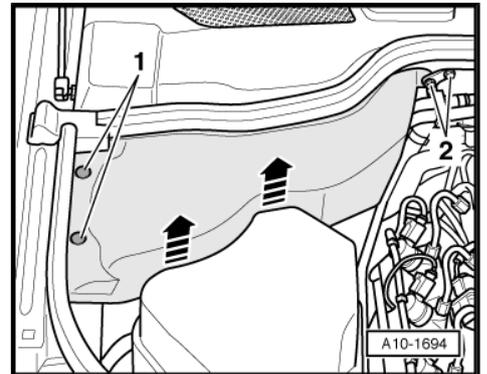
**4.2 Removing and installing fuel filter**

**Removing**

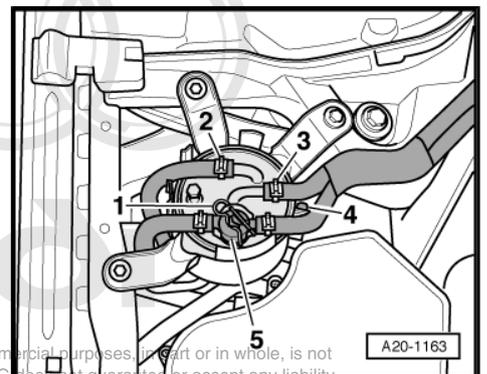
Observe rules for cleanliness ⇒ [page 3](#) .

 **Note**

- ◆ *Fitting location of fuel filter: at rear right of engine compartment.*
- ◆ *Please ensure that no diesel fuel contacts coolant hoses. If necessary clean hoses immediately.*
- ◆ *Please observe requirements for disposal.*



- If fitted, remove cover for suspension turret (right-side); to do so, detach spreader clips -1- and unscrew bolted joint -2-.
- Pull cover out of retainers -arrows-.
- Detach retaining clip -1-.
- Detach regulating valve -5- with fuel pipes still connected.
- Disconnect fuel hoses -2- and -3- from hose connections.
- Slacken clamping bolt -4- at bracket and remove fuel filter from bracket.

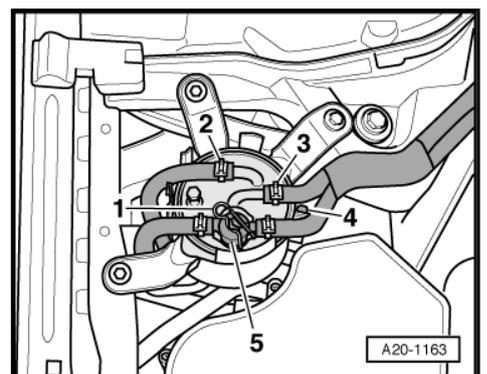


**Installing**

Installation is carried out in the reverse order; note the following:

 **Note**

- ◆ *Always renew seals, retaining clips and gaskets when assembling.*
- ◆ *Secure all hose connections with the correct type of hose clips (same as original equipment) ⇒ [Electronic parts catalogue](#) .*
- Fill new filter with clean diesel fuel. This will enable the engine to start more quickly.
- Fit fuel filter in bracket and tighten clamping bolt -4- to 10 Nm.
- Make sure O-ring in filter housing is in correct position when fitting regulating valve -5-.
- Install regulating valve with fuel lines connected.
- Attach retaining clip -1-.
- Push fuel hoses -2- and -3- onto hose connections and secure with hose clips.



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## 5 Bleeding fuel system

Due to the design of the engine, with a fuel system pressurisation pump located in the fuel tank, it is not necessary to bleed the fuel system.

The fuel system bleeds itself when the starter is operated.



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## 6 Checking fuel system for leaks

⇒ [“6.1 Checking fuel system for leaks \(vehicles with 6-cyl. TDI engine\)”, page 69](#)

⇒ [“6.2 Checking fuel system for leaks \(vehicles with 8-cyl. 4.0 ltr. TDI engine\)”, page 70](#)

⇒ [“6.3 Checking fuel system for leaks \(vehicles with 8-cyl. 4.2 ltr. TDI engine\)”, page 72](#)

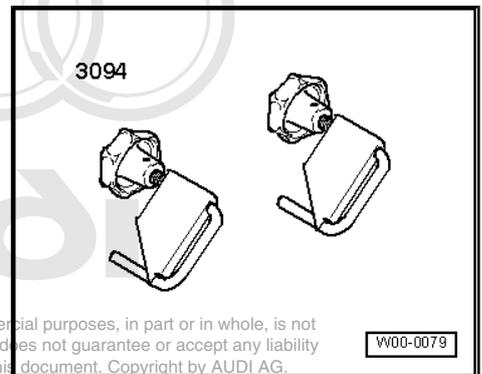
### 6.1 Checking fuel system for leaks (vehicles with 6-cyl. TDI engine)

A leaking fuel system can cause:

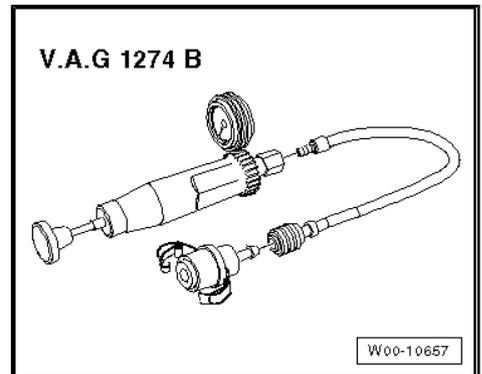
- ◆ Foam build-up or air bubbles in the supply line
- ◆ Lack of power, misfiring
- ◆ Starting problems

#### Special tools and workshop equipment required

- ◆ Hose clamps, up to 25 mm - 3094-

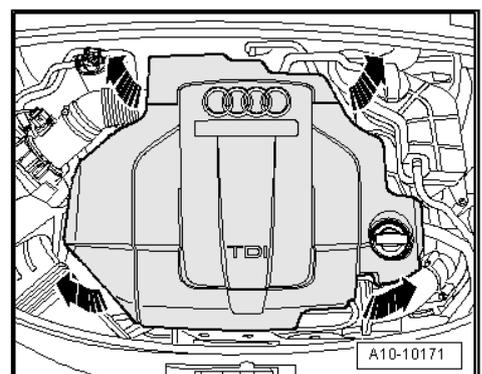


- ◆ Cooling system tester - V.A.G 1274 B- with adapter - V.A.G 1274/1 A- and adapter for testing diesel fuel - V.A.G 1274/2-



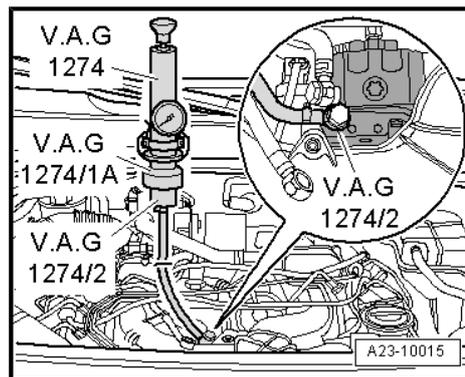
#### Procedure

- Carefully pull engine cover panel off four retaining pins one after the other -arrows-.

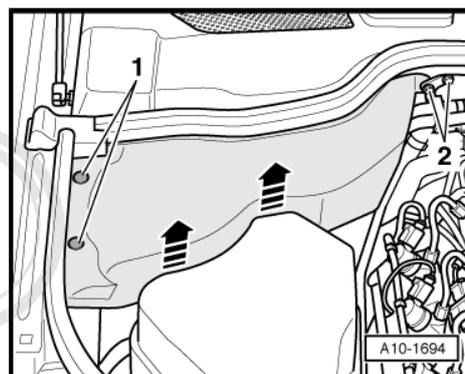




- Attach adapter - V.A.G 1274/2- with adapter - V.A.G 1274/1A- to coolant system tester - V.A.G 1274 B- .
- Unscrew fuel supply line at high-pressure pump and connect up hose of adapter - V.A.G 1274/2- in its place.

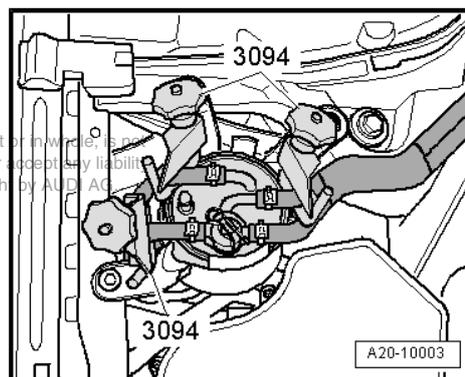


- If fitted, remove cover for suspension turret (right-side); to do so, detach spreader clips -1- and unscrew bolted joint -2-.
- Pull cover out of retainers -arrows-.



- Fit hose clamps - 3094- at the following points:
  - Supply line upstream of fuel filter.
  - Supply line to high-pressure pump.
  - Return line to fuel tank.

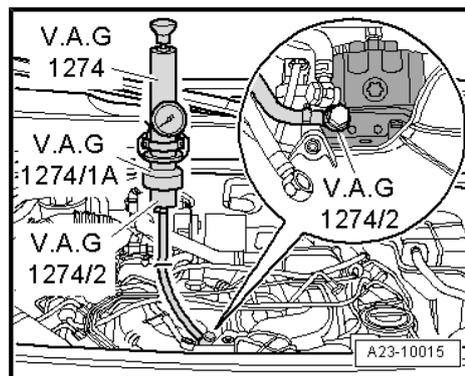
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- Use cooling system tester - V.A.G 1274 B- to create a pressure of between 1.0 ... 1.5 bar.
- If pressure drops constantly, locate leak and eliminate fault.

**i** Note

*By moving the hose clamps from the filter to the fuel tank connections it is also possible to check the fuel hoses at the same time.*



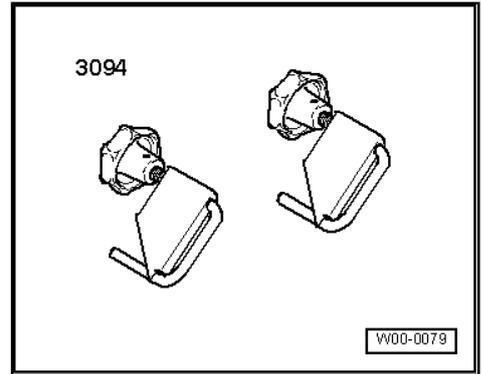
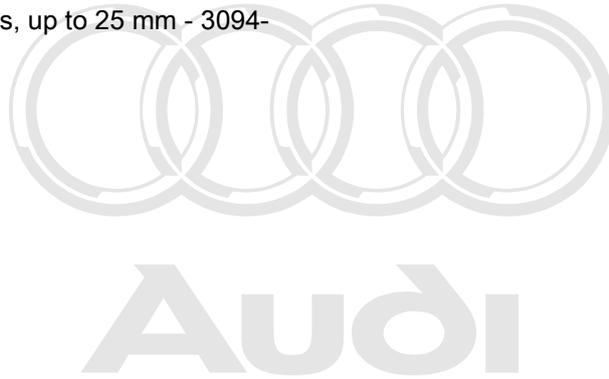
## 6.2 Checking fuel system for leaks (vehicles with 8-cyl. 4.0 ltr. TDI engine)

A leaking fuel system can cause:

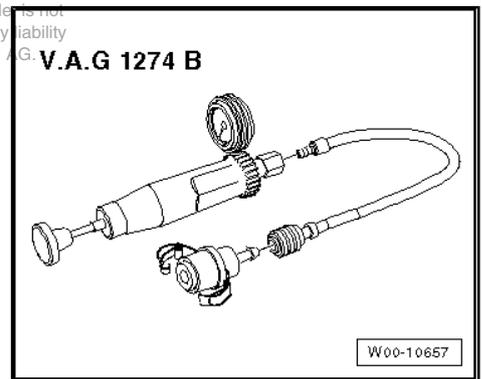
- ◆ Foam build-up or air bubbles in the supply line
- ◆ Lack of power, misfiring
- ◆ Starting problems

**Special tools and workshop equipment required**

- ◆ Hose clamps, up to 25 mm - 3094-

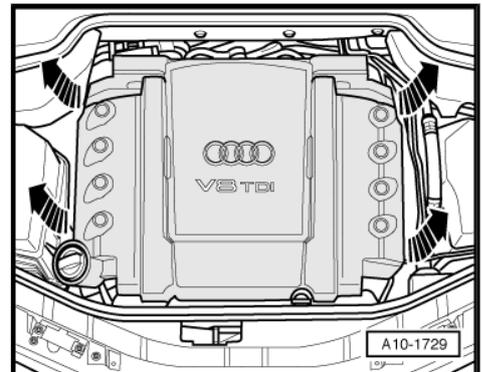


- ◆ Cooling system tester - V.A.G 1274 B- with adapter - V.A.G 1274/1 A- and adapter for testing diesel fuel - V.A.G 1274/2-

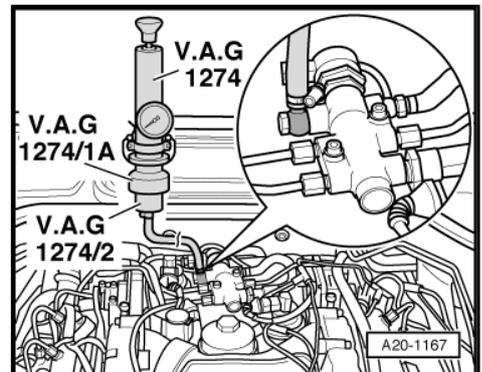


**Procedure**

- Carefully pull engine cover panel off four retaining pins one after the other -arrows-.

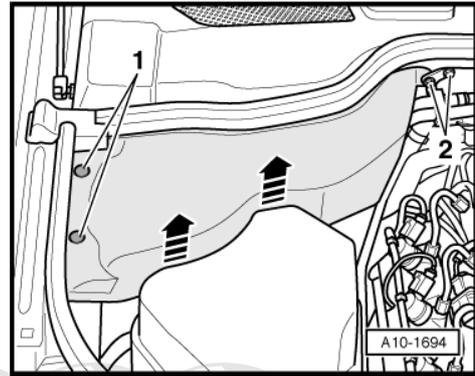


- Attach adapter - V.A.G 1274/2- with adapter - V.A.G 1274/1A- to coolant system tester - V.A.G 1274 B- .
- Unscrew fuel return line at fuel rail and connect up hose of adapter - V.A.G 1274/2- in its place.

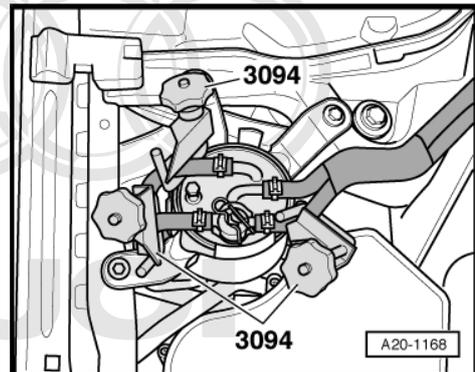




- If fitted, remove cover for suspension turret (right-side); to do so, detach spreader clips -1- and unscrew bolted joint -2-.
- Pull cover out of retainers -arrows-.



- Fit hose clamps - 3094- at the following points:
  - Supply line upstream of fuel filter.
  - Return line to fuel tank.
  - Return line from fuel cooler on engine.



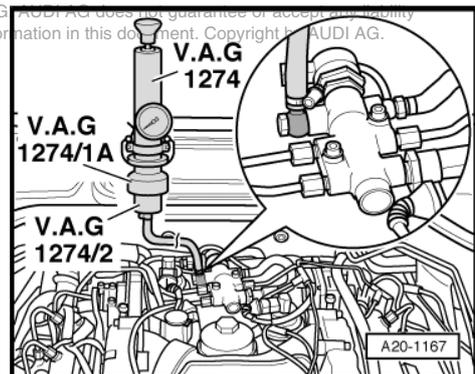
- Use cooling system tester - V.A.G 1274 B- to create a pressure of between 1.0 ... 1.5 bar.
- If pressure drops constantly, locate leak and eliminate fault.

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**Note**

*By moving the hose clamps from the filter to the fuel tank connections it is also possible to check the fuel hoses at the same time.*



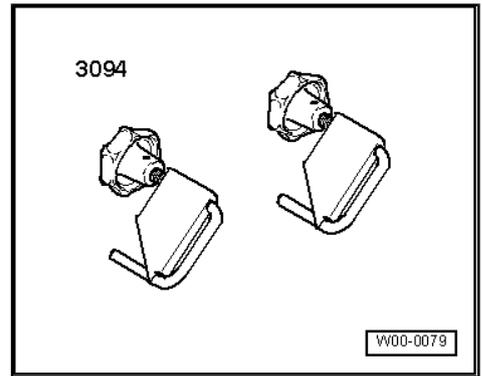
### 6.3 Checking fuel system for leaks (vehicles with 8-cyl. 4.2 ltr. TDI engine)

A leaking fuel system can cause:

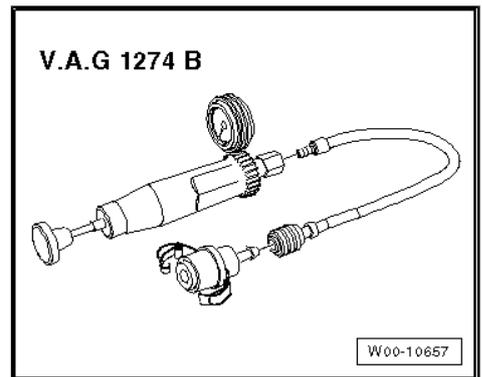
- ◆ Foam build-up or air bubbles in the supply line
- ◆ Lack of power, misfiring
- ◆ Starting problems

**Special tools and workshop equipment required**

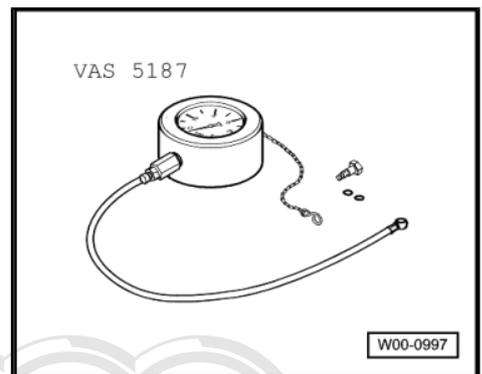
- ◆ Hose clamps, up to 25 mm - 3094-



- ◆ Cooling system tester - V.A.G 1274 B- with adapter - V.A.G 1274/1 A- and adapter for testing diesel fuel - V.A.G 1274/2-

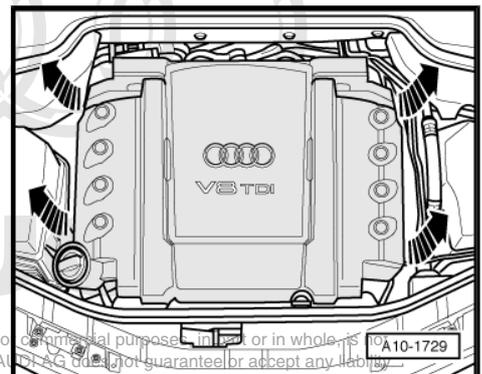


- ◆ Tandem pump tester - VAS 5187-



**Procedure**

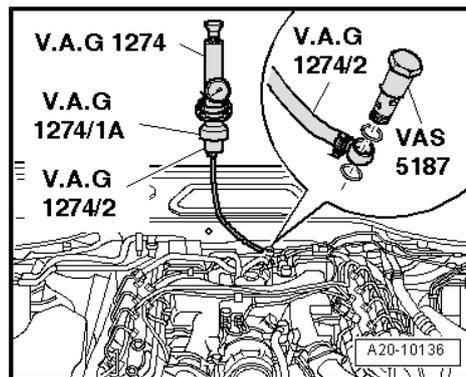
- Carefully pull engine cover panel off four retaining pins one after the other -arrows-.



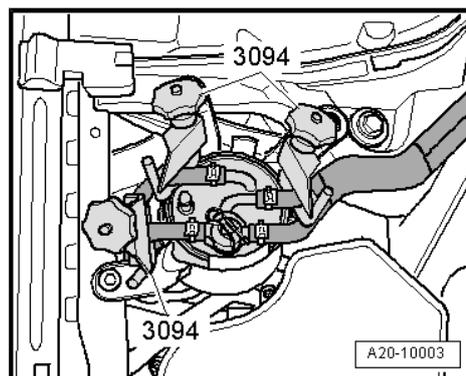
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- Attach adapter - V.A.G 1274/2- with adapter - V.A.G 1274/1A- to coolant system tester - V.A.G 1274 B- .
- Unscrew fuel supply line at high-pressure pump and in its place connect up hose of adapter - V.A.G 1274/2- using banjo bolt from -VAS 5187- to high-pressure pump.



- Fit hose clamps - 3094- at the following points:
  - Supply line upstream of fuel filter.
  - Supply line to high-pressure pump.
  - Return line to fuel tank.

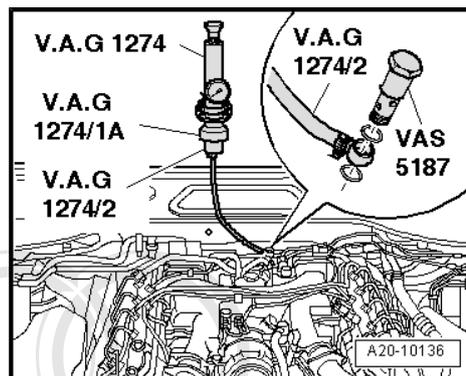


- Use cooling system tester - V.A.G 1274 B- to create a pressure of between 1.0 ... 1.5 bar.
- If pressure drops constantly, locate leak and eliminate fault.



**Note**

*By moving the hose clamps from the filter to the fuel tank connections it is also possible to check the fuel hoses at the same time.*



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## 7 Servicing accelerator mechanism

⇒ [“7.1 Accelerator mechanism - exploded view of components”, page 75](#)

⇒ [“7.2 Removing and installing accelerator pedal module with accelerator position sender”, page 76](#)

⇒ [“7.3 Checking kickdown switch F8”, page 76](#)

⇒ [“7.4 Removing and installing kickdown switch F8”, page 77](#)

### 7.1 Accelerator mechanism - exploded view of components

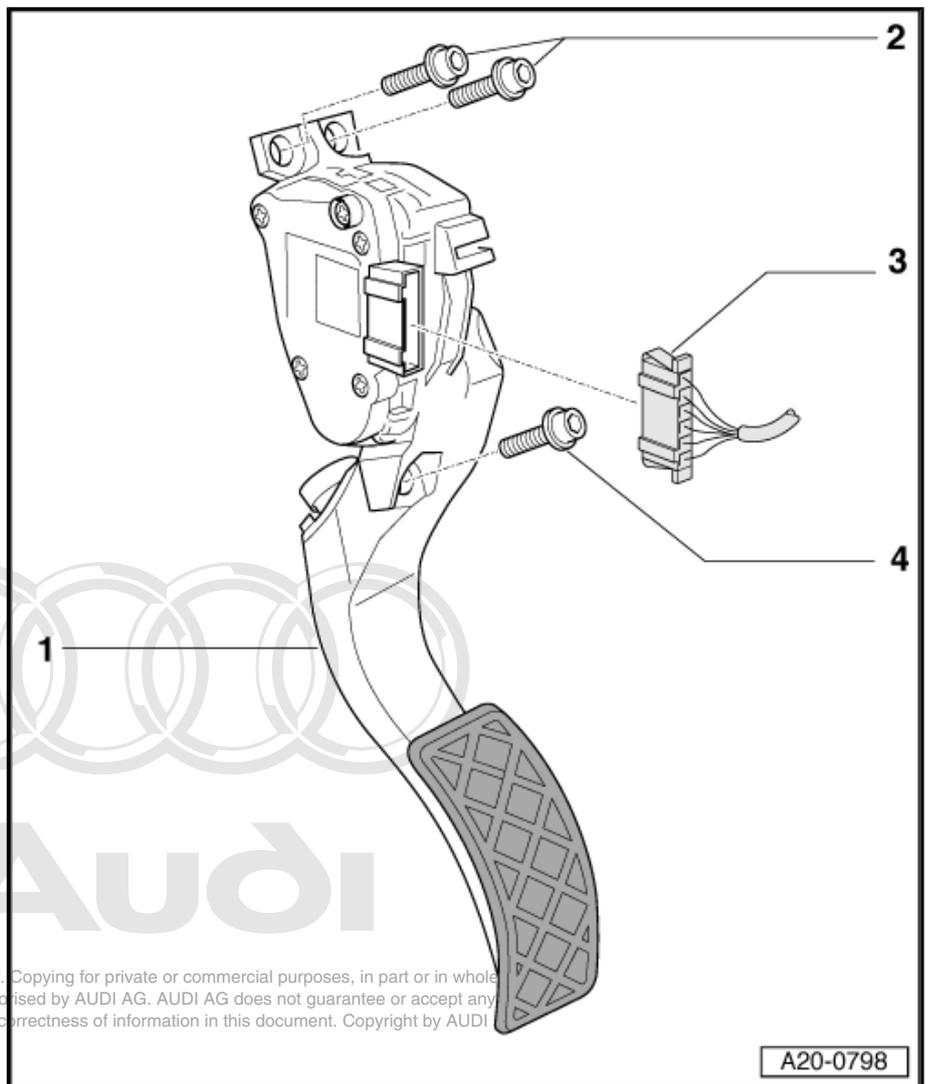
#### 1 - Accelerator pedal module

- With accelerator position sender - G79- and accelerator position sender 2 - G185-
- Removing and installing  
⇒ [page 76](#)

2 - 10 Nm

3 - Electrical connector

4 - 10 Nm



## 7.2 Removing and installing accelerator pedal module with accelerator position sender

### Removing

- Remove storage compartment on driver's side => Rep. gr. 68 .
- Unplug electrical connector -2-.
- Remove bolts -1- and -3-.
- Remove accelerator pedal module.

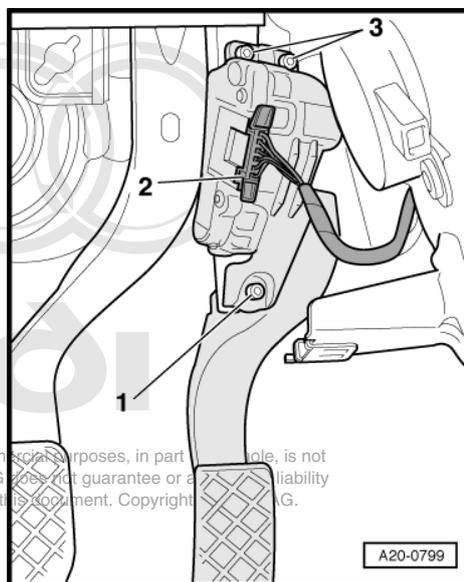
### Installing

Installation is carried out in the reverse order; note the following:

- Install storage compartment on driver's side => Rep. gr. 68 .

### Tightening torque

Component	Nm
Accelerator pedal module to pedal bracket	10



## 7.3 Checking kickdown switch - F8-

### Special tools and workshop equipment required

- ◆ Vehicle diagnostic tester
- ◆ Hand-held multimeter - V.A.G 1526 E-



- ◆ Auxiliary measuring set - V.A.G 1594 C-



### Test conditions

- Vehicle diagnostic tester connected.
- No faults stored in fault memory.

- Engine stopped, ignition switched on

### Test sequence

- Select the following menu items in **Guided Functions** mode of vehicle diagnostic tester :

- ◆ **02-Gearbox electronics**
- ◆ **02-Read measured values**

- Select display group 8 (kickdown switch) from the list → Vehicle diagnostic tester.

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- **Accelerator not depressed: display remains blank**  
 - **Fully depress accelerator pedal beyond kickdown point and keep it pressed.**

- Indicated on display: "kick-down".

If display differs from specification described above:

- Use screwdriver to prise off cover caps.
- Unscrew bolts -arrows- and remove cover for kickdown switch.
- Unplug electrical connector.
- Connect hand-held multimeter - V.A.G 1526 E- to kickdown switch - F8- to measure resistance.
- Specification:  $\infty \Omega$  (no continuity)
- Fully depress accelerator pedal beyond kickdown point and keep it pressed.
- Specification:  $0 \Omega$  (continuity)

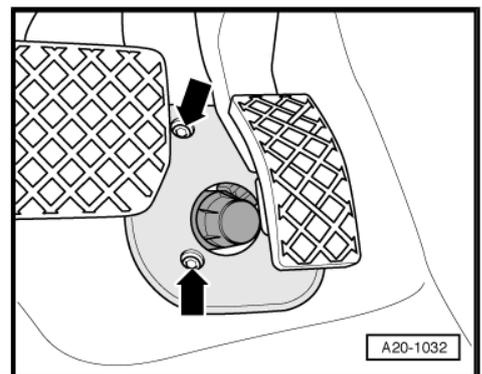
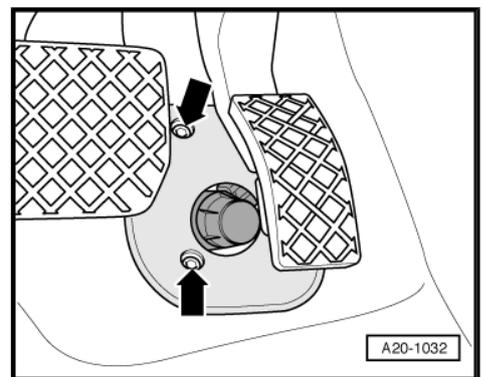
If display differs from specification described above:

- Renew kickdown switch - F8- ⇒ [page 77](#) .

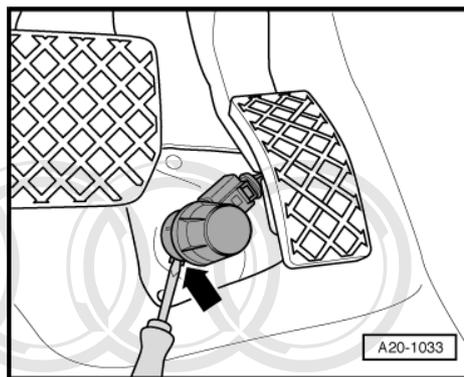
## 7.4 Removing and installing kickdown switch - F8-

### Removing

- Use screwdriver to prise off cover caps.
- Unscrew bolts -arrows- and remove cover for kickdown switch - F8- .



- Use a small screwdriver to release retainer tab -arrow- and turn kickdown switch - F8- anti-clockwise.
- Unplug electrical connector.

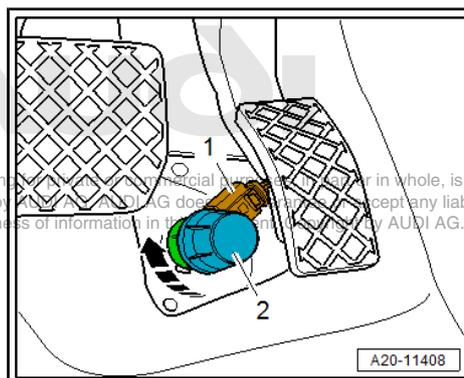


### Installing

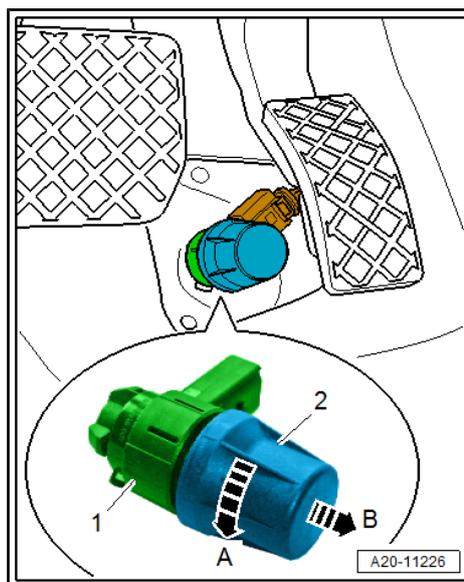
Installation is carried out in the reverse order; note the following:

- Connect electrical connector -1- on kickdown switch - F8- .
- Insert kickdown switch in mounting on vehicle floor and engage by turning clockwise -arrow-.

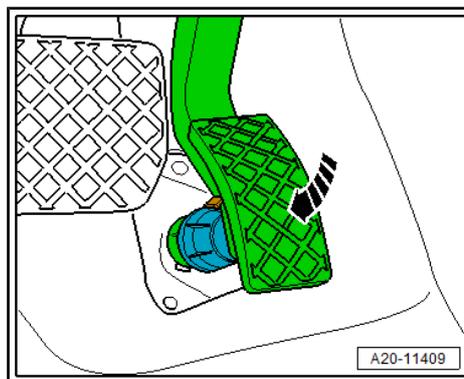
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- Disengage cap -2- of kickdown switch -1-; to do so turn cap anti-clockwise -arrow A-. Pull cap out as far as stop -arrow B-.



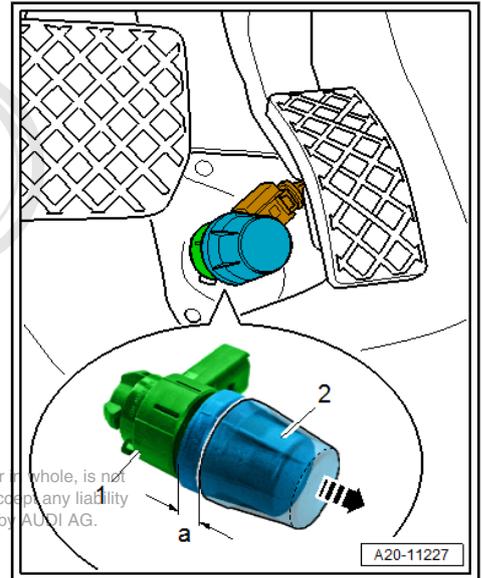
- Press accelerator pedal down as far as stop -arrow- and release again.



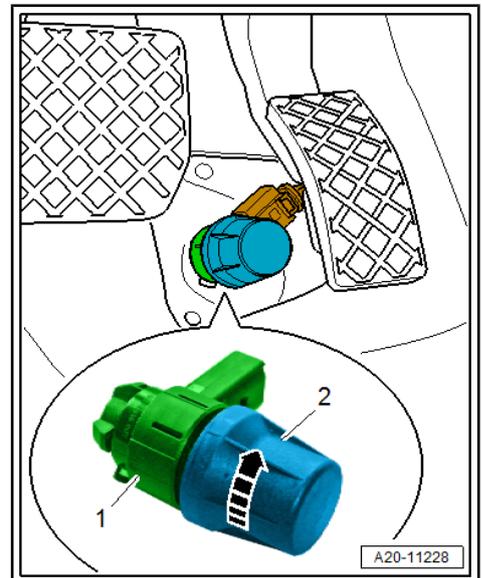
- Pull cap -2- of kickdown switch -1- outwards by distance -a- -arrow-.
- Distance -a- = 5 mm.



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- Lock cap -2- of kickdown switch -1- in its end position by turning it 15° in clockwise direction -arrow-.
- Check kickdown switch - F8- => [page 76](#) .



- Fit cover -arrows-.

