



Workshop Manual

up! 2012 ➤

up! 2017 ➤

up! 2020 ➤

Fuel supply system - natural gas engines									
Engine ID	CPG A								

Edition 10.2019



List of Workshop Manual Repair Groups

Repair Group

00 - Technical data

20 - Fuel supply system



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 information

(VRL013385; Edition 10.2019)

⇒ [“1.1 Safety measures when working on fuel supply”, page 1](#)

⇒ [“1.3 Safety precautions when using testers and measuring instruments during a road test”, page 2](#)

⇒ [“1.2 Safety measures when working on vehicles with a start/stop system”, page 1](#)

⇒ [“1.4 Safety precautions when working on vehicles with a gas system”, page 2](#)

1.1 Safety measures when working on fuel supply

Risk of injury from highly pressurised fuel.

The fuel system is pressurised. Injury from fuel spray possible.

Before opening the fuel system:

- Wear protective goggles.
- Wear protective gloves.
- To release pressure, wrap a clean cloth around the connection and carefully loosen the connection.

Danger of fire caused by escaping fuel

When the battery is connected and the driver door opens, the door contact switch activates the fuel pump. Escaping fuel can ignite and cause a fire.

- Disconnect voltage supply to fuel pump before opening the fuel system.

1.2 Safety measures when working on vehicles with a start/stop system

Risk of injury due to unexpected motor start

If the vehicle's start/stop system is activated, the engine can start unexpectedly. A message in the dash panel insert indicates whether the start/stop system is activated.

- Deactivate start/stop system by switching off the ignition.



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

Risk of injury caused by unsecured testing and measuring instruments

When the front passenger airbag is triggered in an accident, insufficiently secured testing and measuring instruments become dangerous projectiles.

- Secure testing and measuring instruments on the rear seat.

or

- Have a second person operate the test and measuring equipment on the rear seat.

1.4 Safety precautions when working on vehicles with a gas system

- Observe the following before renewing a fuel tank shut-off valve or natural gas fuel tank:
- Instruct the customer to leave as little natural gas in the tank as possible.
- This is to avoid unnecessary costs for the customer as well as the pollution of the environment.
- The fuel tank can be run empty, provided that the vehicle is fully functional and fit for the road.

DANGER

Danger of fatal injury and explosion from uncontrolled gas leakage in connection with sources of ignition and electrostatic discharge.

Risk of explosion leading to loss of life or serious injuries.

- Do not perform any kind of work on the natural gas system if leaking gas can be heard.
- Never drive a vehicle into the workshop if gas can be heard to be leaking from it.
- If a gas leak can be heard on a vehicle, park it in the open and cordon off the area.
- Have work on the natural gas system performed by a specially trained person.
- After working on the natural gas system, perform a leakage test.

Risk of fatal injury and explosion from escaping natural gas

Risk of fatal injury and explosion from static discharge and sources of ignition near natural gas systems. Escaping natural gas may ignite and cause an explosion.

Risk of explosion leading to loss of life or serious injuries.

- Wear safety clothing with a cotton content of at least 35%.
- Wear safety gloves with a cotton content of at least 35%.
- Wear safety shoes.



Risk of freezing injury from escaping natural gas

Natural gas could escape in an uncontrolled manner from the high-pressure area of the natural gas system.

There is a risk of injury on hands and other parts of the body due to freezing.

- Before working on the natural gas system in the high-pressure area, allow the pressure to drop.

DANGER

Risk of explosion from incorrect handling of natural gas system.

- Have work on natural gas systems performed by specially trained persons only.

DANGER

Risk of injury from natural gas under high pressure.

- Release pressure in the system before working on the natural gas system.
- If evacuation of the natural gas tanks is not possible, close the tank shut-off valves.
- Do not perform any further repair work.

DANGER

There is a risk of the natural gas exploding from static discharge while it is being evacuated.

- Do not evacuate natural gas fuel tanks in confined spaces.
- Before evacuation, cordon off an area measuring 10 m x 10 m.
- Purging of the natural gas fuel tanks is only permissible with gas extractor - VAS 523 001- .
- The safety zone must be permanently supervised during the evacuation.
- There must be no open flame or source of ignition in the safety zone.



! NOTICE

High-pressure natural gas line should not be bent or deformed.

High-pressure natural gas line must be connected without tension. It must be screwed on by hand as far as stop first and then tightened.

Ensure that there is sufficient clearance to all moving or hot components.

Route high-pressure natural gas line in original position.

When installing, pay particular attention not to damage surface of fuel tank, natural gas high-pressure line, tensioning straps and mountings. If necessary, protect surface with suitable workshop equipment.

Observe the country-specific regulations as well as specifications provided by the importer regarding the safety measures described in this manual.

On no account may the union nuts be tightened further than specified. Otherwise, the special connection will be damaged and the pressure line must be renewed.

- ◆ Disconnect battery earth strap before carrying out work on natural gas system.
- ◆ Only components of the same type and with the same type approval may be exchanged on the high-pressure system.
- ◆ After assembly work on natural gas system, check leak-tightness of natural gas supply system ⇒ Rep. gr. 24 ; Checking natural gas supply system for leaks
- ◆ A leakage test must always be performed following any repair work on the gas system ⇒ Maintenance ; Booklet 35.1 ; Description of work; Visual inspection of gas tanks for corrosion and leakage test .



2 Identification

⇒ "2.1 Engine number/engine data", page 5

2.1 Engine number/engine data

Codes		CPGA
Exhaust emission standard		EU 5 plus/EU6
Displacement		1.0
Power		50
Fuel:	RON	95 unleaded
	Natural gas	Up to 140 ¹⁾

¹⁾ In gas mode, the engine output and the torque depend on the quality of the natural gas used. The methane content for L gas (low calorific gas: methane content 79.8 - 87.0% vol.) and H gas (high calorific gas: methane content 87.1 - 98.0% vol.) may vary in different regions.





3 General information

⇒ **"3.1 Rules for cleanliness when working on auxiliary/supplementary heater and fuel system", page 6**

3.1 Rules for cleanliness when working on auxiliary/supplementary heater and fuel system

When working on the fuel supply and injection system, pay careful attention to the following "rules":

- ◆ Thoroughly clean all joints and surrounding areas before dismantling.
- ◆ Place removed parts on a clean surface and cover them over. Use lint-free cloths only.
- ◆ Carefully cover opened components or seal them if repairs cannot be carried out immediately.
- ◆ Install only clean parts; do not remove new parts from packaging until immediately before installing. Do not use parts that have been kept unpackaged (for example in toolboxes).
- ◆ When the system is open: Do not work with compressed air.
- ◆ Do not move the vehicle.
- ◆ Immediately seal open lines and unions with clean plugs, for example from engine bung set - VAS 6122- .
- ◆ Protect disconnected electrical connectors from dirt and water, and reconnect them only when dry.
- ◆ To extract E 85 fuel, use only fuel extractor - VAS 5190 A- .



20 – Fuel supply system

1 Fuel system

⇒ [“1.1 Overview of fitting locations - fuel system”, page 7](#)

1.1 Overview of fitting locations - fuel system

1 - Fuel tank 1

- ❑ Assembly overview -
⇒ [“2.12.1 Assembly overview – fuel tank 1, natural gas”, page 59](#)
- ❑ Removing and installing
⇒ [“2.10.1 Removing and installing fuel tank 1”, page 36](#)

2 - Fuel tank shut-off valve 1 - N361-

- ❑ Assembly overview -
⇒ [“2.4 Assembly overview - fuel tank shut-off valve”, page 21](#)
- ❑ Removing and installing
⇒ [“2.8 Removing and installing fuel tank shut-off valve”, page 26](#)
- ❑ Closing by mechanical means
⇒ [“2.6 Closing fuel tank shut-off valve N361 / N362 by mechanical means”, page 23](#)

3 - Fuel tank 2

- ❑ Assembly overview -
⇒ [“2.12.2 Assembly overview – fuel tank 2, natural gas”, page 62](#)
- ❑ Removing and installing
⇒ [“2.10.2 Removing and installing fuel tank 2”, page 42](#)

4 - Fuel tank shut-off valve 2 - N362-

- ❑ Assembly overview - ⇒ [“2.4 Assembly overview - fuel tank shut-off valve”, page 21](#)
- ❑ Removing and installing ⇒ [“2.8 Removing and installing fuel tank shut-off valve”, page 26](#)
- ❑ Closing by mechanical means
⇒ [“2.6 Closing fuel tank shut-off valve N361 / N362 by mechanical means”, page 23](#)

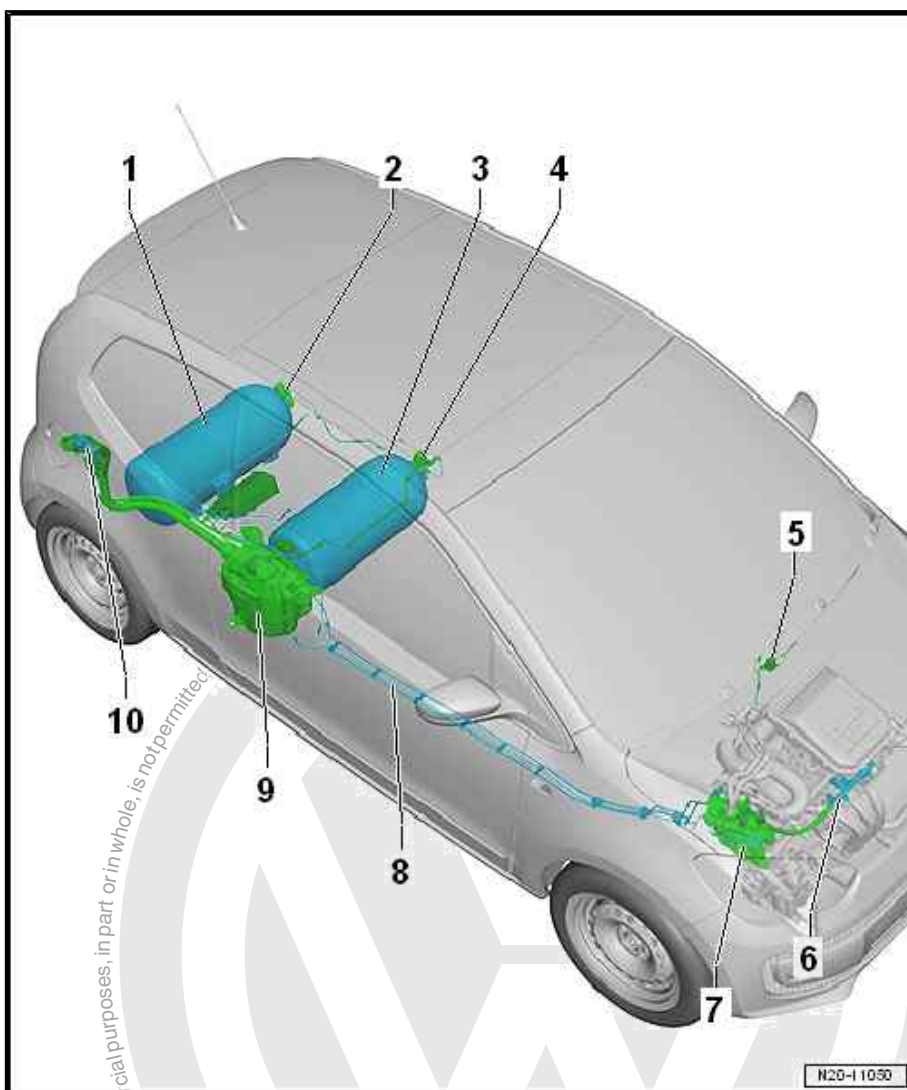
5 - Electrical connector

6 - Gas rail

- ❑ ⇒ Rep. gr. 24 ; Injection system; Assembly overview - fuel system

7 - Gas pressure regulator

- ❑ To high-pressure valve for gas mode - N372-
- ❑ With tank pressure sensor - G400-
- ❑ Assembly overview ⇒ Rep. gr. 24 ; Gas pressure regulator; Assembly overview - Gas pressure regulator





- ☐ Removing and installing ⇒ Rep. gr. 24 ; Gas pressure regulator; Removing and installing gas pressure regulator
- ☐ Removing and installing tank pressure sensor - G400- ⇒ Rep. gr. 24 ; Gas pressure regulator; removing and installing tank pressure sensor - G400-

8 - Fuel lines

9 - Fuel

- ☐ For petrol
- ☐ Assembly overview ⇒ [“2.1 Assembly overview - fuel tank”, page 9](#)
- ☐ Removing and installing ⇒ [“2.3 Removing and installing fuel tank”, page 15](#)
- ☐ With fuel delivery unit ⇒ [“3.1 Assembly overview - fuel delivery unit/fuel gauge sender”, page 82](#)

10 - Filling connection

- ☐ Assembly overview - ⇒ [“2.5 Assembly overview - filler neck”, page 23](#)
- ☐ Removing and installing ⇒ [“2.9 Removing and installing filling connection”, page 32](#)





2 Fuel

- ⇒ [“2.1 Assembly overview - fuel tank”, page 9](#)
- ⇒ [“2.2 Emptying fuel tank”, page 11](#)
- ⇒ [“2.3 Removing and installing fuel tank”, page 15](#)
- ⇒ [“2.4 Assembly overview - fuel tank shut-off valve”, page 21](#)
- ⇒ [“2.5 Assembly overview - filler neck”, page 23](#)
- ⇒ [“2.6 Closing fuel tank shut-off valve N361 / N362 by mechanical means”, page 23](#)
- ⇒ [“2.7 Removing and installing solenoid of fuel tank shut-off valve N361 / N362”, page 24](#)
- ⇒ [“2.8 Removing and installing fuel tank shut-off valve”, page 26](#)
- ⇒ [“2.9 Removing and installing filling connection”, page 32](#)
- ⇒ [“2.10 Removing and installing natural gas fuel tanks”, page 36](#)
- ⇒ [“2.11 Determining residual pressure in natural gas fuel tank”, page 49](#)
- ⇒ [“2.12 Assembly overview - natural gas fuel tank”, page 59](#)
- ⇒ [“2.13 Emptying natural gas fuel tanks”, page 65](#)
- ⇒ [“2.14 Aligning securing strap pads”, page 73](#)
- ⇒ [“2.15 Bonding protective film to natural gas fuel tank”, page 74](#)
- ⇒ [“2.16 Releasing pressure in high-pressure line”, page 80](#)

2.1 Assembly overview - fuel tank



1 - Cap

2 - Tank flap unit

- ❑ ➔ General body repairs, interior; Rep. gr. 72 ; Rear seat; Removing and installing bench seat / individual seats

3 - Filler neck

4 - Bolt

- ❑ Renew after removal
- ❑ Qty. 2
- ❑ 8 Nm +90°

5 - Bolt

- ❑ Renew after removal
- ❑ Qty. 3
- ❑ 20 Nm +90°

6 - Fuel

- ❑ For petrol
- ❑ Removing and installing
➔ ["2.3 Removing and installing fuel tank", page 15](#)

7 - Seal

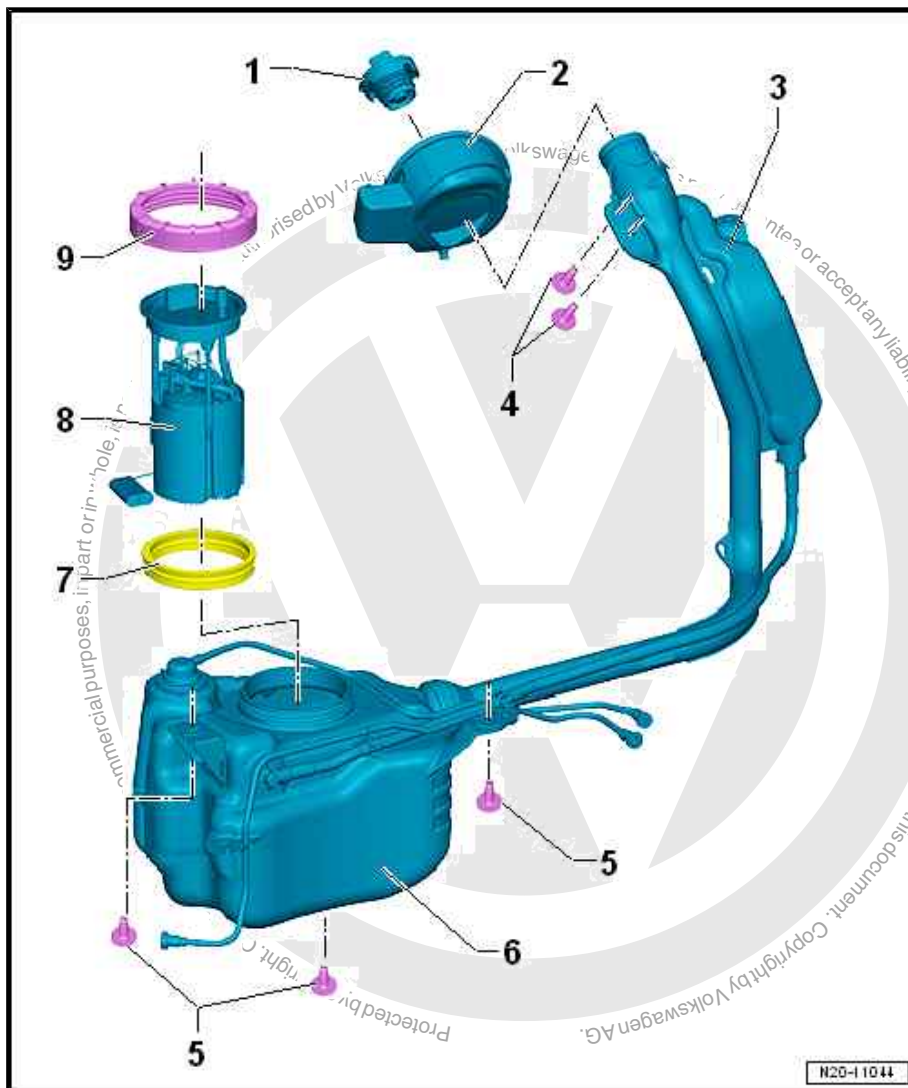
- ❑ Renew after removal
- ❑ When installing, fit dry in fuel tank opening.
- ❑ Moisten with fuel only when installing flange.

8 - Fuel delivery unit

- ❑ Removing and installing
➔ ["3.2 Removing and installing fuel delivery unit, fuel gauge sender", page 83](#)
- ❑ With fuel gauge sender - G-
- ❑ With fuel system pressurisation pump - G6-
- ❑ Checking fuel system pressurisation pump - G6-
➔ ["8.1 Checking fuel system pressurisation pump G6", page 104](#) .
- ❑ Removing and installing fuel gauge sender - G-
➔ ["3.3 Removing and installing fuel gauge sender G", page 86](#)
- ❑ Note installation position on fuel tank
➔ [Fig. "Installation position of fuel delivery unit flange", page 83](#)

9 - Union nut

- ❑ Loosen using union nut tool - 3217-
- ❑ 80 Nm





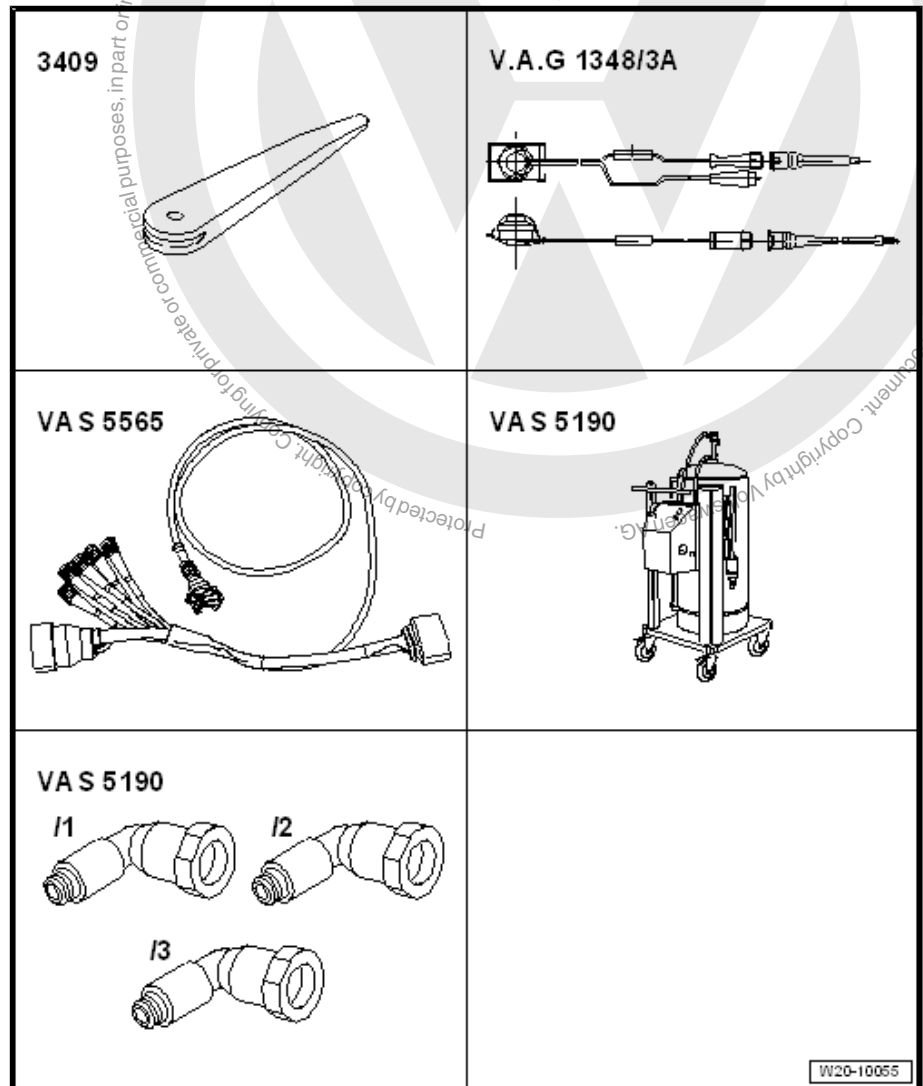
2.2 Emptying fuel tank

⇒ [“2.2.1 Emptying fuel tank when fuel pump is intact, petrol”, page 11](#).

⇒ [“2.2.2 Emptying fuel tank if it is more than 3/4 full, petrol”, page 13](#)

2.2.1 Emptying fuel tank when fuel pump is intact, petrol

Special tools and workshop equipment required



- ◆ Removal wedge - 3409-
- ◆ Remote control - V.A.G 1348/3A-
- ◆ Test instrument adapter/DSO (5-pin) - VAS 5565-
- ◆ Fuel extractor - VAS 5190-
- ◆ Adapter for fuel extraction - VAS 5190-



Note

If the fuel extraction unit - VAS 5190- is still fitted with the extraction hose with a solid tip, the extraction hose must be replaced with the version with a screwed tip.



Note

Separate plug-in connectors
⇒ "4.1 Separating plug-in connectors", page 88 .

- Pull off fuel supply line -1-. Separate plug-in connectors
⇒ "4.1 Separating plug-in connectors", page 88 .



CAUTION

The fuel system is pressurised.

Danger of injury through fuel spray.

- Wear protective goggles.
- Wear protective gloves.
- To release pressure, wrap a clean cloth around the connection and carefully loosen the connection.

- Collect escaping fuel with a cleaning cloth.
- Connect fuel extractor - VAS 5190- with adapter for fuel extractor - VAS 5190/3- to fuel supply line.
- Secure earth wire of fuel extractor to a bare metal part of the body.



CAUTION

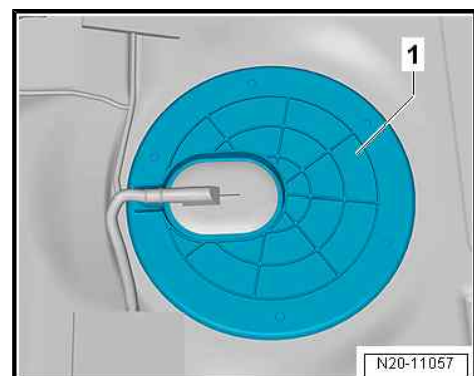
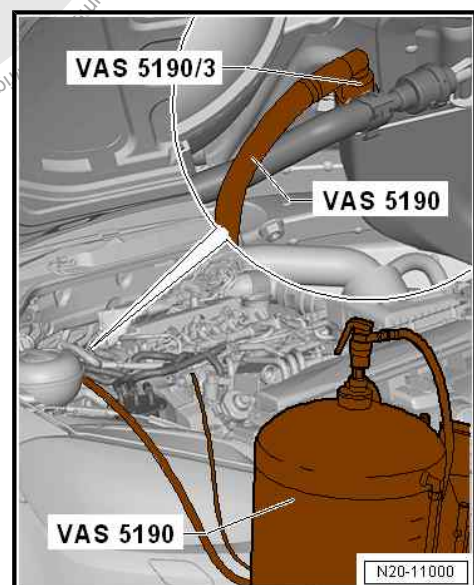
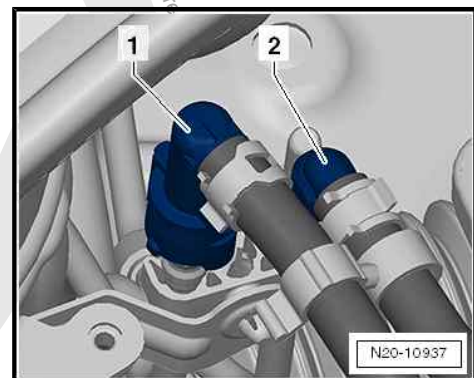
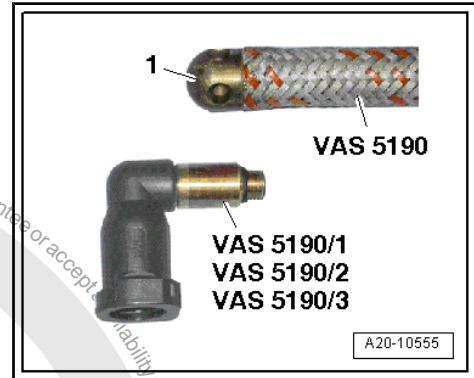
Risk of fire due to escaping fuel.

Risk of severe injuries and burns.

- Check all connected lines for secure fit by pulling.
- Take any fuel-soaked cloths away from area of vehicle.

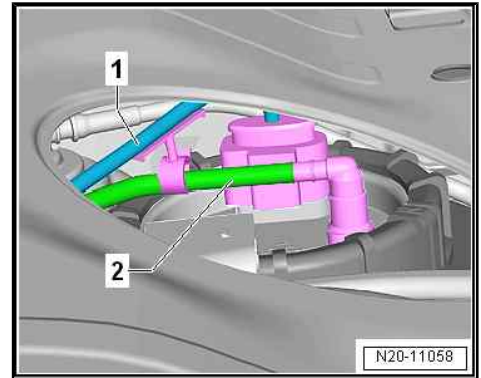
- Remove bench seat ⇒ General body repairs, interior; Rep. gr. 72 ; Rear seats; Removing and installing bench seat/individual seats .

- Unclip cover -1- at retaining tabs using removal wedge - 3409- .





- Unclip, release and pull off wiring harness -1-.
- To do this, release and pull off fuel line -2-. Separate plug-in connectors
 ⇒ ["4.1 Separating plug-in connectors", page 88](#) .



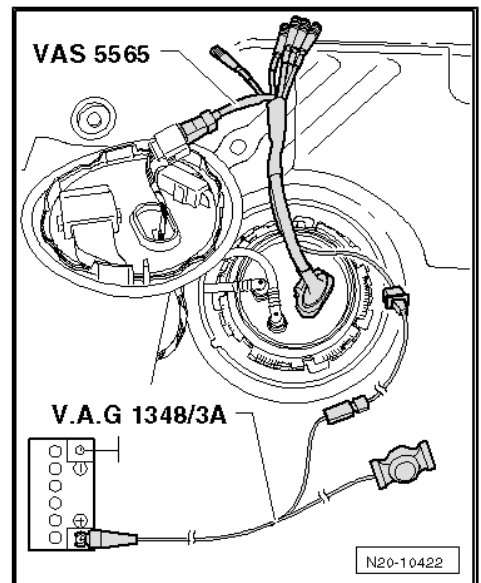
- Connect test instrument adapter/DSO (5-pin) - VAS 5565- to connector and fuel delivery unit.
- Connect remote control - V.A.G 1348/3A- to test instrument adapter/DSO (5-pin) - VAS 5565- and to battery positive (+).



Note

This step serves only to have the fuel pump running when the engine is stopped.

- Reconnect fuel line.



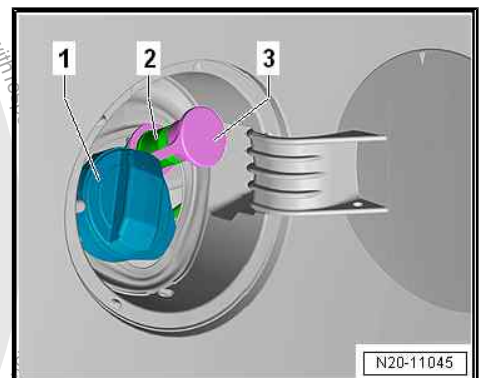
- Open tank flap unit.
- Clean area around fuel filler neck.
- Unscrew cap -1- for fuel filler neck.
- Operate remote control - V.A.G 1348/3A- and shut-off tap on fuel extractor - VAS 5190- until fuel tank is empty.



NOTICE

Risk of irreparable damage to fuel pump if allowed to run dry.

- Never allow fuel pump to run »dry«.

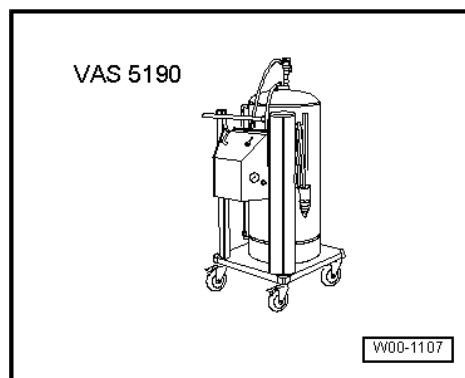


2.2.2 Emptying fuel tank if it is more than 3/4 full, petrol

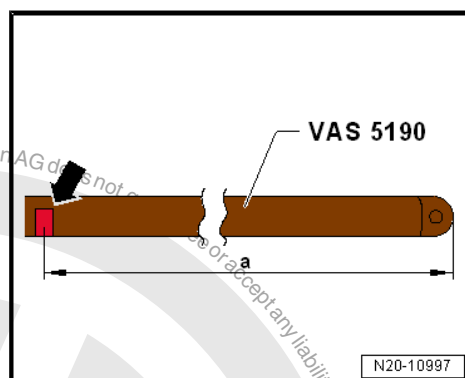
Special tools and workshop equipment required



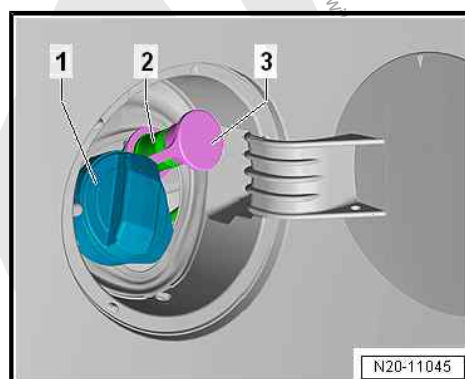
◆ Fuel extractor - VAS 5190-



- Make a mark -arrow- at dimension -a- from end of extraction hose of fuel extractor - VAS 5190- .
- Use insulating tape for this.
- Dimension -a- is 1225 mm.



- Open tank flap unit.
- Clean area around fuel filler neck.
- Unscrew cap -1- for fuel filler neck.
- Secure earth wire of fuel extractor to a bare metal part of the body.
- Pull cotter off fuel extractor - VAS 5190- .



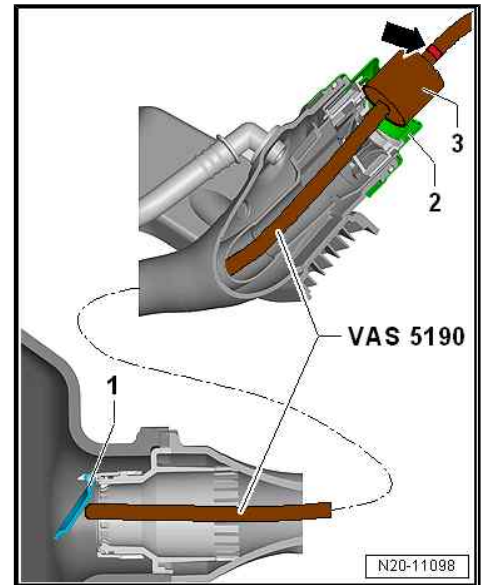


- Screw shaft piece -3- of fuel extractor - VAS 5190- onto fuel tank filler neck -2-.
- Push extraction hose of fuel extractor - VAS 5190- into fuel tank until previously attached marking -arrow- on hose coincides with shaft piece -3-.
- This opens flap -1-.
- Drain fuel tank via filler neck as far as possible.

i Note

- ◆ *There is a flap -1- in the fuel tank at the lower end of the filler neck. The flap must not be damaged by the extraction hose. Therefore push hose into filler neck only as far as marking -arrow-.*
- ◆ *If the extraction hose gets caught on the non-return valve -1- when being pulled out, do not apply force to pull out the extraction hose.*
- ◆ *In this case, remove the fuel delivery unit and open the non-return valve manually. Ensure that your arm does not come into contact with fuel.*



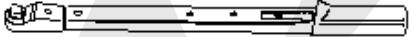
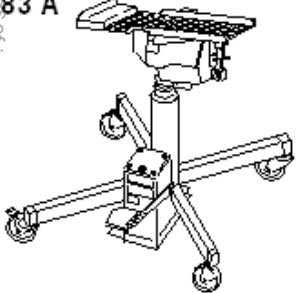
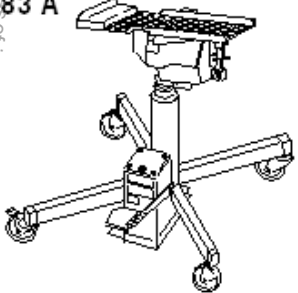
Pull extraction hose out carefully.



2.3 Removing and installing fuel tank



Special tools and workshop equipment required

3409 	V.A.G 1331 
V.A.G 1332 	V.A.G 1383 A 
	

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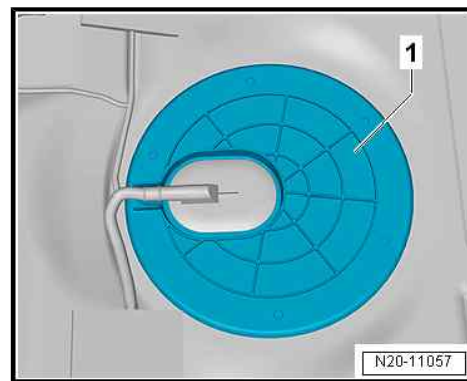
- ◆ Removal wedge - 3409-
- ◆ Torque wrench - V.A.G 1331-
- ◆ Torque wrench - V.A.G 1332-
- ◆ Engine and gearbox jack - V.A.G 1383 A-

Removing

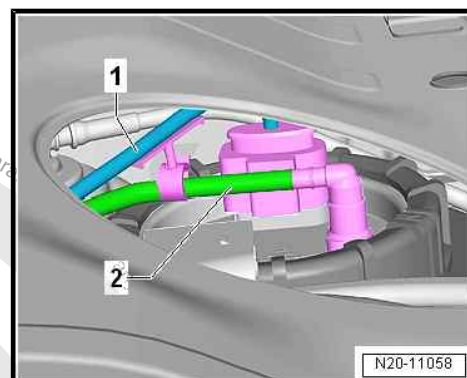
- Drain fuel tank ⇒ [“2.2 Emptying fuel tank”, page 11](#) .
- Move front seats to foremost position.
- Switch off ignition.
- Remove rear bench seat ⇒ General body repairs, interior;
Rep. gr. 72 ; Rear seats; Removing and installing bench seat /
individual seats .



- Unclip cover -1- at retaining tabs using removal wedge - 3409- .



- Release and pull off connector on wire -1-.
- If fitted, remove rear right wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liner; Assembly overview - rear wheel housing liner.



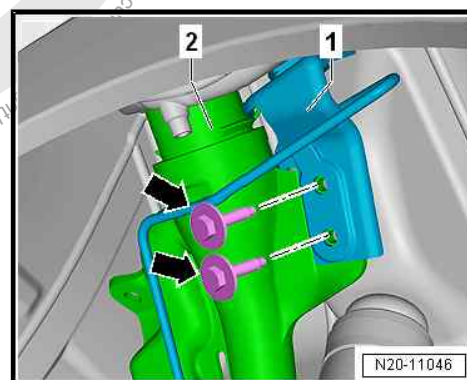
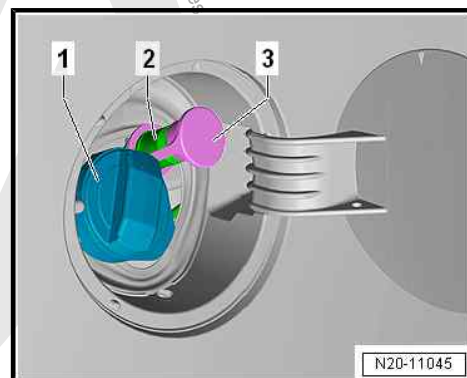
- Open tank flap unit.
- Clean area around fuel filler neck.
- Unscrew cap -1- for fuel filler neck.



Note

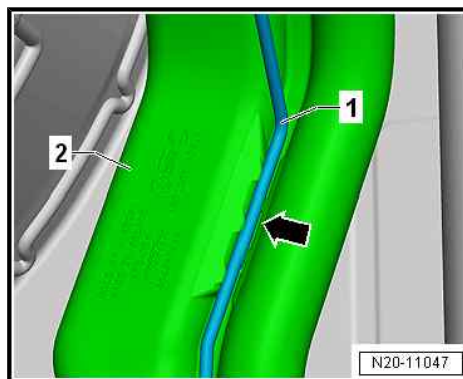
In order to prevent the ingress of dirt, seal the opening of the fuel filler neck with a clean plug.

- Remove rear right wheel ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres; Wheel change .
- Unscrew bolts -arrows- on body.
- Remove tank flap unit -2- ⇒ General body repairs, exterior; Rep. gr. 55 ; Tank flap unit; Removing and installing tank flap unit .

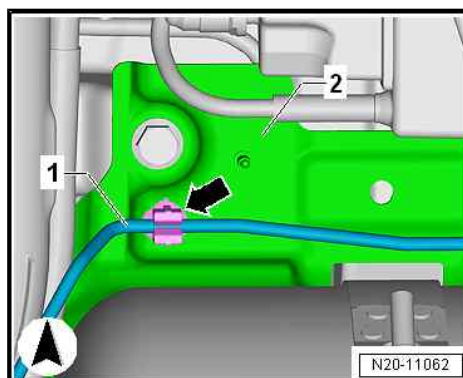




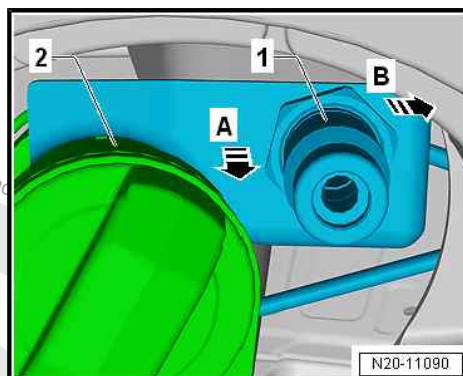
- Unclip fuel line -1- from retainer -arrow- on filler tube -2-.



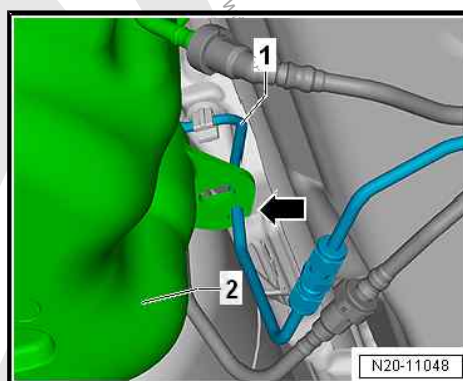
- Unclip fuel line -1- from retainer -2- -arrow-.



- Pull filling connection -1- in -direction of arrow A- off filler neck -2-.
- Swing filling connection -1- in -direction of arrow- towards right.
- Guide filling connection under filler neck towards rear and secure it to body.



- Unclip fuel line -1- from retainer -arrow- on fuel tank -2-.





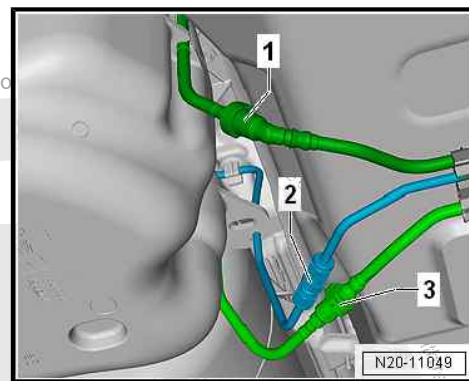
- Disconnect fuel line -1-. Separate plug-in connectors
 ⇒ [“4.1 Separating plug-in connectors”, page 88](#) .

⚠ CAUTION

The fuel system is pressurised.

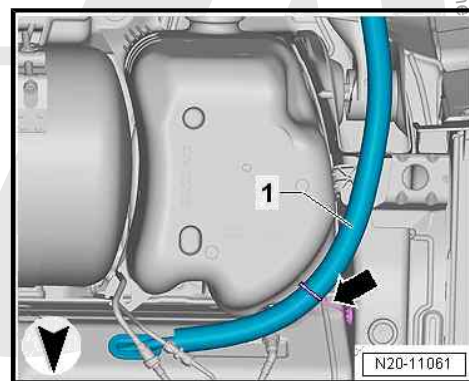
Danger of injury through fuel spray.

- Wear protective goggles.
- Wear protective gloves.
- To release pressure, wrap a clean cloth around the connection and carefully loosen the connection.

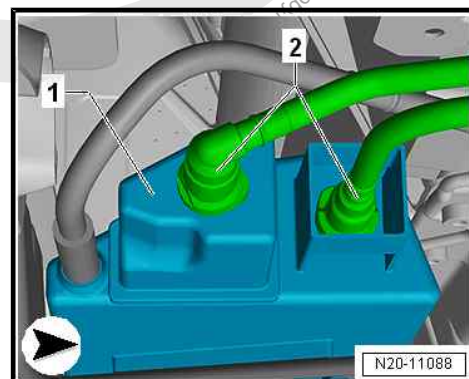


- Disconnect breather line -3-. Separate plug-in connectors
 ⇒ [“4.1 Separating plug-in connectors”, page 88](#) .

- Detach handbrake cable -1- from retainer -arrow-.



- Release and disconnect lines -2- from connections -M- and -T- on activated charcoal filter -1-. Separate plug-in connectors
 ⇒ [“4.1 Separating plug-in connectors”, page 88](#) .



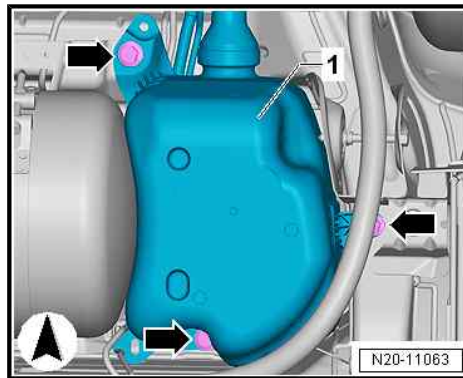


- Support fuel tank -1- with engine and gearbox jack - V.A.G 1383 A- .
- Unscrew bolts -arrows-.



Note

- ◆ For reasons of clarity, the fuel tank is shown without the engine and gearbox jack - V.A.G 1383 A- .
- ◆ The aid of a second mechanic is required to remove the fuel tank.



- Lower fuel tank -1- using engine and gearbox jack - V.A.G 1383 A- .
- Guide fuel tank -1- past rear axle and body by turning fuel tank while lowering it.

Installing

Install in reverse order of removal. Observe the following:

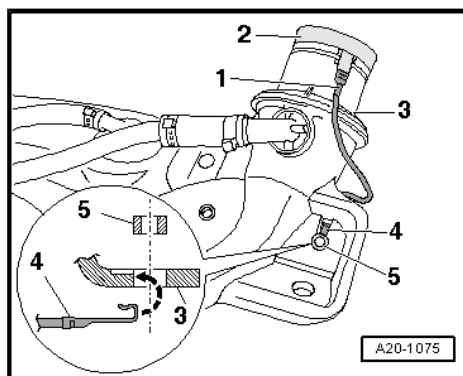


Note

Separate plug-in connectors

= "4.1 Separating plug-in connectors", page 88 .

- Install breather lines and fuel lines free of kinks.
- Ensure that the filler neck of the fuel tank is correctly inserted into the opening in the body.
- Use engine and gearbox jack - V.A.G 1383 A- to position fuel tank on underbody.
- After installing fuel tank, check that lines are still clipped onto the fuel tank.
- Ensure that line connections are tight.
- Ensure connections are secured properly by pulling.
- Check whether there are signs of oxidation on the earth wire of the connectors, remove if necessary.
- Hook contact tab -4- of earth connection into mounting hole on fuel tank -3-.
- Then press in spacer bush -5-.
- Ensure that connector -1- for earth connection is properly seated on metal ring -2- of fuel filler neck.



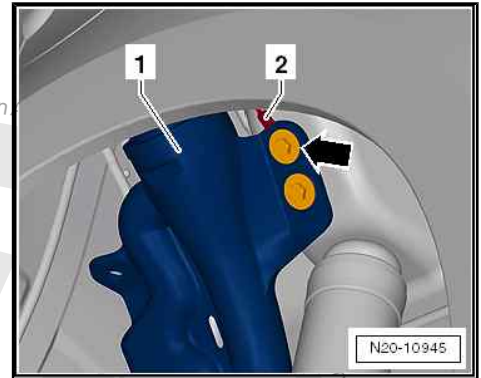


- Secure contact tab -2- of earth connection with flange bolt -arrow- for fuel filler neck -1-.
- Check connection of metal ring on fuel filler neck by measuring between ring and a bare metal part of body using an ohmmeter.
- Specification: approx. 0 ohm.
- If the specification is not attained, there is a risk of explosion due to electrostatic discharge.
- Fill fuel tank with at least 5 litres of fuel.

⚠ WARNING

**Risk of explosion of fuel tank caused by fuel pump activation.
Risk of severe injuries and burns.**

- If a new or completely empty fuel tank has been installed, fill it immediately with at least 5 litres of fuel.



Torque settings

- ◆ ⇒ [“2.1 Assembly overview - fuel tank”, page 9](#)
- ◆ ⇒ [“2.5 Assembly overview - filler neck”, page 23](#)
- ◆ ⇒ General body repairs, interior; Rep. gr. 72 ; Rear seat; Removing and installing bench seat / individual seats
- ◆ ⇒ General body repairs, exterior; Rep. gr. 55 ; Tank flap unit; Removing and installing tank flap unit
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liner; Assembly overview – rear wheel housing liner

2.4 Assembly overview - fuel tank shut-off valve



1 - Plug

- ☐ With seal
- ☐ 9 Nm

2 - Securing nut

- ☐ Renew after removal
- ☐ 12 Nm

3 - Solenoid

- ☐ Removing and installing
⇒ ["2.7 Removing and installing solenoid of fuel tank shut-off valve N361 / N362"](#),
[page 24](#)

4 - Spring lock washer

- ☐ For allocation refer to ⇒
Electronic parts catalogue (ETKA) .

5 - Seal

- ☐ Renew after removal
- ☐ Ensure proper seating
in groove

6 - Fuel line

- ☐ When loosening, counterhold on union with a suitable tool.
- ☐ Take care not to bend or deform any lines
- ☐ Route fuel lines in their original positions
- ☐ Ensure that there is sufficient clearance to all moving or hot components

- ☐ Tighten by hand as far as stop
- ☐ 17 Nm

7 - Seal

- ☐ Renew after removal
- ☐ Between fuel tank shut-off valve to tank and fuel tank.
- ☐ Lightly coat with engine oil or petroleum jelly when installing.

8 - Connection

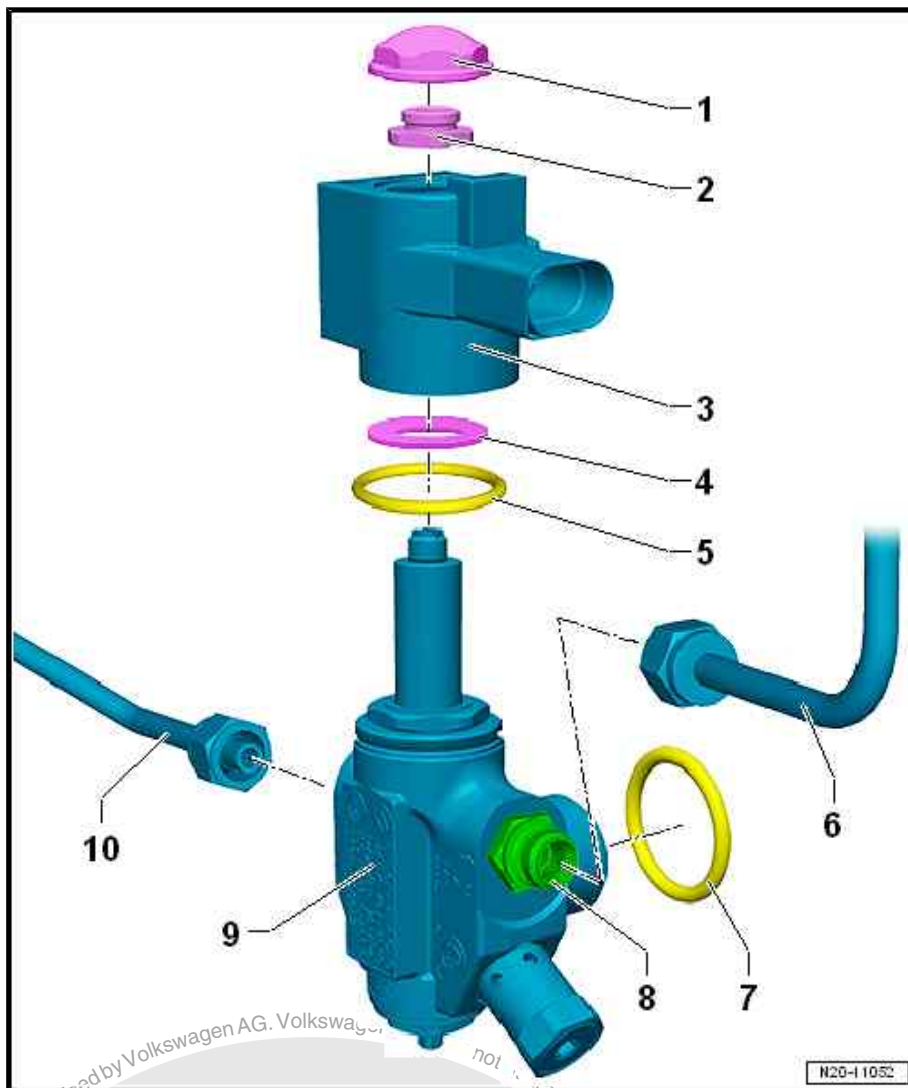
- ☐ 18 Nm

9 - Fuel tank shut-off valve

- ☐ Fuel tank shut-off valve 1 - N361-
- ☐ Fuel tank shut-off valve 2 - N362-
- ☐ Removing and installing ⇒ ["2.8 Removing and installing fuel tank shut-off valve"](#), [page 26](#)
- ☐ 130 Nm

10 - Fuel line

- ☐ When loosening, counterhold on union with a suitable tool
- ☐ Take care not to bend or deform any lines
- ☐ Route fuel lines in their original positions
- ☐ Ensure that there is sufficient clearance to all moving or hot components
- ☐ Tighten by hand as far as stop





- ❑ 17 Nm

2.5 Assembly overview - filler neck

1 - Filling connection

- ❑ For natural gas
- ❑ Removing and installing
 ⇒ ["2.9 Removing and installing filling connection"](#), page 32

2 - Seal

- ❑ Check for damage, and renew if necessary

3 - Washer

4 - Nut

- ❑ Left-hand thread!
- ❑ When tightening the nut using the specified tools, set the torque wrench - V.A.G 1331- to 19 Nm
 ⇒ ["2.9 Removing and installing filling connection"](#), page 32 .

5 - Bracket

6 - Bolts

- ❑ Renew after removal
- ❑ Qty. 2
- ❑ 8 Nm +90°

7 - Cap

- ❑ For filling connection

8 - Cap

- ❑ For fuel tank - petrol.

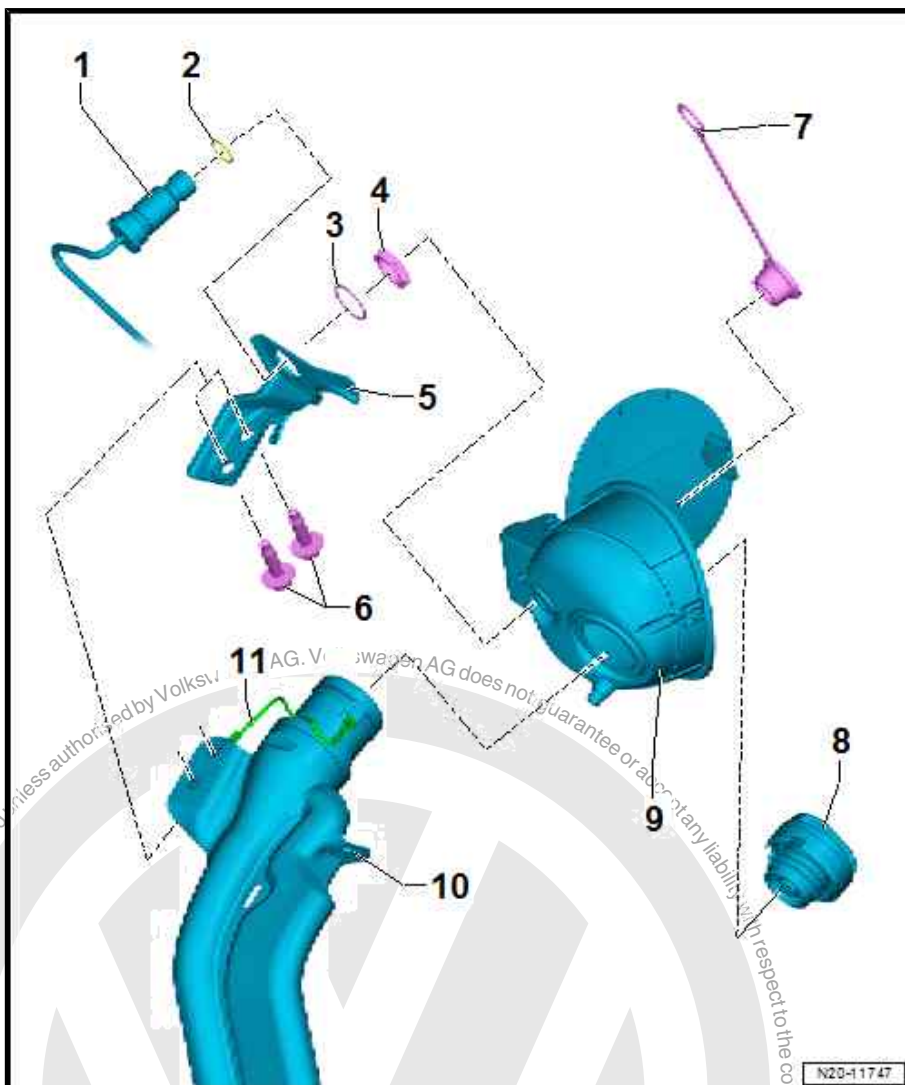
9 - Tank flap unit

- ❑ Removing and installing
 ⇒ General body repairs, exterior; Rep. gr. 55 ; Tank flap unit; Removing and installing fuel tank flap unit .

10 - Filler neck

11 - Earth cable

- ❑ Fitting position ⇒ [page 20](#)

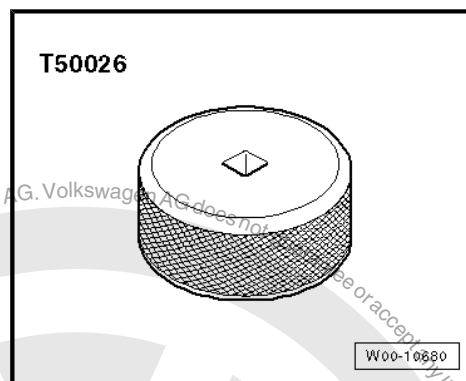


2.6 Closing fuel tank shut-off valve -N361- / -N362- by mechanical means

Special tools and workshop equipment required



◆ Handwheel - T50026-

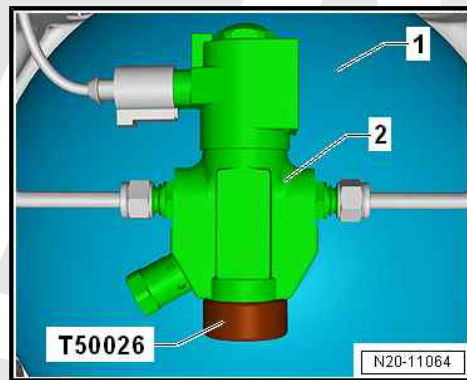


- Disconnect battery ⇒ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and reconnecting battery .
- Remove underbody cladding beneath fuel tanks ⇒ General body repairs, exterior; Rep. gr. 66 Underbody cladding .
- Release connectors and pull them off fuel tank shut-off valves -N361/N362- .
- Close mechanical shut-off valves -2- on fuel tank shut-off valves -N361/N362- on all fuel tanks -1-.
- Use hand wheel - T50026- to do this.
- Close shut-off valves by turning hand wheel in clockwise direction.



Note



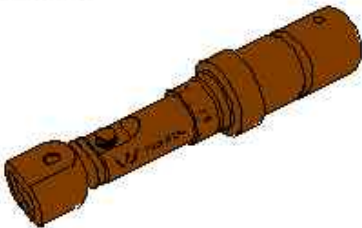
- ◆ *Close shut-off valves hand-tight by turning hand wheel in clockwise direction.*
- ◆ *The mechanical shut-off valves must not be over-tightened.*
- Open mechanical shut-off valves on fuel tank shut-off valves -N361/N362- on all fuel tanks -1-.



2.7 Removing and installing solenoid of fuel tank shut-off valve -N361- / -N362-



Special tools and workshop equipment required

<p>T10521</p> 	<p>T10522</p> 
<p>VAS 6854</p> 	
	<p>W20-10059</p>

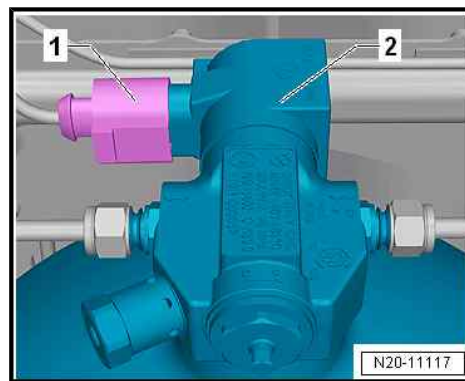
- ◆ Special wrench - T10521-
- ◆ Special wrench - T10522-
- ◆ Torque wrench - VAS 6854-

Removing

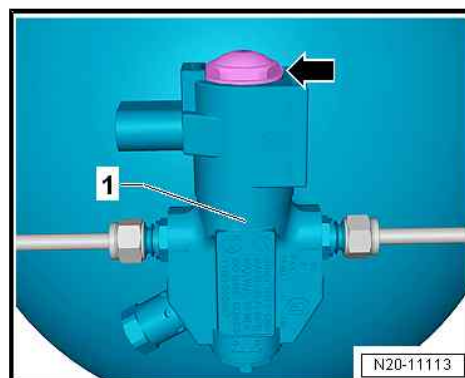
- Ensure not to damage the painted surface when working on the fuel tanks.
- If necessary, protect painted surface with suitable workshop equipment.
- Disconnect battery ⇒ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and reconnecting battery .
- Remove underbody cladding beneath fuel tank ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody cladding .



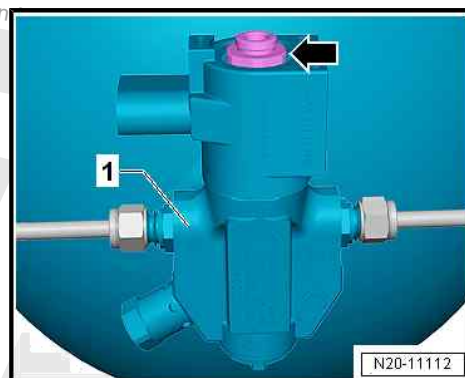
- Release and pull off connector -1- on solenoid -2-.



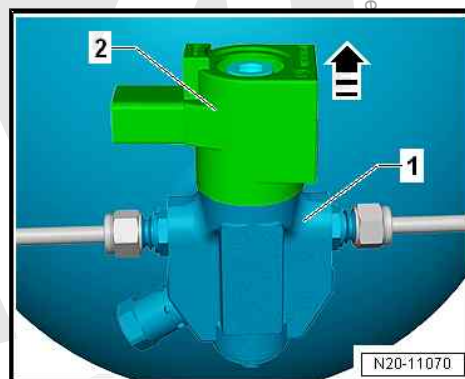
- Unscrew plug -arrow- on fuel tank shut-off valve -1-.



- Unscrew nut -arrow- on fuel tank shut-off valve -1- and remove it.



- Pull solenoid -2- in -direction of arrow- off fuel tank shut-off valve -1-.



Installing

Install in reverse order of removal. Observe the following:

- Tighten fuel tank shut-off valve using torque wrench - VAS 6854- and wrench - T10521/T10522- .




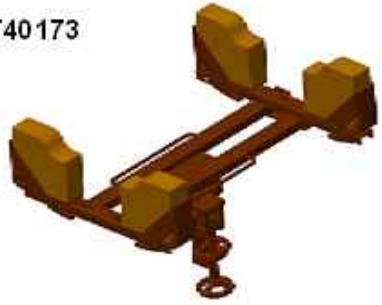


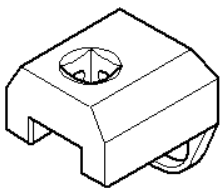

Torque settings

- ♦ ⇒ [“2.4 Assembly overview - fuel tank shut-off valve”, page 21](#)
- ♦ ⇒ [“2.12 Assembly overview - natural gas fuel tank”, page 59](#)
- ♦ ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody cladding

2.8 Removing and installing fuel tank shut-off valve



Special tools and workshop equipment required

<p>V.A.G 1331</p> 	<p>V.A.G 1383 A</p> 
<p>T10523</p> 	<p>T40173</p> 
<p>T40173/1</p> 	<p>T50026</p>  <p>W20-10066</p>
<p>T50025</p>  <p>W00-10679</p>	
<p>V.A.G 1332</p>  <p>W00-11165</p>	



- ◆ Torque wrench - V.A.G 1331-
- ◆ Engine and gearbox jack - V.A.G 1383 A-
- ◆ Tensioning strap - T10523-
- ◆ Gearbox support - T40173-
- ◆ Handwheel - T50026-
- ◆ Gearbox support - T40173/1-
- ◆ Support - VAS 6131/14-1-
- ◆ Special wrench - T50025-
- ◆ Torque wrench - V.A.G 1332-

Removing

- Fuel tank must be at room temperature (at least 15°C).
- Read system pressure using ⇒ Vehicle diagnostic tester.
- Select **Guided Functions**.
- Read **Measured values** for "Gas tank – interior pressure" in "Engine" option.
- Ensure not to damage the painted surface when working on the fuel tanks.
- If necessary, protect painted surface with suitable workshop equipment.

Removing fuel tank shut-off valve 1 - N361- :

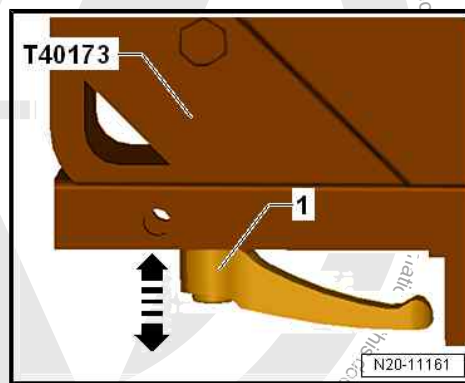
- Remove fuel tank 1
⇒ ["2.10.2 Removing and installing fuel tank 2", page 42](#) .

Removing fuel tank shut-off valve 2 - N362- :

- Remove fuel tank 2
⇒ ["2.10.1 Removing and installing fuel tank 1", page 36](#) .

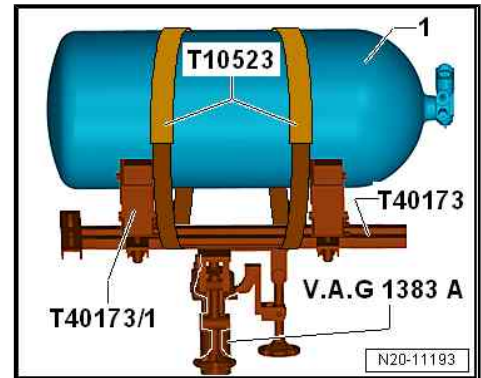
Continued for all vehicles

- Align adjustable supports of gearbox support - T40173- relative to fuel tank, and secure them.
- In order to properly secure adjustable supports, pull lever -1- downwards, and position it such that it can be properly secured.

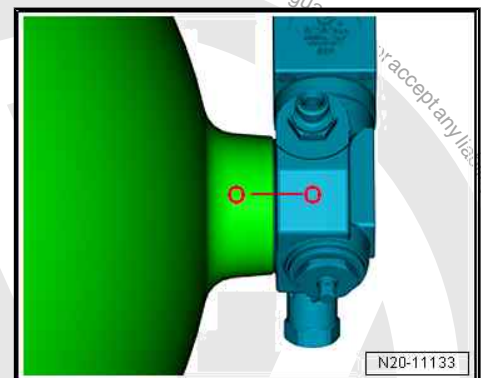
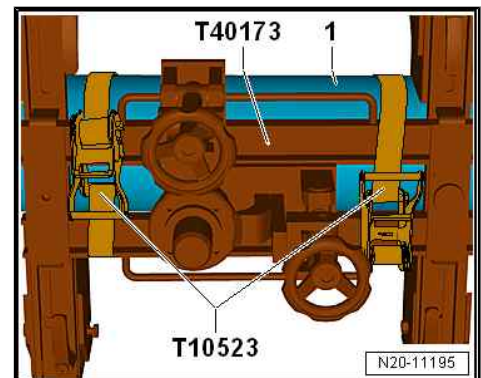




- Secure fuel tank -1- on gearbox support - T40173- using tensioning strap - T10523- , as shown in illustration.



- Ensure that the ratchets of the tensioning straps are offset, as shown in illustration.
- Securely lash fuel tank -1- to gearbox support - T40173- using the two tensioning straps - T10523- .
- When lashing, make sure to not damage painted surface of fuel tank.
- If necessary, protect painted surface with suitable workshop equipment.
- Drain fuel tank
 ⇒ [“2.13 Emptying natural gas fuel tanks”, page 65 .](#)
- Thoroughly clean area around fuel tank shut-off valve .
- Perform back pressure test
 ⇒ [“2.11 Determining residual pressure in natural gas fuel tank”, page 49 .](#)
- Mark the position of the valve relative to the fuel tank.



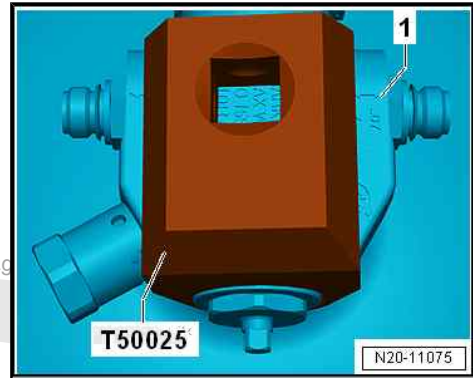


- Fit special wrench - T50025- on fuel tank shut-off valve -1- as shown in illustration.
- Ensure proper seating of guide of special wrench - T50025- in support.

Carefully loosen and unscrew fuel tank shut-off valve -1- using special wrench - T50025- .

Procedure for unscrewing fuel tank shut-off valve

- Carefully loosen fuel tank shut-off valve -1- using special wrench - T50025- .



Note

- ♦ *The O-ring will slip out of the groove while doing so and will allow for any residual gas to escape.*
- ♦ *Depending on the residual pressure, a loud noise may be audible when the O-ring is released from the sealing surface.*
- Slowly unscrew fuel tank shut-off valve by up to a half turn, so that residual gas can escape.

DANGER

If gas can be heard to escape.

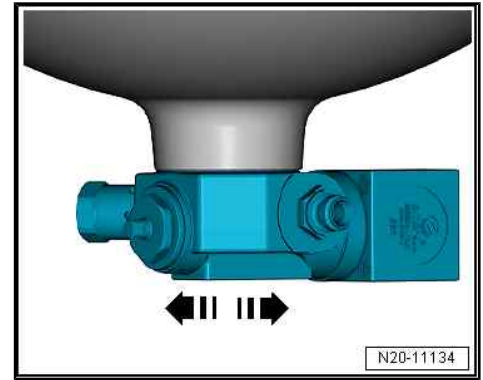
- Do not unscrew the tank shut-off valve any further.
- Wait until no more gas escapes before carefully unscrewing tank shut-off valve further.

- Wait until no more gas can be heard to escape before continuing work:



Checking play on fuel tank shut-off valve :

- Carefully move fuel tank shut-off valve in -directions of arrows-.
- The fuel tank shut-off valve must not be unscrewed any further while doing so.
- There must be a slight play.
- Let more residual gas escape.
- Unscrew fuel tank shut-off valve further in 90° steps.
- Unscrew fuel tank shut-off valve further by a maximum of 2 turns.



! DANGER

If after two turns no gas has escaped and no play can be observed:

- The valve must not be unscrewed any further.

If no residual gas has escaped:

- Tighten fuel tank shut-off valve to 130 Nm.
- Do not perform any further work on fuel tank or fuel tank shut-off valve .

If the residual gas has escaped and play can be observed:

- Unscrew fuel tank shut-off valve .
- Remove any wax residue.

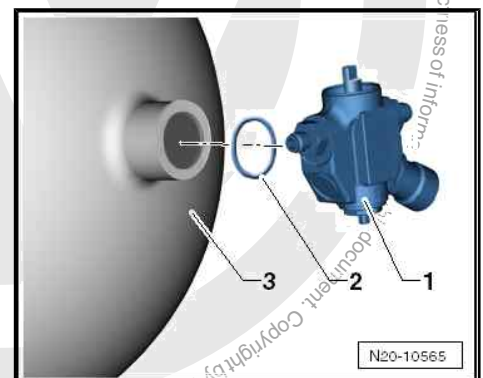
Installing

Install in reverse order of removal. Observe the following:



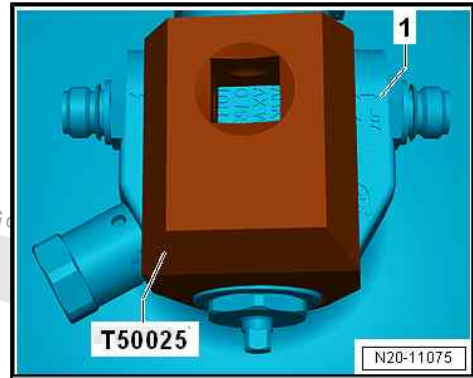
Note

- ◆ *Lightly coat seal with engine oil or Vaseline.*
- ◆ *There must not be any wax on the thread.*
- ◆ *No wax must be allowed to get into the fuel tank.*
- ◆ *No wax must be allowed to get into the lines.*
- Fit new seal -2- on fuel tank shut-off valve -1-.
- Screw fuel tank shut-off valve -1- into fuel tank -3-.





- Tighten fuel tank shut-off valve to 130 Nm using special wrench - T50025- .
- Install fuel tank ⇒ [page 36](#) .
- Check natural gas supply system for leaks ⇒ Rep. gr. 24 ; Checking natural gas supply system for leaks .
- Perform gas system test ⇒ Maintenance ; Booklet 35/1 ; Description of work; Performing visual inspection of natural gas fuel tanks for corrosion and leakage test .

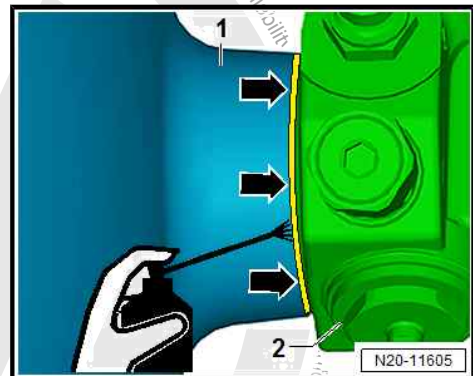


- Coat connection between fuel tank -1- and fuel tank shut-off valve -2- with wax.
- For allocation of wax, refer to ⇒ ETKA .
- Make sure wax is sprayed along the entire circumference -arrows-.



Note

- ◆ *There must not be any wax on the thread.*
- ◆ *No wax must be allowed to get into the fuel tank.*
- ◆ *No wax must be allowed to get into the lines.*



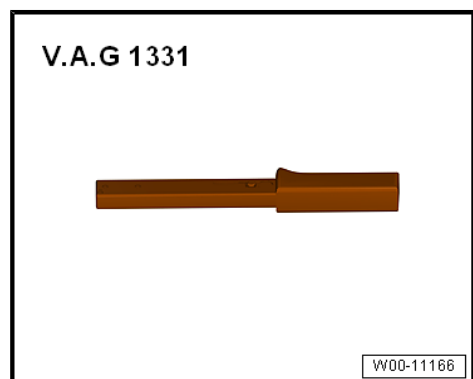
Torque settings

- ◆ ⇒ [“2.12 Assembly overview - natural gas fuel tank”, page 59](#)
- ◆ ⇒ [“2.4 Assembly overview - fuel tank shut-off valve”, page 21](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody cladding

2.9 Removing and installing filling connection

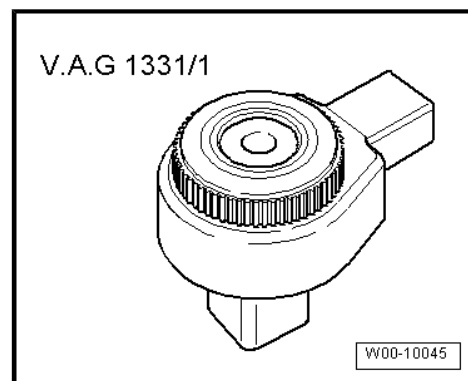
Special tools and workshop equipment required

- ◆ Torque wrench - V.A.G 1331-

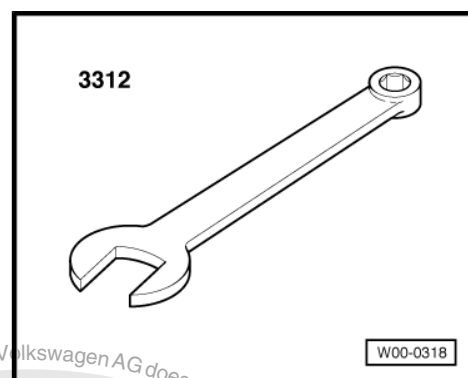




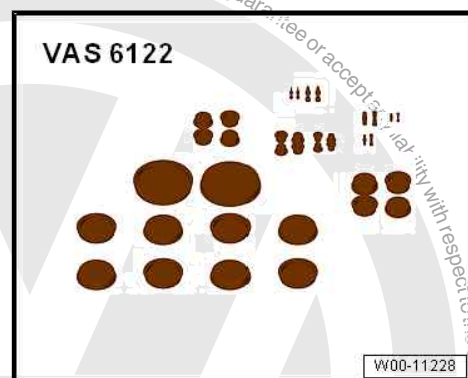
- ◆ Ratchet wrench - V.A.G 1331/1-



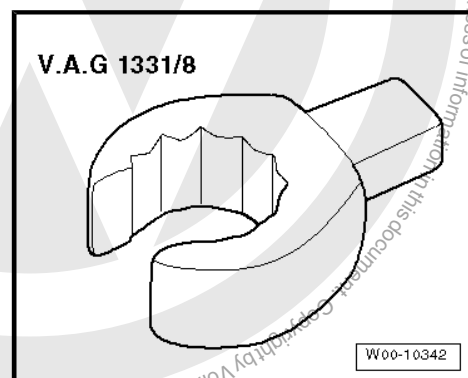
- ◆ Open-end spanner - 3312-



- ◆ Engine bung set - VAS 6122-



- ◆ 14 mm open-ring tool insert - V.A.G 1331/8-

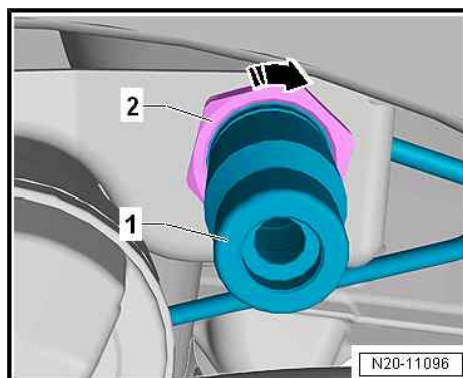
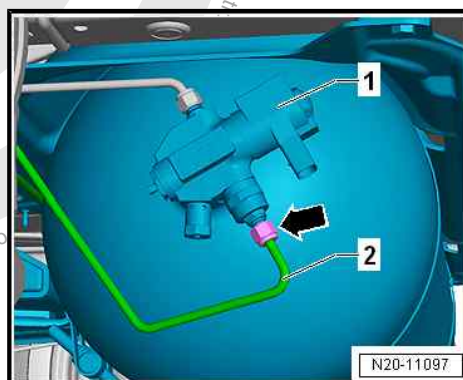
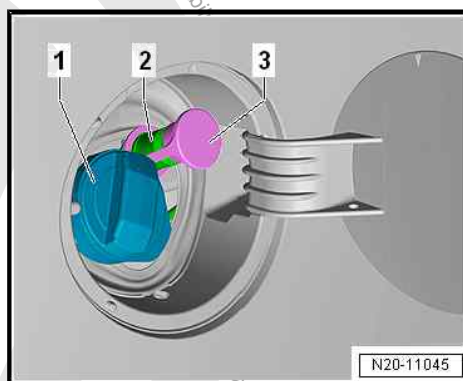


Removing

- Ensure not to damage the painted surface when working on the fuel tanks.
- If necessary, protect painted surface with suitable workshop equipment.



- If fitted, remove rear right wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liner; Assembly overview - rear wheel housing liner .
- Remove underbody cladding beneath fuel tank 2 ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody cover .
- Close fuel tank shut-off valve -N361/N362- mechanically
⇒ "2.6 Closing fuel tank shut-off valve N361 / N362 by mechanical means", page 23 .
- Release pressure in high-pressure line
⇒ "2.16 Releasing pressure in high-pressure line", page 80 .
- Disconnect battery ⇒ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and reconnecting battery .
- Open tank flap unit.
- Pull cap -3- off filling connection -2-.
- Clean area around fuel filler neck.
- Unscrew cap -1- for fuel filler neck.
- Remove tank flap unit ⇒ General body repairs, exterior; Rep. gr. 55 ; Tank flap unit; Removing and installing tank flap unit .
- Remove rear right wheel ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres; Wheel change .
- Carefully loosen union nut -arrow- for fuel line -2- on fuel tank shut-off valve 2 - N362- -1- to allow residual gas to escape.
- To do this, counterhold on connection of fuel tank shut-off valve 2 - N362- -1- using a suitable tool.
- Unscrew fuel line -2- on fuel tank shut-off valve 2 - N362- -1-.
- Immediately seal open connection using suitable plugs from engine bung set - VAS 6122- .
- Loosen and unscrew nut -2- on filling connection -1- in -direction of arrow-.

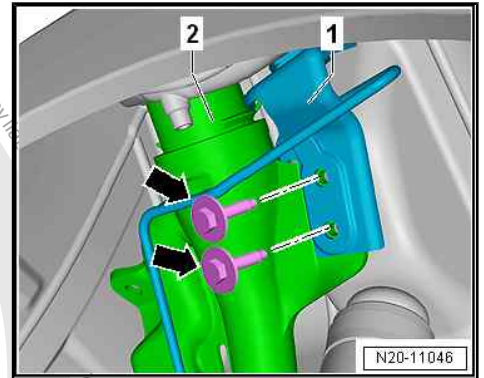


Note

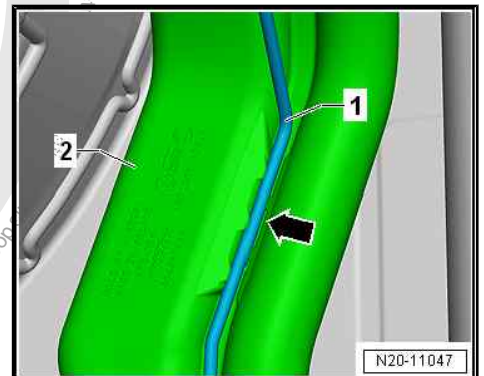
Left-hand thread!



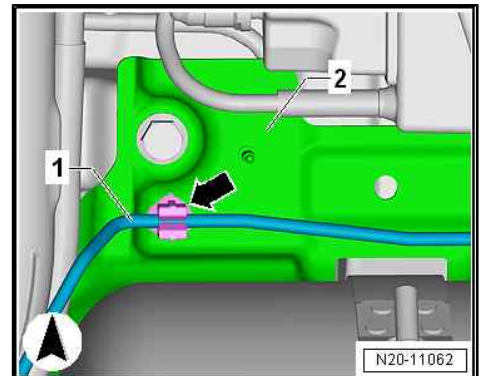
- Unscrew bolts -arrows- on bracket for filling connection 1-



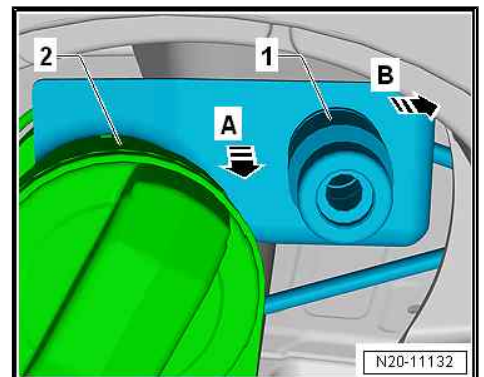
Unclip fuel line -1- from retainer -arrow- on filler tube -2-.



- Unclip fuel line -1- from retainers -arrow- on bracket for fuel tank 2 -2-.



- Pull filling connection -1- in -direction of arrow A- off filler neck -2-.
- Swing filling connection -1- in -direction of arrow- towards right.
- Remove filling connection together with line.



Installing

Install in reverse order of removal. Observe the following:



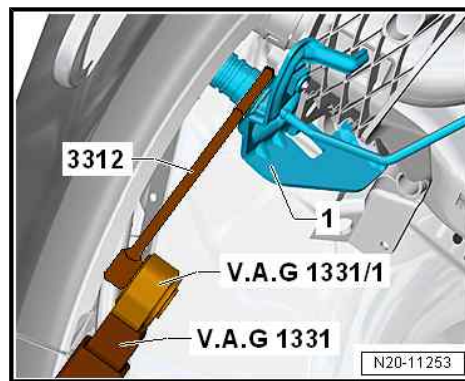
- Apply tools for applying specified torque to filling connection
-1- as shown in illustration.



Note

Left-hand thread!

- Set torque wrench - V.A.G 1331- to 19 Nm.
- Check natural gas supply system for leaks ⇒ Rep. gr. 24 ;
Checking natural gas supply system for leaks .
- Perform gas system test ⇒ Maintenance ; Booklet 35.1 ; De-
scription of work; Performing visual inspection of natural gas
fuel tanks for corrosion and leakage test .



Torque settings

- ♦ ⇒ [“2.5 Assembly overview - filler neck”, page 23](#)
- ♦ ⇒ [“2.12.1 Assembly overview – fuel tank 1, natural gas”, page 59](#)
- ♦ ⇒ [“2.4 Assembly overview - fuel tank shut-off valve”, page 21](#)
- ♦ ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody cladding
- ♦ ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liner; Assembly overview – rear wheel housing liner

2.10 Removing and installing natural gas fuel tanks




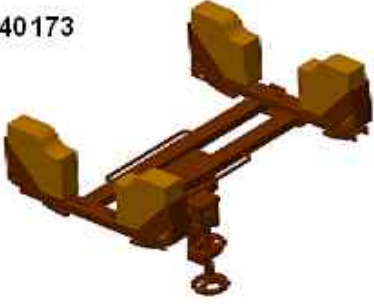


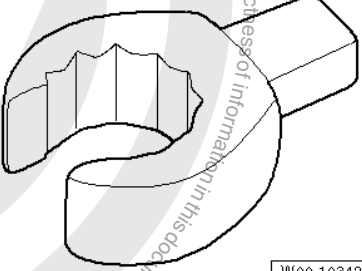
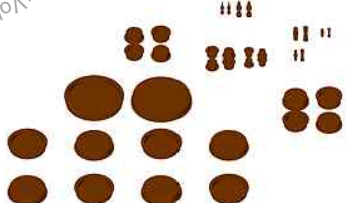

⇒ [“2.10.1 Removing and installing fuel tank 1”, page 36](#)

⇒ [“2.10.2 Removing and installing fuel tank 2”, page 42](#)

2.10.1 Removing and installing fuel tank 1



Special tools and workshop equipment required

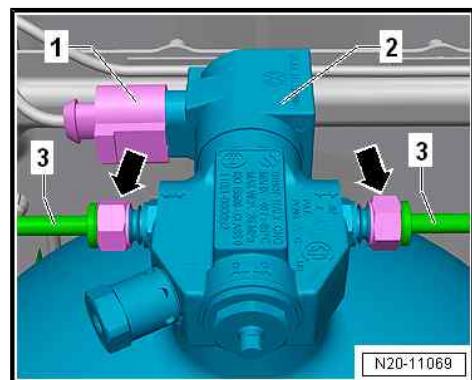
<p>V.A.G 1331</p> 	<p>V.A.G 1383 A</p> 
<p>T10523</p> 	<p>T40173</p> 
<p>T40173/1</p> 	<p>T50026</p>  <p>W20-10066</p>
<p>V.A.G 1331/8</p>  <p>W00-10342</p>	<p>VAS 6122</p>  <p>W00-11228</p>
<p>V.A.G 1332</p> 	<p>2. Fuel</p>



- ◆ Torque wrench - V.A.G 1331-
- ◆ Engine and gearbox jack - V.A.G 1383 A-
- ◆ Tensioning strap - T10523-
- ◆ Gearbox support - T40173-
- ◆ Gearbox support - T40173/1-
- ◆ Handwheel - T50026-
- ◆ Support - VAS 6131/14-1-
- ◆ 14 mm open-ring tool insert - V.A.G 1331/8-
- ◆ Engine bung set - VAS 6122-
- ◆ Torque wrench - V.A.G 1332-
- ◆ Digital caliper, 150 mm - VAS 6335-

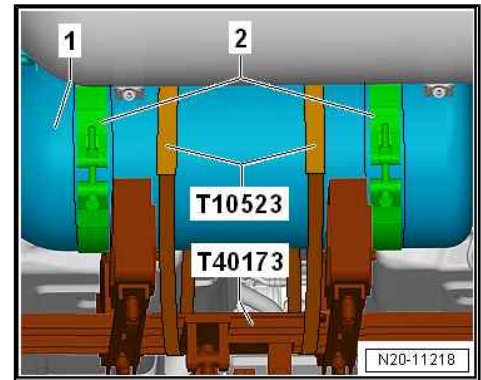
Removing

- The vehicle must be at room temperature (at least 15°C).
- Check version of gearbox support - T40173-
⇒ [Fig. "Check version of gearbox support -T40173- .", page 69](#) .
- Prepare engine and gearbox jack with gearbox support - T40173-
⇒ [Fig. "Preparing gearbox support -T40173- .", page 69](#) .
- Ensure not to damage the painted surface when working on the fuel tanks.
- If necessary, protect painted surface with suitable workshop equipment.
- Remove underbody cladding ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody cladding .
- Release pressure in high-pressure line
⇒ ["2.16 Releasing pressure in high-pressure line", page 80](#) .
- Disconnect battery ⇒ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and reconnecting battery .
- Mark installation position of securing strap pads using a felt-tip pen ⇒ ["2.14 Aligning securing strap pads", page 73](#) .
- Measure and write down the installation positions of securing straps ⇒ ["2.14 Aligning securing strap pads", page 73](#) .
- Mark installation positions of securing straps and pads in order to apply protective film
⇒ ["2.15.2 Attaching protective film to fuel tank 1", page 78](#) .
- Release connector -1-, and pull it off fuel tank shut-off valve 1 - N361- -2-.
- Carefully loosen union nuts -arrows- to allow remaining gas to escape.
- When loosening, counterhold on union with a suitable tool.
- Unscrew union nuts -arrows-.
- Remove high-pressure lines -3- from connections.
- Take care not to bend or deform the lines -3-.
- Immediately seal open connections using suitable plugs from engine bung set - VAS 6122- .

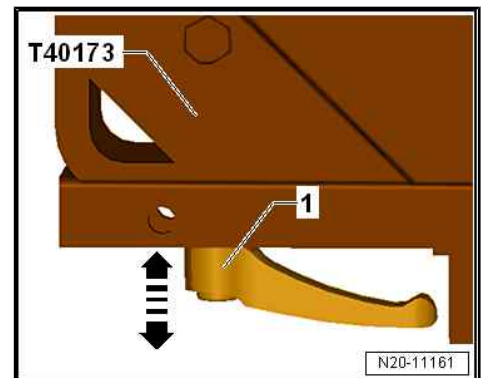




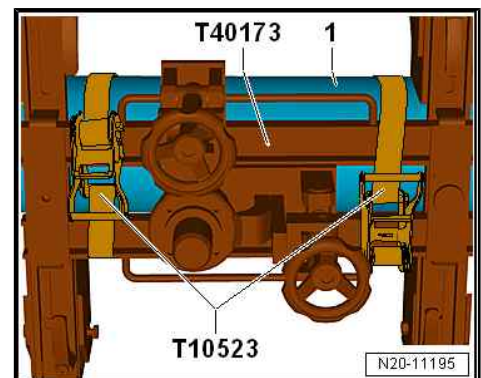
- Position engine and gearbox jack - V.A.G 1383 A- with gearbox support - T40173- under fuel tank -1-.
- Align gearbox support - T40173- with fuel tank -1- between tensioning straps.
- Raise engine and gearbox jack - V.A.G 1383 A- until gearbox support - T40173- rests against fuel tank.



- Align adjustable supports of gearbox support - T40173- relative to fuel tank, and secure them.
- In order to properly secure adjustable supports, pull lever -1- downwards, and position it such that it can be properly secured.



- Ensure that the ratchets of the tensioning straps are offset, as shown in illustration.
- Securely lash fuel tank -1- to gearbox support - T40173- using the two tensioning straps - T10523- .



Unscrew bolts -arrows- on securing straps -2-.



Note

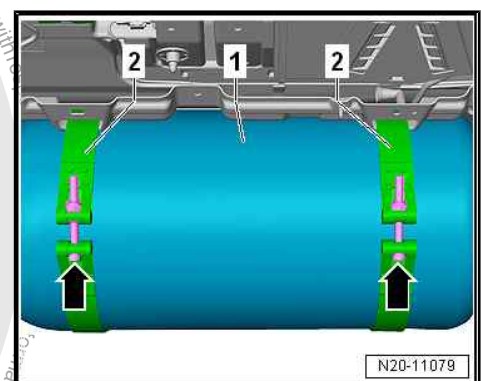
The securing straps are slightly under tension.

- Lower fuel tank slowly with engine and gearbox jack - V.A.G 1383 A- .
- Slightly pull securing straps apart while doing so.
- Drain fuel tank
 ⇒ [“2.13 Emptying natural gas fuel tanks”, page 65](#) .

Installing

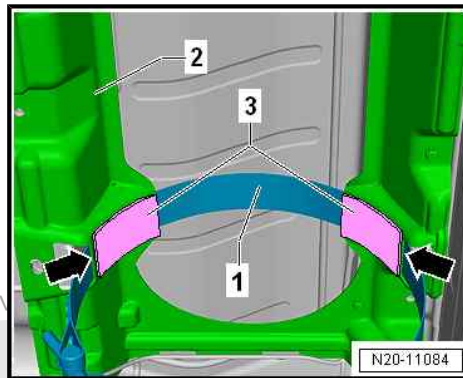
Install in reverse order of removal. Observe the following:

- Apply protective film
 ⇒ [“2.15.2 Attaching protective film to fuel tank 1”, page 78](#) .

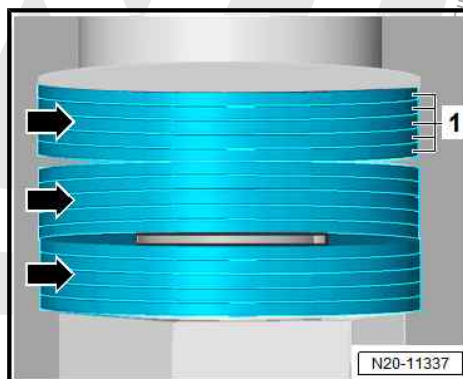
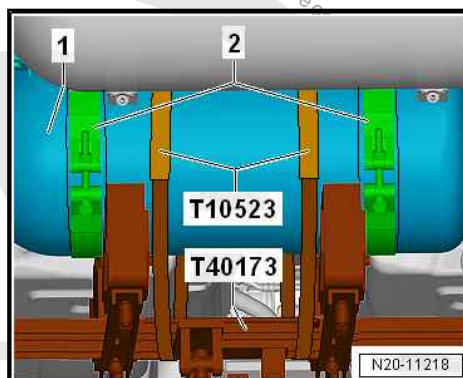




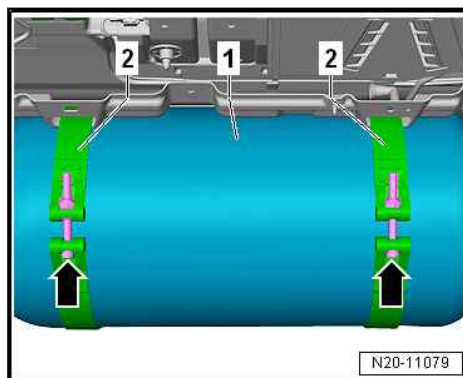
- Ensure proper seating of securing straps -1- in mounting -2-.
- Securing straps -1- must be seated in guide -arrows-.
- Check rubber pads -3- for damage and renew if necessary.
- Renew rubber pads if damaged.



- Position fuel tank -1- on bracket using engine and gearbox jack - V.A.G 1383 A- .
- Close securing strap -3- with securing strap bolt -4-.
- Align fuel tank ➔ [page 41](#) .
- Mark bonding surface -arrows-.
- Open securing strap -3- again.
- Clean bonding surface -arrows-.
- Attach protective film in marked area -arrows-, as shown in illustration.
- The upper edge of the protective film must be flush with the lower rivets -3- in securing strap -2-.
- Ensure correct installation position of dished springs.
- Three spring packs -arrows- each with five dished springs -1- must be assembled.
- The spring packs -arrows- must be assembled with opposing sides facing each other as shown in illustration.



- Screw in bolts -1- on securing straps -2-.
- Fuel tank must still be free to move.
- Ensure correct installation position of protective pads ➔ [page 63](#) .





- Align fuel tank.
- The outer edge of fuel tank shut-off valve 1 - N361- -1- must be aligned flush with the outer edge of mounting -2-.

Pfeil A - Outer edge of mounting

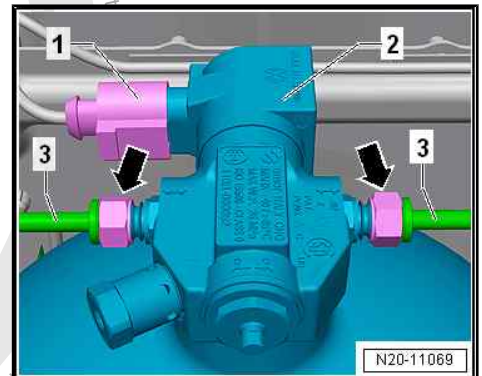
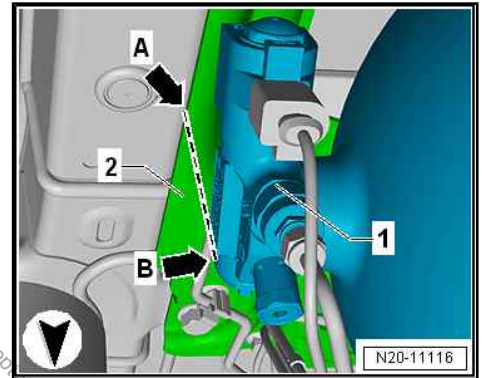
Pfeil B - Outer edge of fuel tank shut-off valve 1 - N361-

- Align fuel tank so that fuel lines can be connected free of stress.



Note

- Take care not to bend or deform any fuel lines.
- The lines must be screwed on by hand as far as stop.
- The lines must be installed free of stress.
- Turn fuel tank so that the union nuts -arrows- can be screwed on.
- The lines -3- must be installed free of stress.
- The lines -3- must be screwed on by hand as far as stop.
- Take care not to bend or deform the fuel lines -3-.
- The lines -3- must be screwed on by hand as far as stop.
- The lines -3- must be installed free of stress.
- Route fuel lines in their original positions.
- Ensure that there is sufficient clearance to all moving or hot components.
- Ensure that fuel lines are properly seated in retainers.
- Bolt on threaded connections -arrows-.
- Connect connector -1- on fuel tank shut-off valve 1 - N361- .





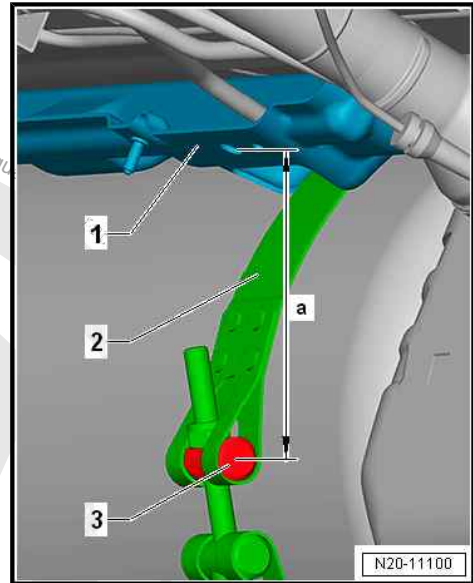
- Align securing strap -2- with mounting -1-.
- Dimension -a- must be attained between centre line of barrel -3- and mounting -1-.



Note

Any point on bracket -1- can be used as a reference. However, it is essential to use the same point for the measurement after re-installing.

- Tighten securing straps
⇒ ["2.12.3 Assembly overview - securing straps and spring pack", page 64](#).
- Check natural gas supply system for leaks ⇒ Rep. gr. 24 ;
Checking natural gas supply system for leaks .
- Perform gas system test ⇒ Maintenance ; Booklet 35.1 ; Description of work; Performing visual inspection of natural gas fuel tanks for corrosion and leakage test .






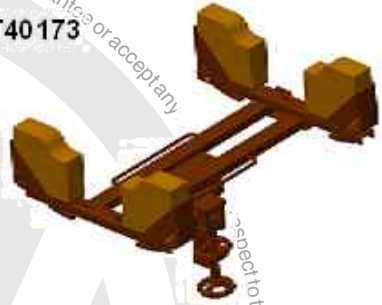


Torque setting

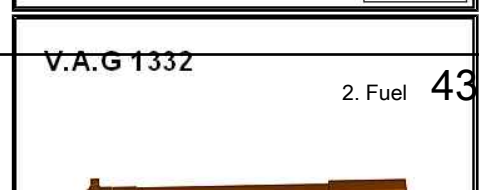
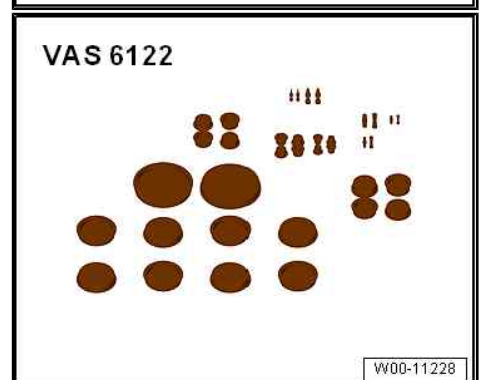
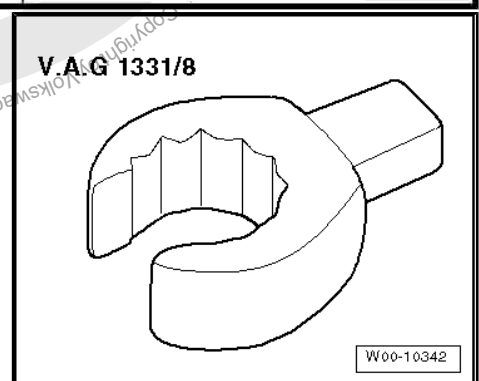
- ◆ ⇒ [Fig. "Installation position of protective pads", page 61](#)
- ◆ ⇒ [Fig. "Installation position of securing strap", page 65](#)
- ◆ ⇒ ["2.12.3 Assembly overview - securing straps and spring pack", page 64](#)
- ◆ ⇒ ["2.12 Assembly overview - natural gas fuel tank", page 59](#)
- ◆ ⇒ ["2.4 Assembly overview - fuel tank shut-off valve", page 21](#)
- ◆ ⇒ General body repairs, exterior, Rep. gr. 66 ; Underbody cladding

2.10.2 Removing and installing fuel tank 2



Special tools and workshop equipment required

<p>V.A.G 1331</p> 	<p>V.A.G 1383 A</p> 
<p>T10523</p> 	<p>T40173</p> 
<p>T40173/1</p> 	<p>T50026</p>  <p>W20-10066</p>

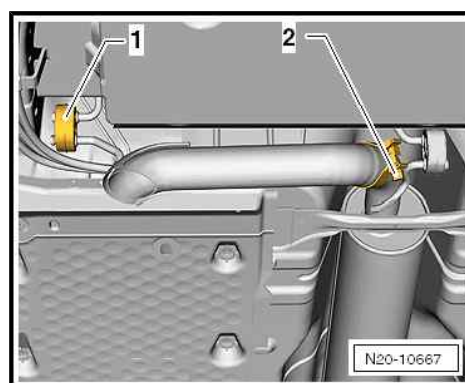




- ◆ Torque wrench - V.A.G 1331-
- ◆ Engine and gearbox jack - V.A.G 1383 A-
- ◆ Tensioning strap - T10523-
- ◆ Gearbox support - T40173-
- ◆ Gearbox support - T40173/1-
- ◆ Handwheel - T50026-
- ◆ Support - VAS 6131/14-1-
- ◆ 14 mm open-ring tool insert - V.A.G 1331/8-
- ◆ Engine bung set - VAS 6122-
- ◆ Torque wrench - V.A.G 1332-
- ◆ Digital caliper, 150 mm - VAS 6335-

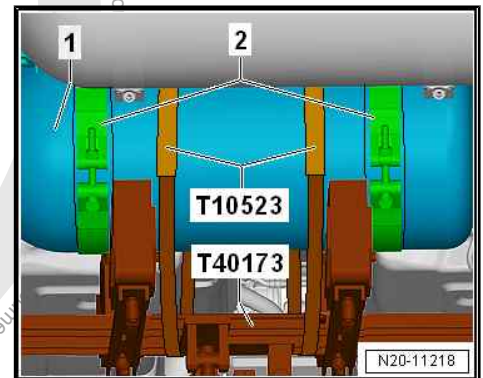
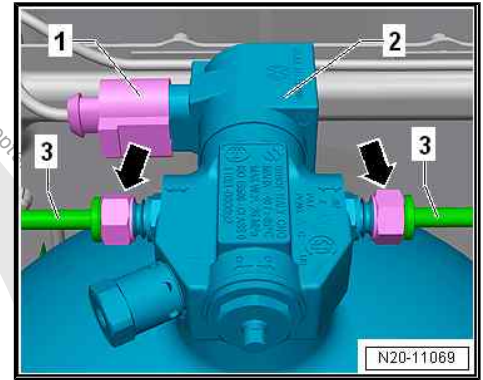
Removing

- The vehicle must be at room temperature (at least 15°C).
- Check version of gearbox support - T40173-
⇒ [Fig. "Check version of gearbox support - T40173- :"" , page 69](#) .
- Prepare engine and gearbox jack with gearbox support - T40173-
⇒ [Fig. "Preparing gearbox support -T40173- :"" , page 69](#) .
- Ensure not to damage the painted surface when working on the fuel tanks.
- If necessary, protect painted surface with suitable workshop equipment.
- Remove underbody cladding ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody cladding .
- Release pressure in high-pressure line
⇒ ["2.16 Releasing pressure in high-pressure line", page 80](#) .
- Disconnect battery ⇒ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and reconnecting battery .
- Detach exhaust hanger -1-.
- Open clamp -2- and remove exhaust pipe.
- Mark installation position of securing strap pads using a felt-tip pen ⇒ ["2.14 Aligning securing strap pads", page 73](#) .
- Measure and write down the installation positions of securing straps ⇒ ["2.14 Aligning securing strap pads", page 73](#) .
- Mark installation positions of securing straps and pads in order to apply protective film
⇒ ["2.15.2 Attaching protective film to fuel tank 1", page 78](#) .

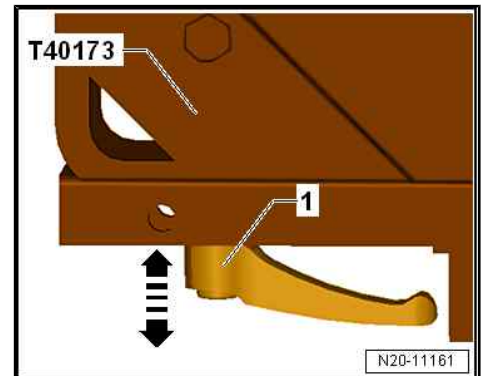




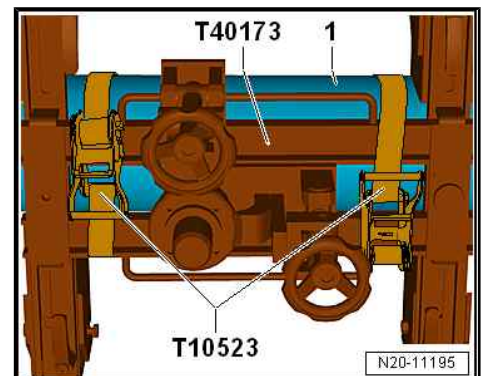
- Release connector -1-, and pull it off fuel tank shut-off valve 2 - N362- -2-.
- Carefully loosen union nuts -arrows- to allow remaining gas to escape.
- When loosening, counterhold on union with a suitable tool.
- Unbolt threaded connections -arrows-.
- Remove high-pressure lines -3- from connections.
- Take care not to bend or deform any lines.
- Immediately seal open connections using suitable plugs from engine bung set - VAS 6122- .
- Position engine and gearbox jack - V.A.G 1383 A- with gearbox support - T40173- under fuel tank -1-.
- Align gearbox support - T40173- with fuel tank -1- between tensioning straps.
- Raise engine and gearbox jack - V.A.G 1383 A- until gearbox support - T40173- rests against fuel tank.



- Align adjustable supports of gearbox support - T40173- relative to fuel tank, and secure them.
- In order to properly secure adjustable supports, pull lever -1- downwards, and position it such that it can be properly secured.



- Ensure that the ratchets of the tensioning straps are offset, as shown in illustration.
- Securely lash fuel tank -1- to gearbox support - T40173- using the two tensioning straps - T10523- .





- Unscrew bolts -arrows- on securing straps -2-.



Note

The securing straps are slightly under tension.

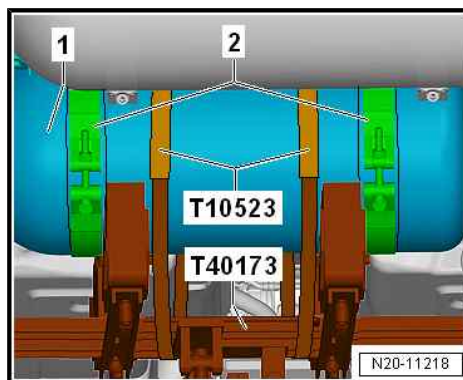
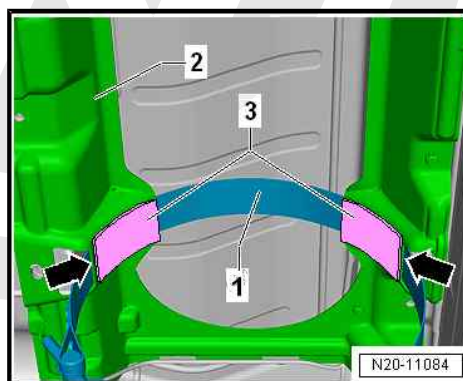
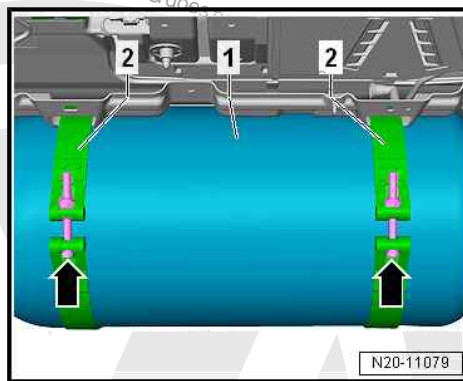
- Slowly lower fuel tank -1- with engine and gearbox jack - V.A.G 1383 A- .
- With the aid of a second mechanic, guide out fuel tank -1-.
- Slightly pull securing straps apart while doing so.

Installing

Install in reverse order of removal. Observe the following:

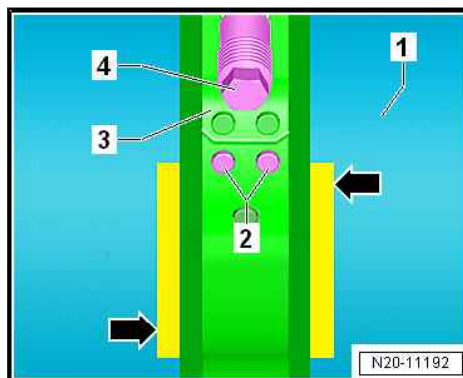
- Apply protective film
⇒ [“2.15.1 Attaching protective film to fuel tank 2”, page 74](#) .
- Ensure proper seating of securing straps -1- in mounting -2-.
- Securing straps -1- must be seated in guide -arrows-.
- Check rubber pads -3- for damage and soiling, and renew them if necessary.

- Position fuel tank -1- on bracket using engine and gearbox jack - V.A.G 1383 A- .



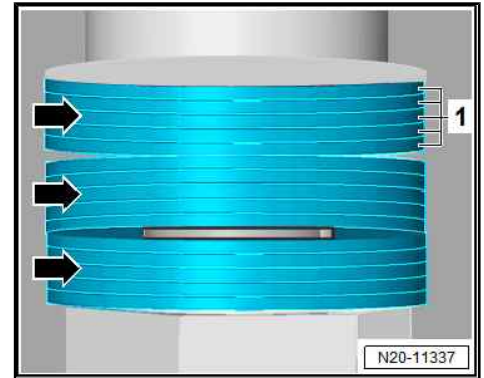
A protective film must be attached to fuel tank -1- in area underneath securing strap bolt -4-.

- For allocation of protective film refer to ⇒ ETKA .
- Close securing strap -3- with securing strap bolt -4-.
- Align fuel tank ⇒ [page 47](#) .
- Mark bonding surface -arrows-.
- Open securing strap -3- again.
- Clean bonding surface -arrows-.
- Attach protective film in marked area -arrows-, as shown in illustration.
- The upper edge of the protective film must be flush with the lower rivets -3- in securing strap -2-.

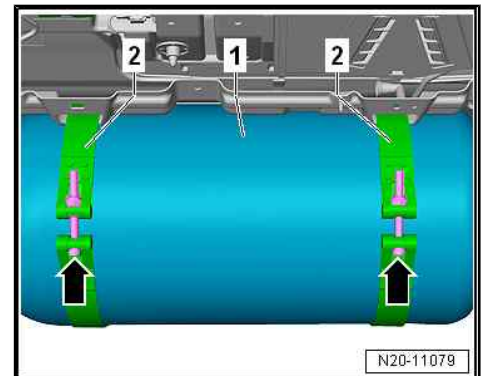




- Ensure correct installation position of dished springs.
- Three spring packs -arrows- each with five dished springs -1- must be assembled.
- The spring packs -arrows- must be assembled with opposing sides facing each other as shown in illustration.



- Screw in bolts -arrows- on securing straps -2-.
- Fuel tank -1- must still be free to move.
- Ensure correct installation position of securing straps and protective pads ➔ [page 63](#).
- Renew protective pads if damaged.

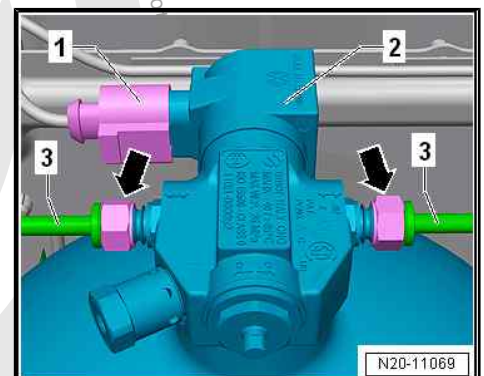
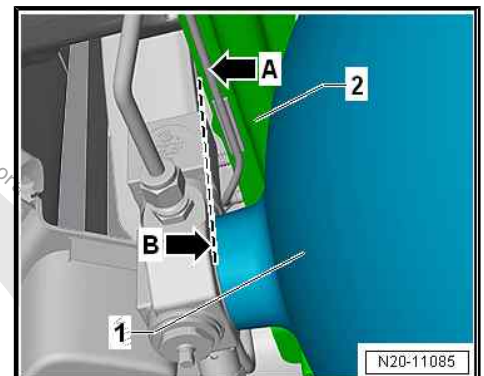


- Align fuel tank -1-.
- The end of the fuel tank must be aligned flush with the outer edge of mounting -2-.

Pfeil A - Outer edge of mounting

Pfeil B - End fuel tank

- Align fuel tank so that fuel lines can be connected free of stress.
- Take care not to bend or deform any fuel lines.
- The lines must be screwed on by hand as far as stop.
- The lines must be installed free of stress.
- Turn fuel tank so that the union nuts -arrows- can be screwed on.
- The lines -3- must be installed free of stress.
- The lines -3- must be screwed on by hand as far as stop.
- Take care not to bend or deform the fuel lines -3-.
- The lines -3- must be screwed on by hand as far as stop.
- The lines -3- must be installed free of stress.
- Ensure that there is sufficient clearance to all moving or hot components.
- Route fuel lines in their original positions.
- Ensure that fuel lines are properly seated in retainers.
- Bolt on threaded connections -arrows-.
- Connect connector -1- on fuel tank shut-off valve 2 - N362- .





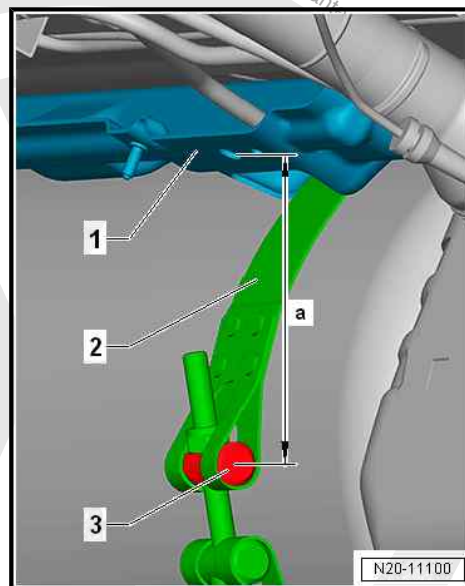
- Align securing strap -2- with mounting -1-.
- Dimension -a- must be attained between centre line of barrel -3- and mounting -1-.



Note

Any point on bracket -1- can be used as a reference. However, it is essential to use the same point for the measurement after re-installing.

- Tighten securing straps
⇒ [“2.12.3 Assembly overview - securing straps and spring pack”, page 64](#) .
- Check natural gas supply system for leaks ⇒ Rep. gr. 24 ;
Checking natural gas supply system for leaks .
- Perform gas system test ⇒ Maintenance ; Booklet 35.1 ; Description of work; Performing visual inspection of natural gas fuel tanks for corrosion and leakage test .



Torque setting

- ◆ ⇒ [Fig. “Installation position of protective pads”](#) , page 63
- ◆ ⇒ [Fig. “Installation position of securing strap”](#) , page 65
- ◆ ⇒ [“2.12.3 Assembly overview - securing straps and spring pack”, page 64](#)
- ◆ ⇒ [“2.12 Assembly overview - natural gas fuel tank”, page 59](#)
- ◆ ⇒ [“2.4 Assembly overview - fuel tank shut-off valve”, page 21](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody cladding
- ◆ ⇒ Rep. gr. 26 ; Exhaust pipes/silencers; Assembly overview - silencers



2.11 Determining residual pressure in natural gas fuel tank

⇒ [“2.11.1 Checking and converting adapter for counterpressure check on natural gas tank”, page 49](#)

⇒ [“2.11.2 Self-test of cooling system tester V.A.G 1274 B”, page 50](#)

⇒ [“2.11.3 Determining residual pressure in natural gas fuel tank”, page 54](#)

2.11.1 Checking and converting adapter for counterpressure check on natural gas tank

WARNING

Before using the adapter for counterpressure check on natural gas tank, always check if it is the latest version.

Older versions of the adapter for counterpressure check on natural gas tank must not be used unless converted accordingly.

The only adapter that may be used is the adapter - V.A.G 1274B/12 A- . All other adapters need to be converted accordingly.

Adapters with pressure relief valve need to be retrofitted
 ⇒ [Fig. “Adapter -V.A.G 1274B/12 A-1- ”, page 50](#) .

Distinguishing between different versions
 ⇒ [Fig. “”, page 49](#) .

Converting adapter for counterpressure check on natural gas tank ⇒ [Fig. “”, page 50](#) .

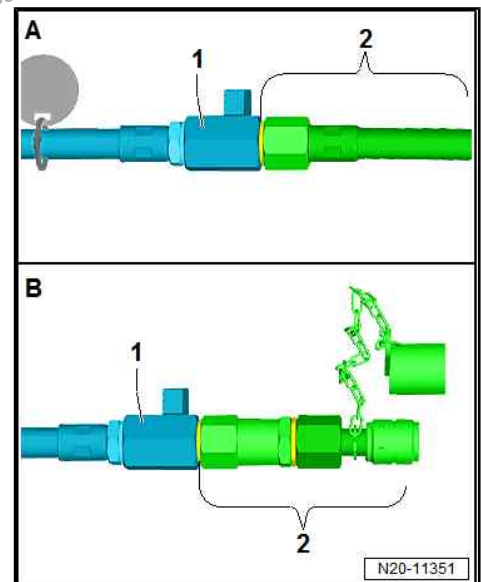
Distinguishing between different versions:

A - Old version without pressure relief valve in connection piece -2-

B - Adapter - V.A.G 1274B/12 A- new version with pressure relief valve in connection piece -2-

The older version -A- of the adapter has no pressure relief valve and has to be converted. Located after connection piece -1- is a flexible hose.

The newer version -B- of the adapter is distinctly longer in area -2-. This is the area where the pressure relief valve is located.





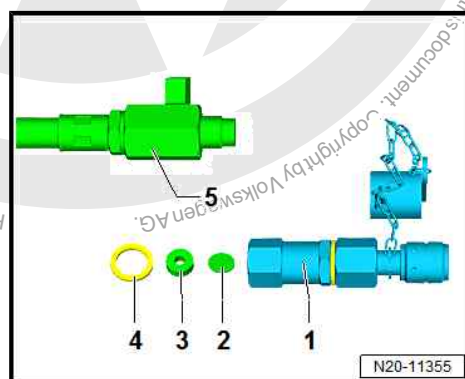
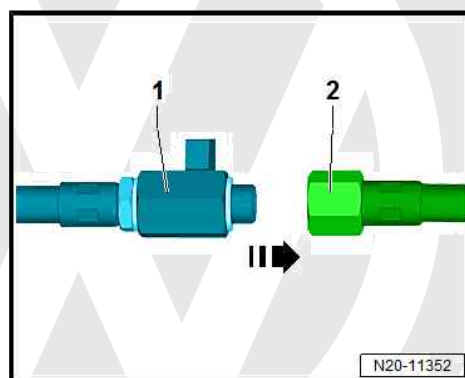
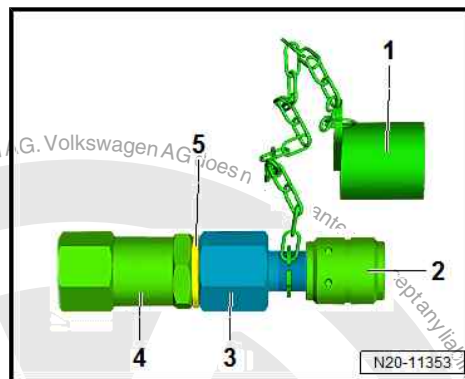
Adapter - V.A.G 1274B/12 A-1-

- 1 - Cap
- 2 - Threaded union for fuel tank shut-off valve
- 3 - Connection piece
- 4 - Pressure relief valve
- 5 - Seal

Use adapter - V.A.G 1274B/12 A-1- to convert from old to new version.

Converting from old to new version:

- Carefully loosen and unscrew union nut -2-.
- When doing so, counterhold on union -1- with suitable tool.
- Remove spacer ring from union -1-.
- Insert filter strainer -2- into adapter -1-.
- Insert supplied seal -3- in adapter -1-.
- Fit spacer ring -4- onto threaded piece of adapter -5-.
- Screw adapter - V.A.G 1274B/12 A-1- -15- onto adapter -5-, and tighten to 20 Nm.
- Counterhold using a suitable tool while doing so.
- Connect converted adapter for counterpressure test on natural gas tank to fuel tank shut-off valve and perform leakage test
⇒ ["2.11.2 Self-test of cooling system tester V.A.G 1274 B", page 50](#).



2.11.2 Self-test of cooling system tester - V.A.G 1274 B-

Special tools and workshop equipment required

- ◆ Cooling system tester - V.A.G 1274 B-
- ◆ Engine bung set - VAS 6122-
- ◆ Handwheel - T50026-



NOTICE

The check (self-test) of the cooling system tester - V.A.G 1274 B- must be carried out before the counterpressure check.

This ensures that the tools are OK and suitable for the check.

The counterpressure check must be performed after the fuel tank has been emptied.

Adapter for counterpressure check on natural gas tank before conversion:



- ◆ Adapter for counterpressure check on natural gas tank (6 mm thread) - V.A.G 1274 B/12-
- ◆ Adapter with pressure relief valve
- ◆ Determine version of adapter for counterpressure check on natural gas tank
⇒ [“2.11.1 Checking and converting adapter for counterpressure check on natural gas tank”, page 49](#) .
- ◆ This adapter for counterpressure check on natural gas tank (6 mm thread) - V.A.G 1274 B/12- needs to be converted
⇒ [“2.11.1 Checking and converting adapter for counterpressure check on natural gas tank”, page 49](#) .

Adapter for counterpressure check on natural gas tank after conversion:

- ◆ Adapter for counterpressure check on natural gas tank - V.A.G 1274 B/12 A-
- ◆ Determine version of adapter for counterpressure check on natural gas tank
⇒ [“2.11.1 Checking and converting adapter for counterpressure check on natural gas tank”, page 49](#) .



Note

- ◆ *The counterpressure check must be performed after the fuel tank has been emptied.*
- ◆ *The counterpressure check is used to verify that the pressure in the fuel tank is below 1.0 bar.*
- ◆ *If no counterpressure test has been performed, any work on the fuel tank and the fuel tank shut-off valve is prohibited.*
- ◆ *Seal open connections using suitable plugs from engine bung set - VAS 6122-*

Test precondition:

- Check adapter for counterpressure check on natural gas tank and convert it accordingly if necessary.
- Remove fuel tank
⇒ [“2.10 Removing and installing natural gas fuel tanks”, page 36](#) .



Note

Perform a leakage test in the area around the fuel tank shut-off valve before emptying the fuel tank ⇒ Rep. gr. 00; Checking gas system; Checking gas system for leaks .

- Drain fuel tank
⇒ [“2.13 Emptying natural gas fuel tanks”, page 65](#) .



Fuel tank shut-off valve with two line connections:



Note

- ◆ Different fuel tank shut-off valves may be installed.
 - ◆ Depending on the version of the fuel tank shut-off valve installed, 1 or 2 line connections may be present.
 - ◆ In the case of fuel tank shut-off valves with 2 connections, each of the connections must be sealed using the adapter for counterpressure check on natural gas tank and an additional sealing cap.
- If necessary, seal open connection with suitable bung - VAS 523 001/7- .

Continued for all vehicles:

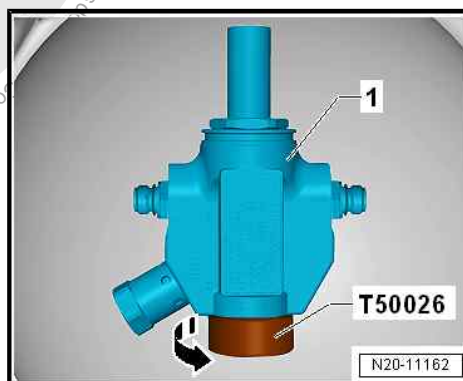
- Check adapter for counterpressure check on natural gas tank , and convert it to new version, if necessary
⇒ "2.11.1 Checking and converting adapter for counterpressure check on natural gas tank", page 49 .
- Close mechanical shut-off valve on fuel tank shut-off valve -1- using hand wheel - T50026- .
- Close shut-off valves by turning hand wheel in clockwise direction.

DANGER

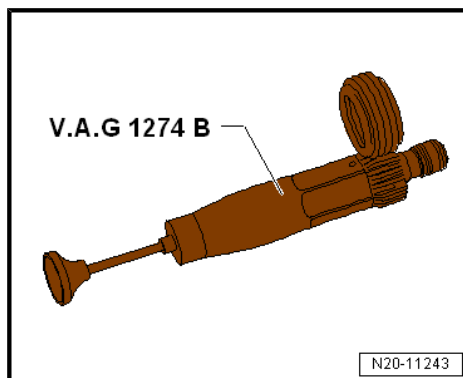
Never leave the fuel tank unattended when the tester is connected.

To ensure that the counterpressure check is performed correctly, always check the cooling system tester - V.A.G 1274 B- and the adapter for counterpressure check on natural gas tank (self test) beforehand.

If the self test fails, the tools must not be used.



- Disconnect any adapter lines from cooling system tester - V.A.G 1274 B- .
- Operate cooling system tester - V.A.G 1274 B- several times.





- Build up a pressure of 3.0 bar on cooling system tester - V.A.G 1274 B- .
- Observe pressure on pressure gauge of cooling system tester - V.A.G 1274 B- for 30 seconds.

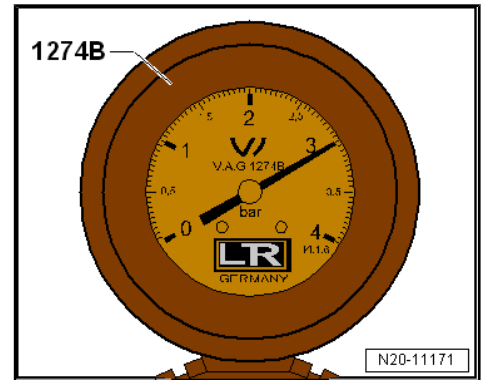
If no pressure builds up or if the pressure drops again:

The cooling system tester - V.A.G 1274 B- is not OK and must not be used for counterpressure check.

If pressure builds up, and if the pressure does not drop:

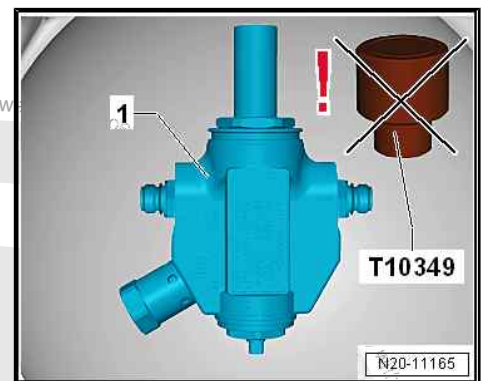
The cooling system tester - V.A.G 1274 B- is OK and can be used for counterpressure check.

Check adapter for counterpressure check on natural gas tank as described below.

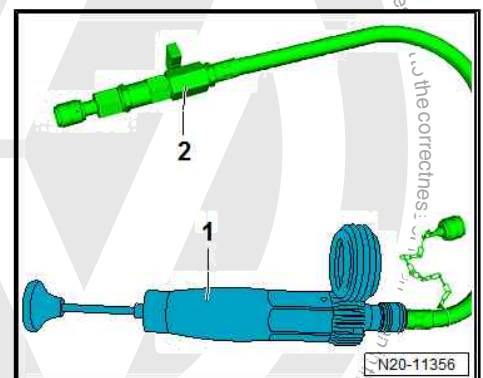


Self-test on adapter for counterpressure check on natural gas tank :

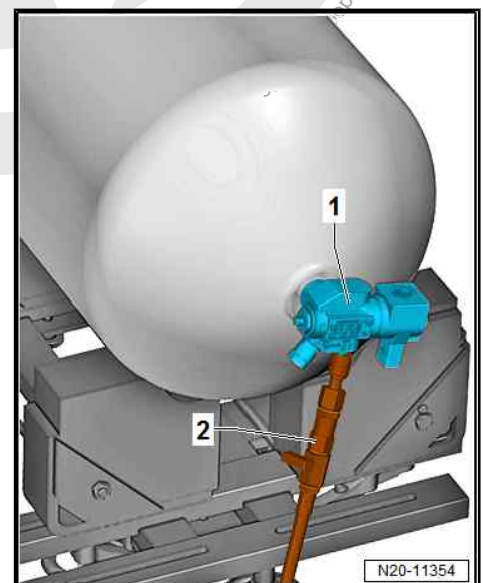
- Ensure that magnetic release tool - T10349- is not placed on fuel tank shut-off valve -1-.
- Check threads on fuel tank shut-off valve and on adapter for counterpressure check on natural gas tank for soiling, and clean them if necessary.



- Connect adapter for counterpressure check on natural gas tank -2- to cooling system tester - V.A.G 1274 B- -1-.
- Open shut-off tap -arrow- on adapter for back pressure test on natural gas tank .
- Lever is then in line with direction of flow.



- Connect adapter for counterpressure check on natural gas tank -2- to fuel tank shut-off valve -1-.
- Operate cooling system tester - V.A.G 1274 B- several times.





- Build up a pressure of 3.0 bar on cooling system tester - V.A.G 1274 B- .
- Observe pressure on pressure gauge of cooling system tester - V.A.G 1274 B- for 30 seconds.

If no pressure builds up or if the pressure drops again:

- Check connection between fuel tank shut-off valve and adapter for counterpressure check on natural gas tank , and tighten it if necessary.
- Repeat self test ⇒ [page 53](#) .

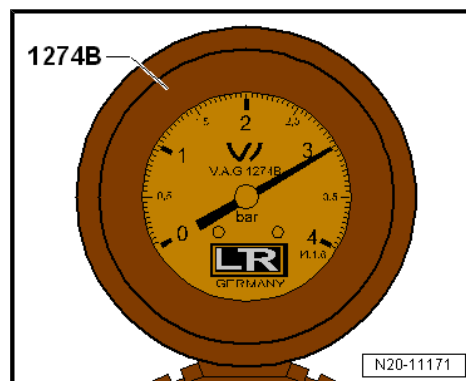
If no pressure builds up or if the pressure drops again:

Adapter for counterpressure check on natural gas tank is not OK and must not be used for counterpressure check.

If pressure builds up, and if the pressure does not drop:

Cooling system tester - V.A.G 1274 B- and adapter for counterpressure check on natural gas fuel tank can be used for counterpressure check.

- Press the pressure compensation button on the cooling system tester - V.A.G 1274 B- . This will cause the pressure in the cooling system tester - V.A.G 1274 B- and the adapter for counterpressure check on natural gas fuel tank to be released.



2.11.3 Determining residual pressure in natural gas fuel tank

Special tools and workshop equipment required

- ◆ Cooling system tester - V.A.G 1274 B-
- ◆ Engine bung set - VAS 6122-
- ◆ Handwheel - T50026-

Adapter for counterpressure check on natural gas tank before conversion:

- ◆ Adapter for counterpressure check on natural gas tank (6 mm thread) - V.A.G 1274 B/12-
- ◆ Adapter with pressure relief valve
- ◆ Determine version of adapter for counterpressure check on natural gas tank
⇒ ["2.11.1 Checking and converting adapter for counterpressure check on natural gas tank", page 49](#) .
- ◆ This adapter for counterpressure check on natural gas tank (6 mm thread) - V.A.G 1274 B/12- needs to be converted
⇒ ["2.11.1 Checking and converting adapter for counterpressure check on natural gas tank", page 49](#) .

Adapter for counterpressure check on natural gas tank after conversion:

- ◆ Adapter for counterpressure check on natural gas tank - V.A.G 1274 B/12 A-
- ◆ Determine version of adapter for counterpressure check on natural gas tank
⇒ ["2.11.1 Checking and converting adapter for counterpressure check on natural gas tank", page 49](#) .



Note

- ◆ *The counterpressure check must be performed after the fuel tank has been emptied.*
- ◆ *The counterpressure check is used to verify that the pressure in the fuel tank is below 1.0 bar.*
- ◆ *If no counterpressure test has been performed, any work on the fuel tank and the fuel tank shut-off valve is prohibited.*
- ◆ *Seal open connections using suitable plugs from engine bung set - VAS 6122- .*
- ◆ *The only adapter that may be used is the adapter for counterpressure check on natural gas tank - V.A.G 1274 B/12 A- . Older versions must be converted accordingly.*

Test precondition:

- Remove fuel tank
⇒ ["2.10 Removing and installing natural gas fuel tanks", page 36](#) .



Note

Perform a leakage test in the area around the fuel tank shut-off valve before emptying the fuel tank ⇒ Rep. gr. 00 ; Checking gas system; Checking gas system for leaks .

- Drain fuel tank
⇒ ["2.13 Emptying natural gas fuel tanks", page 65](#) .
- Check adapter for counterpressure check on natural gas tank , and convert it to new version, if necessary
⇒ ["2.11.1 Checking and converting adapter for counterpressure check on natural gas tank", page 49](#) .
- Perform self test of cooling system tester - V.A.G 1274 B-
⇒ ["2.11.2 Self-test of cooling system tester V.A.G 1274 B", page 50](#) .



DANGER

Never leave the fuel tank unattended when the tester is connected.

To ensure that the counterpressure check is performed correctly, always check the cooling system tester - V.A.G 1274 B- and the adapter for counterpressure check on natural gas tank (self test) beforehand.

If the self test fails, the tools must not be used.



Fuel tank shut-off valve with two line connections:



Note

- ◆ Different fuel tank shut-off valves may be installed.
 - ◆ Depending on the version of the fuel tank shut-off valve installed, 1 or 2 line connections may be present.
 - ◆ In the case of fuel tank shut-off valves with 2 connections, each of the connections must be sealed using the adapter for counterpressure check on natural gas tank and an additional sealing cap.
- If necessary, seal open connection with suitable bung - VAS 523 001/7- .

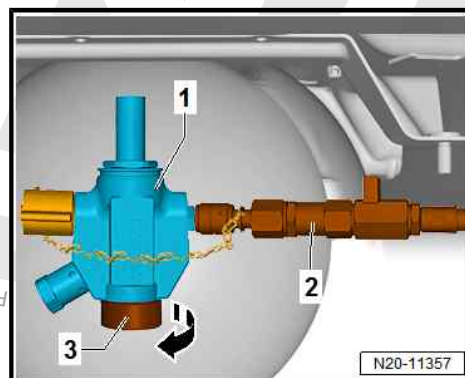
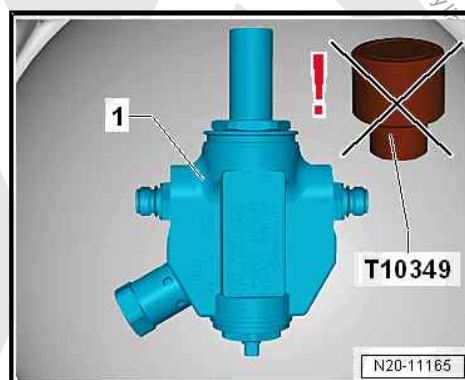
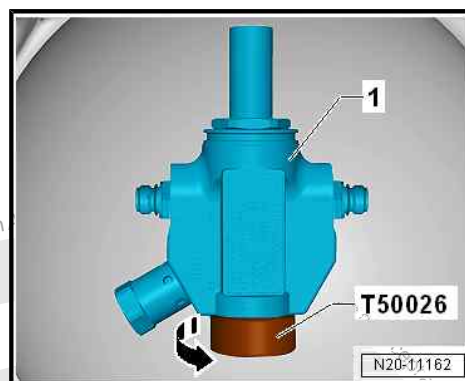
Continued for all vehicles:

- Close mechanical shut-off valve on fuel tank shut-off valve -1- using hand wheel - T50026- .
- Close shut-off valves by turning hand wheel in clockwise direction.

Performing counterpressure check:

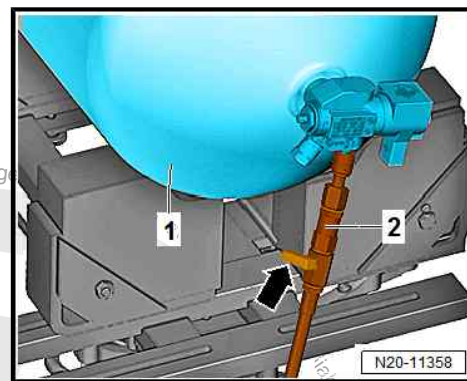
- Ensure that the magnetic release tool T10349- is not placed on the fuel tank shut-off valve .

- Use hand wheel - T50026- -3- to carefully open mechanical shut-off valve on fuel tank shut-off valve -1-.

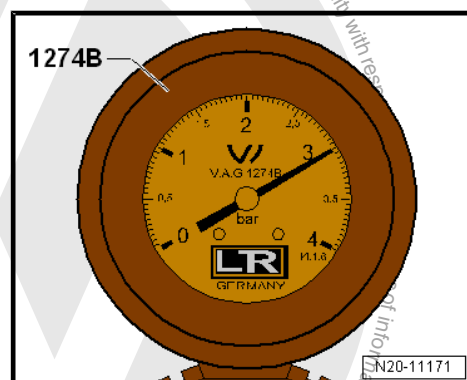




- Close shut-off tap -arrow- on adapter for counterpressure check on natural gas tank -2-. Lever is then at right angle to direction of flow.



- Operate cooling system tester - V.A.G 1274 B- several times.
- Build up a pressure of 3.0 bar on cooling system tester - V.A.G 1274 B- .





- Open shut-off tap -arrow- on adapter for counterpressure check on natural gas tank -2-.
- Lever is then in line with direction of flow.
- Observe pressure on pressure gauge of cooling system tester - V.A.G 1274 B- for 30 seconds.

If pressure does not drop below 1.0 bar immediately:

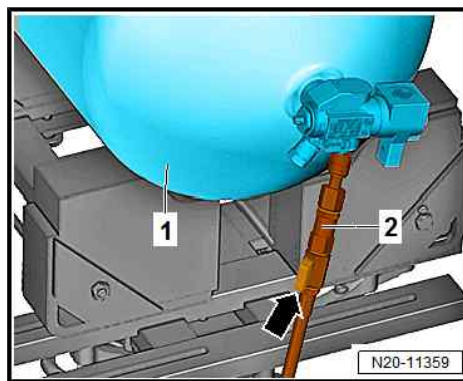
The pressure in the fuel tank is too high because the fuel tank has not been emptied completely.

⚠ DANGER

Danger of fatal injury and explosion caused by gas leakage from insufficiently purged natural gas fuel tanks in connection with sources of ignition and electrostatic discharge.

Risk of explosion leading to loss of life or serious injuries.

- **Never work on filled, pressurised natural gas fuel tanks.**



- Empty fuel tank again
⇒ [“2.13 Emptying natural gas fuel tanks”, page 65](#) .
- Repeat fuel pressure test ⇒ [page 56](#) .

If pressure still does not drop below 1.0 bar:

- Empty fuel tank again
⇒ [“2.13 Emptying natural gas fuel tanks”, page 65](#) .
- Repeat fuel pressure test ⇒ [page 56](#) .

If pressure still does not drop below 1.0 bar:

Do not continue work on fuel tank.

If pressure drops very slowly:

- Check connection between fuel tank shut-off valve and adapter for counterpressure check on natural gas tank , and tighten it if necessary.
- Check connection between sealing cap of adapter for back pressure check on natural gas tank (6 mm thread) - V.A.G 1274 B/12- and fuel tank shut-off valve , and tighten it if necessary.
- Repeat self test ⇒ [page 53](#) .
- Repeat fuel pressure test ⇒ [page 56](#) .



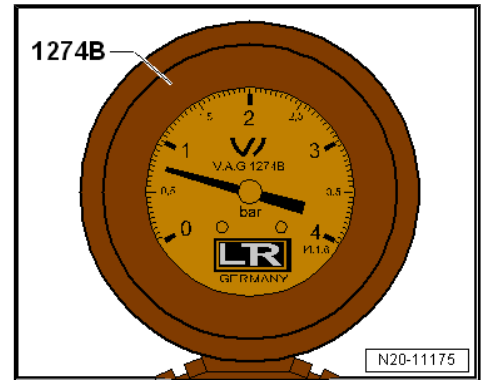
If pressure drops below 1.0 bar immediately:

- Repeat counterpressure check to verify that the previous counterpressure check has been performed correctly
⇒ [page 56](#) .



Note

- ◆ Upon completion of the counterpressure check, operate the cooling system tester - V.A.G 1274 B- several times.
- ◆ No pressure must build up while doing so.
- ◆ Air can be heard to flow into the fuel tank.
- ◆ If pressure builds up, repeat the counterpressure check
⇒ [page 56](#) .



The fuel tank has been emptied sufficiently, and the pressure has been released.

The fuel tank shut-off valve can be removed.



DANGER

Danger of fatal injury and explosion caused by gas leakage from insufficiently purged natural gas fuel tanks in connection with sources of ignition and electrostatic discharge.

Risk of explosion leading to loss of life or serious injuries.

- No other work on the natural gas fuel tank may be performed until after the residual pressure in the natural gas fuel tank has been determined.

2.12 Assembly overview - natural gas fuel tank

⇒ [“2.12.1 Assembly overview – fuel tank 1, natural gas”, page 59](#)

⇒ [“2.12.2 Assembly overview – fuel tank 2, natural gas”, page 62](#)

⇒ [“2.12.3 Assembly overview securing straps and spring pack”, page 64](#)

2.12.1 Assembly overview – fuel tank 1, natural gas



1 - Support bearing

- ☐ For fuel tank

2 - Bolt

- ☐ Renew after removal
- ☐ Qty. 2
- ☐ 20 Nm +90°

3 - Protective pads

- ☐ Bonded in
- ☐ Qty. 4 on inside of mounting
- ☐ Renew if damaged

4 - Bolt

- ☐ Renew after removal
- ☐ Qty. 2
- ☐ 50 Nm +90°

5 - Bracket

- ☐ For fuel line

6 - Filling connection

- ☐ With fuel line
- ☐ Assembly overview - filling connection
⇒ [“2.5 Assembly overview - filler neck”, page 23](#)
- ☐ Removing and installing filling connection
⇒ [“2.9 Removing and installing filling connection”, page 32](#)
- ☐ When loosening, counterhold on union with a suitable tool
- ☐ Take care not to bend or deform any lines
- ☐ Route fuel lines in their original positions
- ☐ Ensure that there is sufficient clearance to all moving or hot components
- ☐ Tighten by hand as far as stop
- ☐ 17 Nm

7 - Securing strap

- ☐ Assembly overview ⇒ [“2.12.3 Assembly overview - securing straps and spring pack”, page 64](#)
- ☐ Fitting position ⇒ [Fig. “Installation position of securing strap”, page 65](#)

8 - Protective pads

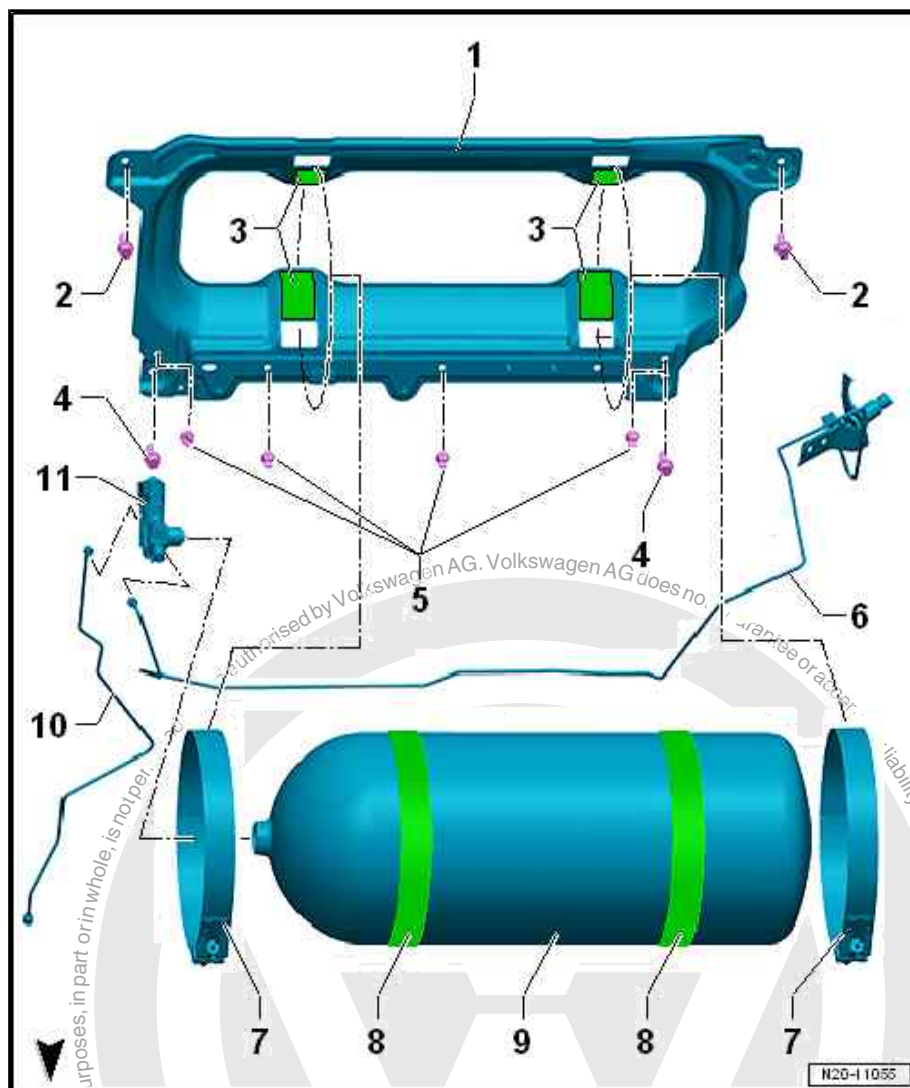
- ☐ Fitting position ⇒ [Fig. “Installation position of protective pads”, page 61](#)
- ☐ Renew if damaged

9 - Fuel tank 1

- ☐ Overview of fitting locations ⇒ [“1.1 Overview of fitting locations - fuel system”, page 7](#)
- ☐ Removing and installing ⇒ [“2.10.2 Removing and installing fuel tank 2”, page 42](#)

10 - Fuel line

- ☐ To fuel tank 1
- ☐ When loosening, counterhold on union with a suitable tool
- ☐ Take care not to bend or deform any lines
- ☐ Route fuel lines in their original positions





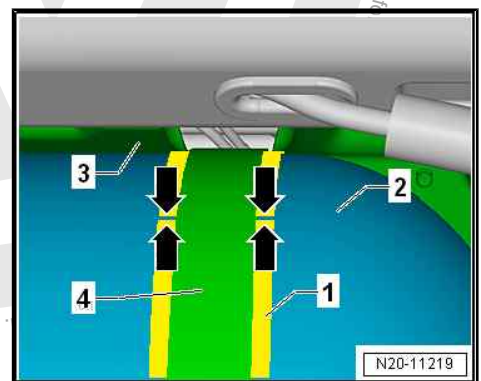
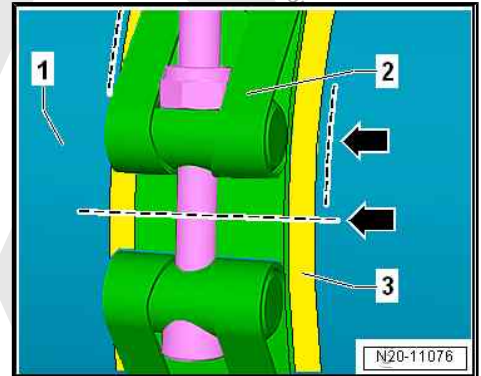
- ☐ Ensure that there is sufficient clearance to all moving or hot components
- ☐ Tighten by hand as far as stop
- ☐ 17 Nm

11 - Fuel tank shut-off valve 1 - N361-

- ☐ Assembly overview ➔ [“2.4 Assembly overview - fuel tank shut-off valve”, page 21](#)
- ☐ Removing and installing ➔ [“2.8 Removing and installing fuel tank shut-off valve”, page 26](#)

Installation position of protective pads

- Mark installation position before removing protective pad -3-.
- To do this, mark horizontal and vertical alignment on fuel tank -1- -arrows- using a felt-tip pen.
- The protective pads -3- must be properly seated under securing straps -2-.
- Use the previously made markings for proper alignment.
- The protective pads -3- must be attached free of wrinkles.
- The ends of the protective pads -1- must be positioned as close as possible to each other under the securing straps -4-.
- The seams of the protective pads -arrows- must be located as close as possible to bracket -3-.
- The gap between the two ends -arrows- must be as small as possible.
- Thoroughly clean contact surface between protective pads -1- and fuel tank -2-.
- Renew protective pads -1- if damaged.



2.12.2 Assembly overview – fuel tank 2, natural gas

1 - Support bearing

- For fuel tank

2 - Bolt

- Renew after removal
- Qty. 4
- 20 Nm +90°

3 - Protective pads

- Bonded in
- Qty. 4 on inside of mounting
- Renew if damaged

4 - Bracket

- For fuel line

5 - Securing strap

- Assembly overview
⇒ [“2.12.3 Assembly overview - securing straps and spring pack”, page 64](#)
- Fitting position
⇒ [Fig. “Installation position of securing strap”, page 65](#)
- Specified torque
⇒ [Item 1 \(page 64\)](#)

6 - Protective pads

- Fitting position
⇒ [Fig. “Installation position of protective pads”, page 63](#)
- Renew if damaged

7 - Fuel tank 2

- Overview of fitting locations ⇒ [“1.1 Overview of fitting locations - fuel system”, page 7](#)
- Removing and installing ⇒ [“2.10.1 Removing and installing fuel tank 1”, page 36](#)
- Specified torque ⇒ [Item 1 \(page 64\)](#)

8 - Fuel tank shut-off valve 2 - N362-

- Assembly overview ⇒ [“2.4 Assembly overview - fuel tank shut-off valve”, page 21](#)
- Removing and installing ⇒ [“2.8 Removing and installing fuel tank shut-off valve”, page 26](#)

9 - Fuel line

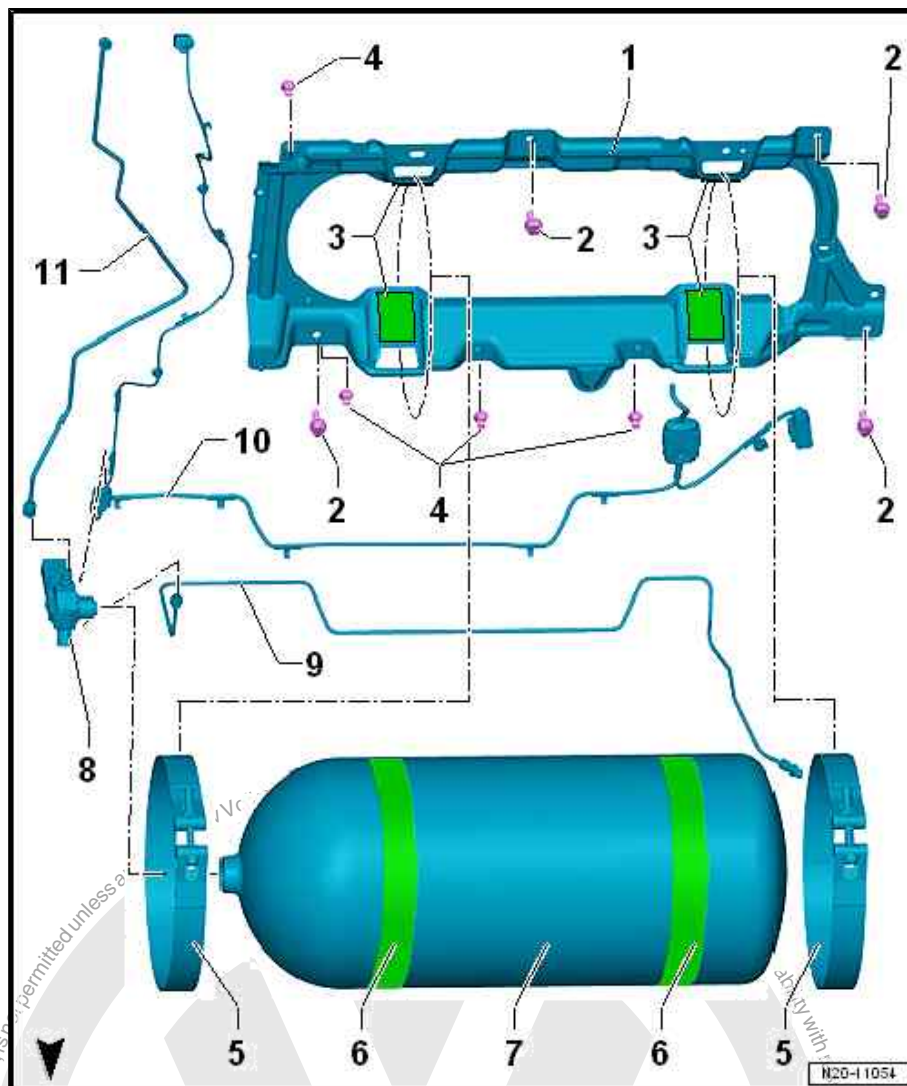
- When loosening, counterhold on union with a suitable tool
- Take care not to bend or deform any lines
- Route fuel lines in their original positions
- Ensure that there is sufficient clearance to all moving or hot components
- Tighten by hand as far as stop
- 17 Nm

10 - Wiring harness

- For fuel tank shut-off valve .

11 - Fuel line

- When loosening, counterhold on union with a suitable tool

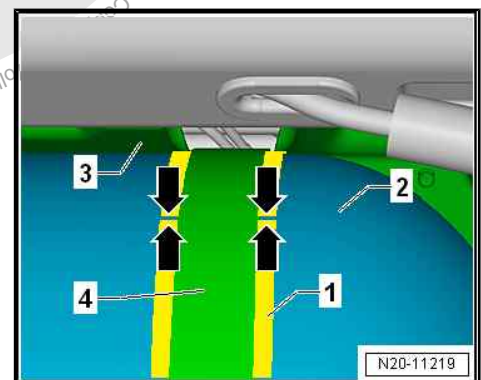
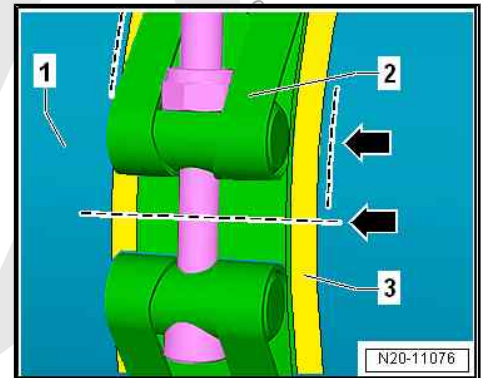




- ☐ Take care not to bend or deform any lines
- ☐ Route fuel lines in their original positions
- ☐ Ensure that there is sufficient clearance to all moving or hot components
- ☐ Tighten by hand as far as stop
- ☐ 17 Nm

Installation position of protective pads

- Mark installation position before removing protective pad -3-.
- To do this, mark horizontal and vertical alignment on fuel tank -1- -arrows- using a felt-tip pen.
- The protective pads -3- must be properly seated under securing straps -2-.
- Use the previously made markings for proper alignment.
- The protective pads -3- must be attached free of wrinkles.
- When installing, the ends of the protective pads must not be positioned in the area where the securing strap ends are joined together.
- The ends of the protective pads -1- must be positioned as close as possible to each other under the securing straps -4-.
- The seams of the protective pads -arrows- must be located as close as possible to bracket -3-.
- The gap between the two ends -arrows- must be as small as possible.
- Thoroughly clean contact surface between protective pads -1- and fuel tank -2-.
- Renew protective pads -1- if damaged.



2.12.3 Assembly overview - securing straps and spring pack

1 - Securing strap

- ❑ Fitting position
⇒ Fig. "Installation position of securing strap", page 65
- ❑ Specified torque
⇒ Fig. "Tightening securing straps with emptied fuel tanks and pressure between 0 and 10 bar", page 65
- ❑ ⇒ Fig. "Tightening securing straps with filled fuel tanks and pressure between 190 and 200 bar", page 65

2 - Bolt

- ❑ Specified torque
⇒ Fig. "Tightening securing straps with emptied fuel tanks and pressure between 0 and 10 bar", page 65
- ❑ ⇒ Fig. "Tightening securing straps with filled fuel tanks and pressure between 190 and 200 bar", page 65

3 - Dished spring

- ❑ Qty. 15
- ❑ Fitting position
⇒ Fig. "Installation position of dished spring", page 64

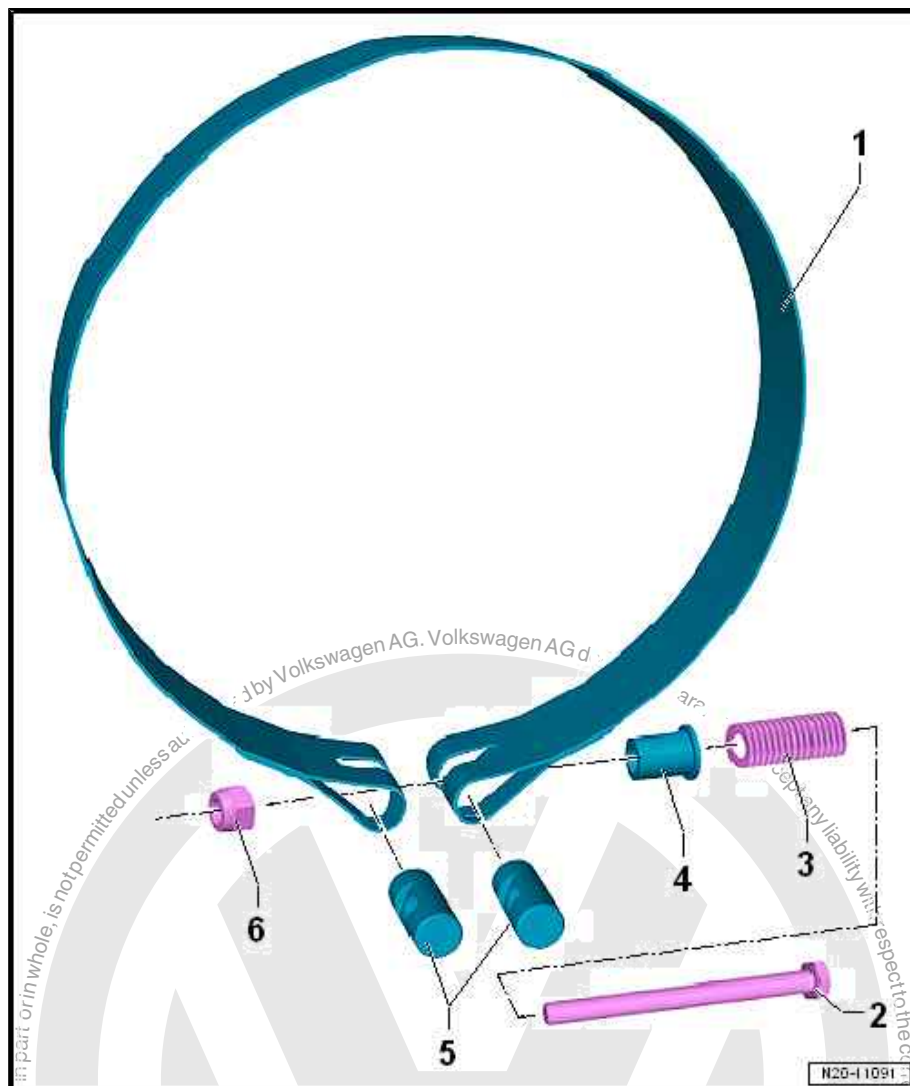
4 - Spacer

- ❑ Observe installation position

5 - Tensioning pin

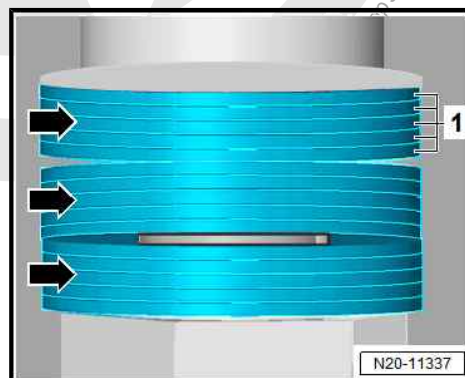
6 - Nut

- ❑ Renew after removal



Installation position of dished spring

- Three spring packs -arrows- each with five dished springs must be assembled.
- The spring packs -arrows- must be assembled with opposing sides facing each other as shown in illustration.



Installation position of securing strap

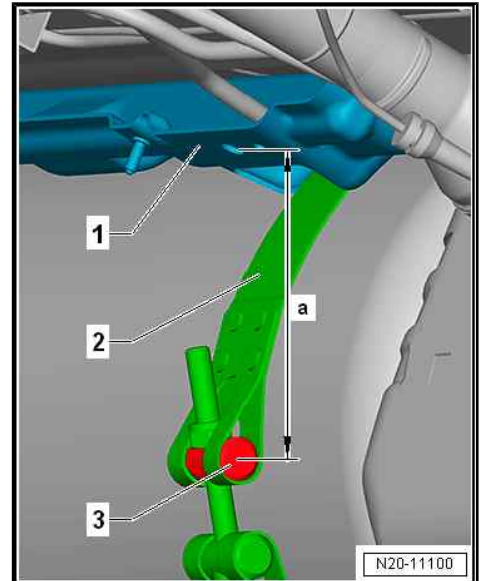
- Before removing, the correct installation position of the securing straps -2- must be determined.
- To do this, measure dimension -a- as shown in illustration.
- Dimension -a- must be measured between centre line of cotter pin -3- and fuel tank bracket -1-.



Note

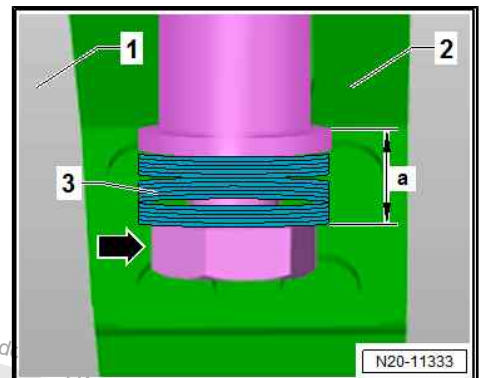
Any point on bracket -1- can be used as a reference. However, it is essential to use the same point for the measurement after re-installing.

- After installing, align securing strap so that dimension -a- corresponds with the determined dimension.



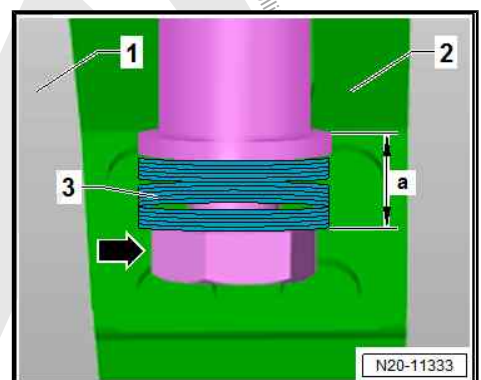
Tightening securing straps with emptied fuel tanks and pressure between 0 and 10 bar

- Fuel tank must have been emptied → [page 65](#) .
- Pre-tighten securing straps -2- on fuel tank -1-.
- Tighten spring pack -3- by tightening bolt -arrow- to 20 Nm until stop.
- Then loosen threaded connection -arrow-.
- Measure thickness of spring pack -3-, as shown in illustration.
- The spring packet is measured together with the collar of the bush.
- To do this, use digital calliper, 150 mm - VAS 6335- .
- Set dimension -a- by loosening bolt -arrow-.
- ♦ Dimension -a- must measure 16.0 mm + 0.1 mm.



Tightening securing straps with filled fuel tanks and pressure between 190 and 200 bar

- The temperature must be 15°C.
- The pressure must be 190 - 200 bar.
- Pre-tighten securing straps -2- on fuel tank -1-.
- Tighten spring pack -3- by tightening bolt -arrow- to 20 Nm until stop.
- Then loosen threaded connection -arrow-.
- Measure thickness of spring pack -3-, as shown in illustration.
- The spring packet is measured together with the collar of the bush.
- To do this, use digital calliper, 150 mm - VAS 6335- .
- Set dimension -a- by loosening bolt -arrow-.
- ♦ Dimension -a- must measure 15.5 mm + 0.1 mm.



2.13 Emptying natural gas fuel tanks



up! 2012 ➤ , up! 2017 ➤ , up! 2020 ➤

Fuel supply system - natural gas engines - Edition 10.2019

Special tools and workshop equipment required

T10349



T10521



T10522



T50026



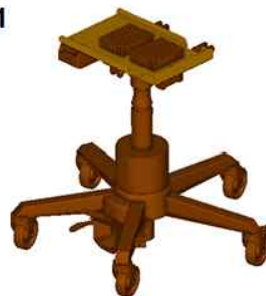
W20-10064

VAS 523 003



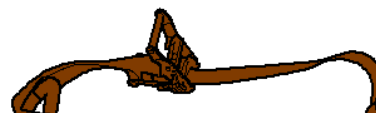
W00-11885

VAS 6931



W00-11607

T10523

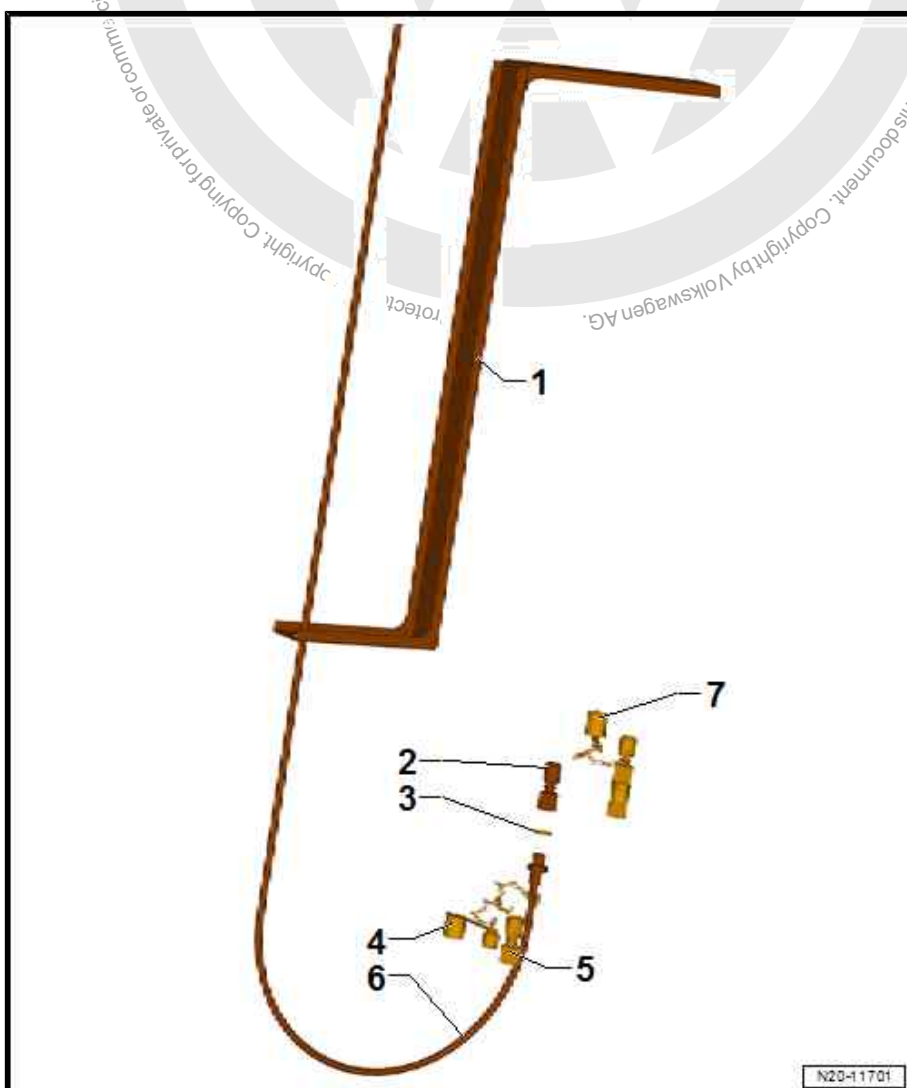




- ◆ Magnetic release tool - T10349-
- ◆ Special wrench - T10521-
- ◆ Special wrench - T10522-
- ◆ Handwheel - T50026-
- ◆ Leak detector - VAS 523 003-
- ◆ Leak detector spray (commercially available)
- ◆ Bungs - VAS 523 001/7- for gas extractor - VAS 523 001-
- ◆ Engine and gearbox jack - VAS 6931-
- ◆ Tensioning straps - T10523- , qty. 2
- ◆ Gearbox support - T40173-
- ◆ Support - T40173/3-
- ◆ Safety gloves with a cotton content of at least 35%

Gas extractor - VAS 523 001-

- 1 - Bracket - VAS 523 001/6-
- 2 - Adapter - VAS 523 001A/9-
- 3 - Seal
- 4 - Plugs - VAS 523 001A/8-
- 5 - Adapter - VAS 523 001/2-
- 6 - Gas discharge pipe - VAS 523 001/1-
- 7 - Adapter - VAS 523 001/3-



- ◆ Qty. 2 M8 × 30 bolts with 2 washers and a nut.

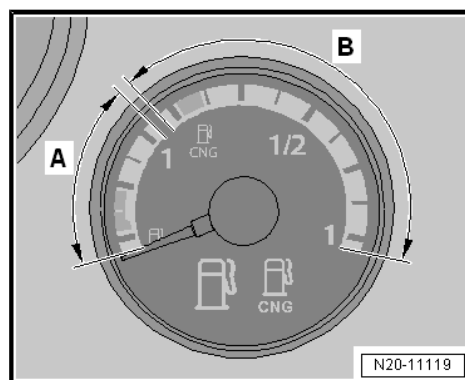


Sequence of operations



Note

- ◆ The fuel tank must be run empty, provided that the vehicle is fully functional and fit for the road.
- ◆ When the gauge for natural gas -B- shows "tank empty" and the engine control unit has switched to petrol mode, there is still a pressure of about 12 bar in the fuel tank.
- ◆ In area -A- of the gauge, the fill level of the fuel system (petrol) is displayed.
- ◆ In area -B- of the gauge, the fill level of the natural gas system is displayed.
- ◆ If the needle is in area -B- of the gauge, the vehicle is in natural gas mode.
- ◆ The remaining natural gas in the fuel tank must now be drained from the fuel tank via the manual shut-off mechanism in the fuel tank shut-off valve.



The fuel tank must be run empty, provided that the vehicle is fully functional and fit for the road.

When the gauge for natural gas shows "tank empty" and the engine control unit has switched to petrol, there is still a pressure of about 12 bar in tank.

DANGER

There is a risk of the natural gas exploding from static discharge while it is being evacuated.

- Do not evacuate natural gas fuel tanks in confined spaces.
- Before evacuation, cordon off an area measuring 10 m x 10 m.
- Purging of the natural gas fuel tanks is only permissible with gas extractor - VAS 523 001- .
- The safety zone must be permanently supervised during the evacuation.
- There must be no open flame or source of ignition in the safety zone.
- Make provision for potential compensation between mechanic and natural gas fuel tank.

CAUTION

Danger of damage and accident from natural gas fuel tank falling down.

- Secure tanks with tensioning straps to prevent them from falling down.

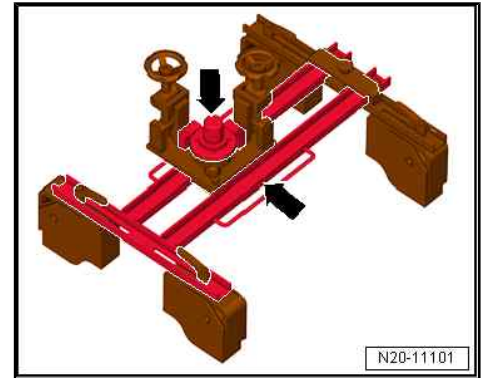


Check version of gearbox support - T40173- :

DANGER

Risk of accident due to using a gearbox support - T40173- which does not correspond to the permitted version.

- Before using gearbox support - T40173- , always check whether gearbox support corresponds to the permitted version.
- Only the permitted gearbox support versions must be used. An impermissible gearbox support version must be replaced by the permitted versions:



Distinguishing between versions:

- The tool has been delivered before 05/2018 according to the type plate. The base frame -arrows- has a silver-coloured zinc coating, -area marked red-! Gearbox support - T40173- must not be used.
- The tool has been delivered before 05/2018 according to the type plate. The base frame -arrows- is yellow chromated, -area marked red-! Gearbox support - T40173- can be used.
- The tool has been delivered after 05/2018 according to the type plate. The base frame -arrows- has a silver-coloured zinc coating, -area marked red-! Gearbox support - T40173- can be used.

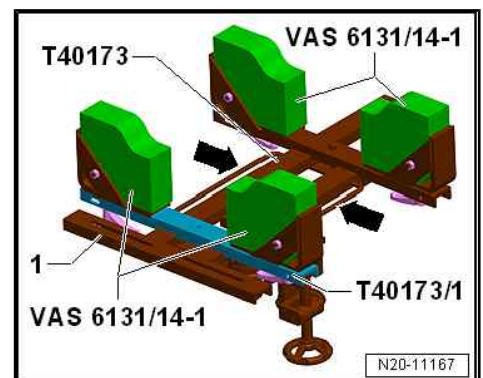


Note

- ◆ If the gearbox support does not comply with the requirements, proceed as follows:
- ◆ German market: contact the Kassel distribution centre in order to replace the gearbox support.
- ◆ All other markets: Contact your importer in order to replace the gearbox support.

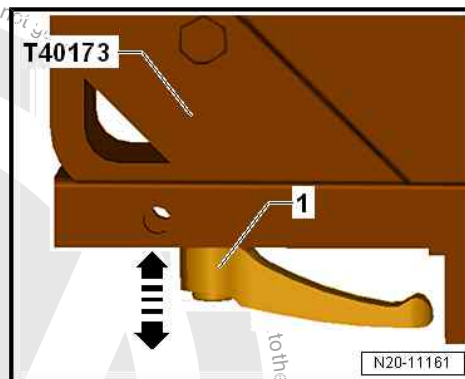
Preparing gearbox support - T40173- :

- Use suitable workshop equipment to adapt support pads - VAS 6131/14-1- to shape of fuel tank.
- Extend gearbox support - T40173- with gearbox support - T40173/1- .
- To do this, install gearbox support - T40173/1- between rigid carrier -1- and bars -arrows-.
- If necessary install mountings for support pads - VAS 6131/14-1- to gearbox support - T40173/1- .
- Remove respective fuel tank
➤ ["2.10 Removing and installing natural gas fuel tanks", page 36](#) .

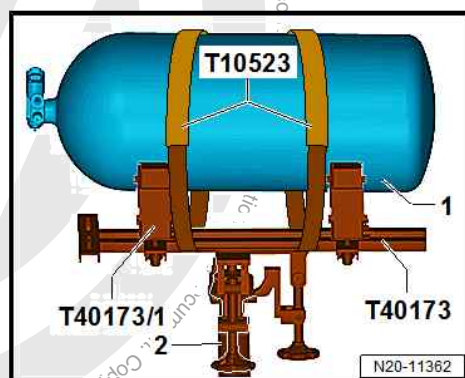




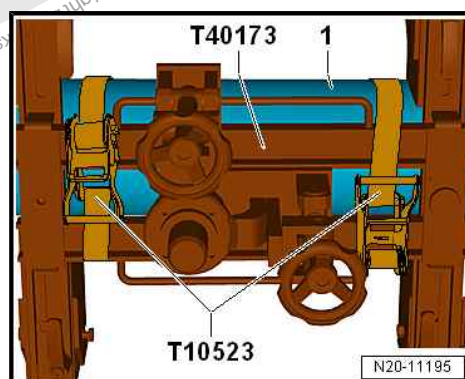
- Align adjustable supports of gearbox support - T40173- relative to fuel tank, and secure them.
- In order to properly secure adjustable supports, pull lever -1- downwards, and position it such that the fuel tank can be properly secured.



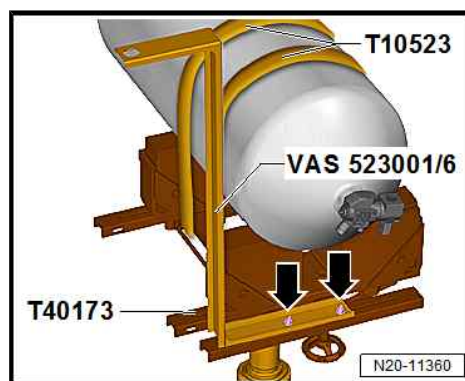
- Fit fuel tank -1- to gearbox support - T40173- with tensioning strap - T10523- as shown in illustration.
- Secure fuel tank against falling using tensioning strap - T10523- .
- Make sure that fuel tank shut-off valve is flush with rigid mounting.
- Turn fuel tank so that connection for fuel line on fuel tank shut-off valve points vertically downwards.



- Ensure that the ratchets of the tensioning straps are offset, as shown in illustration.
- Securely lash fuel tank -1- to gearbox support - T40173- using the two tensioning straps - T10523- .
- When lashing, do not damage surface of fuel tank.
- If necessary, protect surface with suitable workshop equipment.

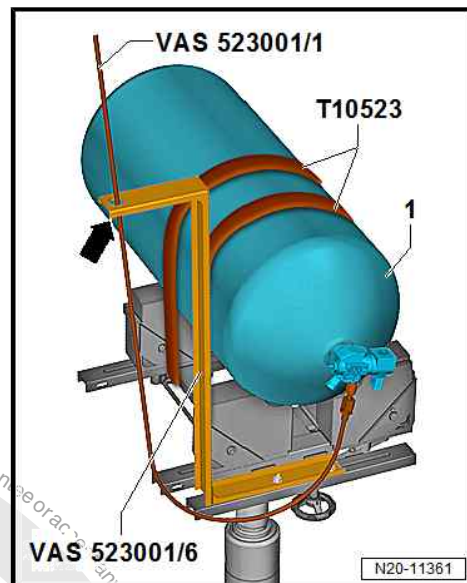


- Secure bracket - VAS 523 001/6- on gearbox support - T40173- as shown in illustration.
- Use one or two bolts for this purpose -arrows-.





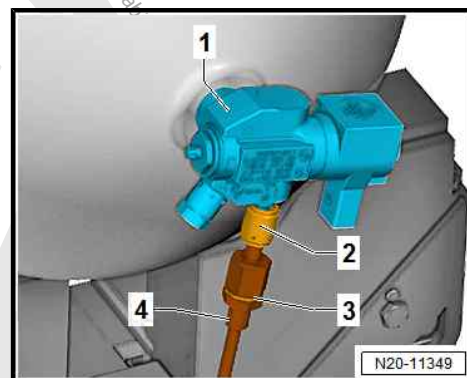
- Insert gas discharge pipe - VAS 523 001/1- into guide -arrow- of bracket - VAS 523 001/6- .



- Screw suitable adapter - VAS 523 001- onto gas discharge pipe -4-.
- Ensure that seal -3- is seated correctly.
- Screw adapter -2- onto fuel tank shut-off valve -1-.
- Adapter only needs to be screwed on hand-tight. Do not use any tools for this purpose, e.g. pliers or similar.

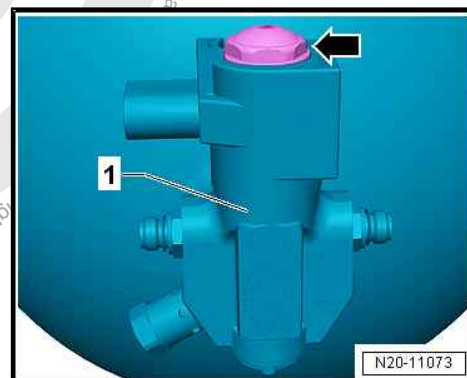
Fuel tank shut-off valve with two line connections:

- If necessary, seal open connection with suitable bung - VAS 523 001/7- .

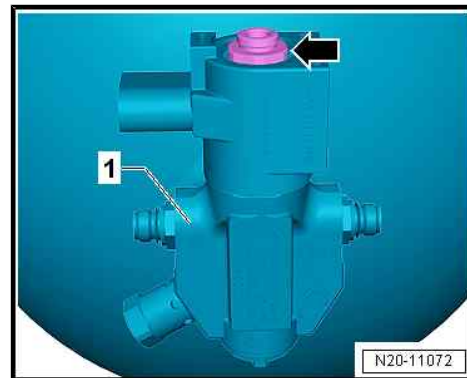


Continued for all vehicles:

- Unscrew plug -arrow- on fuel tank shut-off valve -1-.

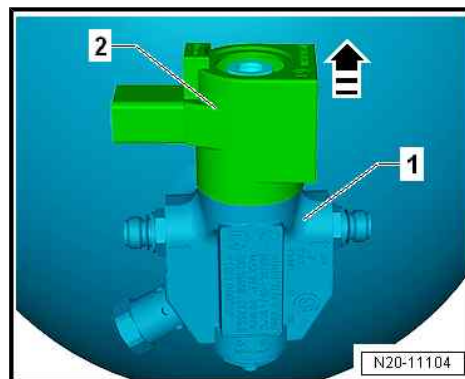


- Unscrew nut -arrow- on fuel tank shut-off valve -1- and remove it.





- Pull solenoid -2- in -direction of arrow- off fuel tank shut-off valve -1-.

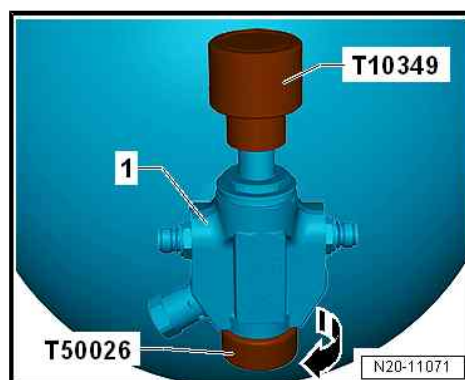


- Fit magnetic release tool - T10349- on valve.



Note

- ♦ *The magnetic release tool - T10349- must remain fitted onto the valve during the entire emptying process.*
- ♦ *It prevents the valve from becoming jammed.*
- Fit hand wheel - T50026- to manual shut-off mechanism -arrow- on fuel tank shut-off valve .



DANGER

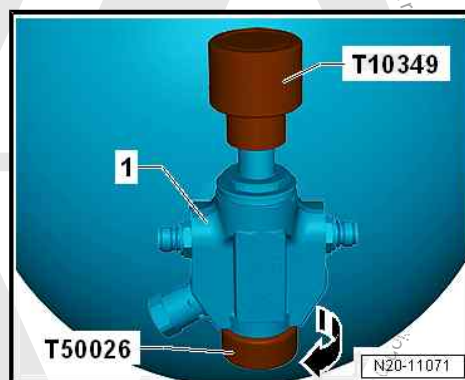
Danger of fatal injury and explosion from gas leakage in connection with sources of ignition and electrostatic discharge.

Risk of explosion leading to loss of life or serious injuries.

- Never empty natural gas fuel tanks in enclosed spaces.
- Never empty natural gas fuel tanks if stormy weather is approaching.
- Cordon off area measuring 10 × 10 m.
- Safety zone must be under permanent surveillance.
- Never bring sources of ignition into the cordoned off area.
- Make provision for potential compensation between mechanic and natural gas fuel tank.

Checking for leaks at connections:

- Carefully open fuel tank shut-off valve in -direction of arrow- using hand wheel - T50026- until natural gas escapes.





- After 1 or 2 seconds, close fuel tank shut-off valve .
- Check connections between gas discharge pipe -4- and fuel tank shut-off valve -1- for leaks.
- Use gas leak detector - VAS 523 003- and commercially available leak detector spray.

If leaks are found:

- Check seal -3- for damage, and renew it if necessary.
- Check connection between gas discharge pipe -4- and fuel tank shut-off valve -1- for soiling, and tighten it if necessary.
- If the leak cannot be rectified, do not use the gas discharge pipe.

If no leaks could be found, or if a leak was found but rectified:

- Carefully open fuel tank shut-off valve in -direction of arrow- using hand wheel - T50026- until natural gas escapes.
- Carefully open fuel tank shut-off valve as far as possible without triggering the »restrictor valve«.
- The fuel tank shut-off valve must not be opened completely.



Note

- ◆ Depending on the tank pressure, the fuel tank shut-off valve can be opened completely.
- ◆ Fully opening will trigger the "restrictor valve". Then only a small amount of gas can escape.

If the valve has been opened too far, thus triggering the »restrictor valve«:

- To reset the restrictor valve, the pressure must be equalised by closing the »manual shut-off«.
- Close valve, then open it again making sure not to open it too far this time.
- After approx. 2 minutes, the valve can be opened completely.

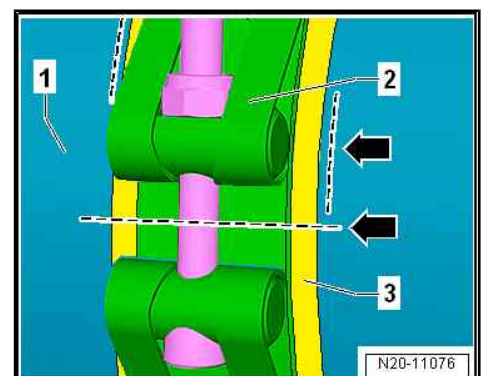
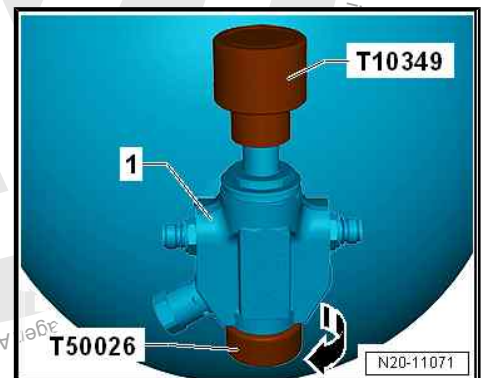
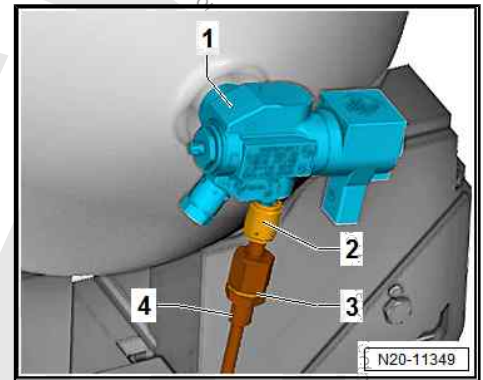
Continued for all:

- When natural gas no longer escapes from fuel tank, the manual shut-off valve must be closed again.
- Perform counterpressure check to ensure that the gas tank has been sufficiently emptied
 ⇒ ["2.11 Determining residual pressure in natural gas fuel tank", page 49](#) .

2.14 Aligning securing strap pads

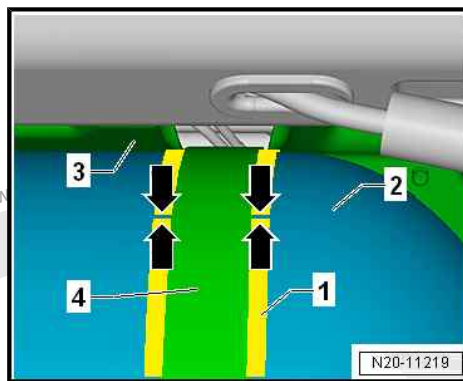
Installation position of protective pads

- Mark installation position before removing protective pad -3-.
- To do this, mark horizontal and vertical alignment on fuel tank -1- -arrows- using a felt-tip pen.
- The protective pads -3- must be properly seated under securing straps -2-.
- Use the previously made markings for proper alignment.
- The protective pads -3- must be attached free of wrinkles.





- The ends of the protective pads -1- must be positioned as close as possible to each other under the securing straps -4-.
- The seams of the protective pads -arrows- must be located as close as possible to bracket -3-.
- The gap between the two ends -arrows- must be as small as possible.
- Thoroughly clean contact surface between protective pads -1- and fuel tank -2-.
- Renew protective pads -1- if damaged.



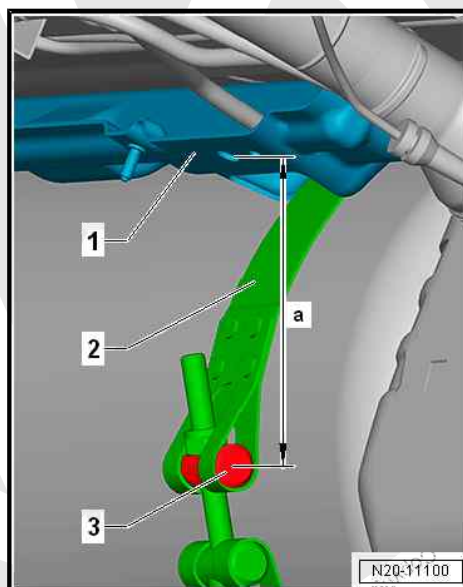
Installation position of securing straps:

- Measure dimension -a- between securing strap -2- and mounting -1-.
- Dimension -a- must be measured between centre line of barrel -3- and mounting -1-.



Note

- ♦ Any point on bracket -1- can be used as a reference. However, it is essential to use the same point for the measurement after reinstalling.
- ♦ The installation position can be marked just as for the securing strap pads to aid during installation. This will simplify sticking on the protective films.
- ♦ However, it is necessary to measure the installation position before removal and use the measurements later to check the re-installation position.



2.15 Bonding protective film to natural gas fuel tank

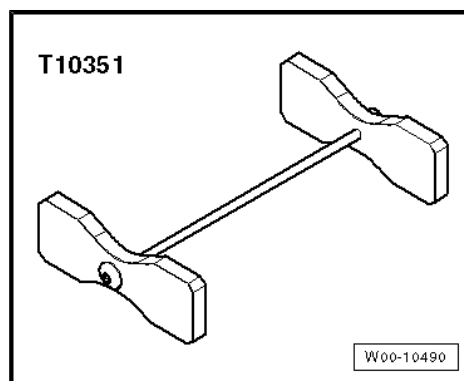
⇒ "2.15.1 Attaching protective film to fuel tank 2", page 74

⇒ "2.15.2 Attaching protective film to fuel tank 1", page 78

2.15.1 Attaching protective film to fuel tank 2

Special tools and workshop equipment required

- ♦ Bracket - T10351-





Note

- ◆ *Protective films are attached to the fuel tanks.*
- ◆ *Check protective film for damage, and renew them if necessary.*
- ◆ *For allocation of protective film, refer to ⇒ ETKA .*
- ◆ *Thoroughly clean adhesive surfaces before fitting new protective film.*
- ◆ *Before a new fuel tank is fitted, the protective film must be bonded in the same position as for the old tank.*
- ◆ *The bonding surfaces of the protective film must be oriented to the fuel tank shut-off valve .*
- ◆ *The supplied protective films are larger than those originally fitted.*
- ◆ *Adapt new protective film as necessary using suitable workshop equipment.*

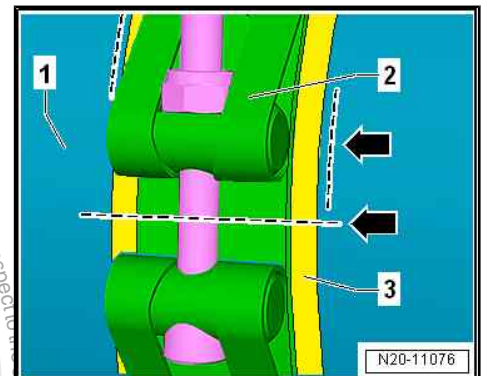
Allocation of fuel tanks

⇒ [“1.1 Overview of fitting locations - fuel system”, page 7](#) .

Assembly overview

⇒ [“2.12.2 Assembly overview – fuel tank 2, natural gas”, page 62](#) .

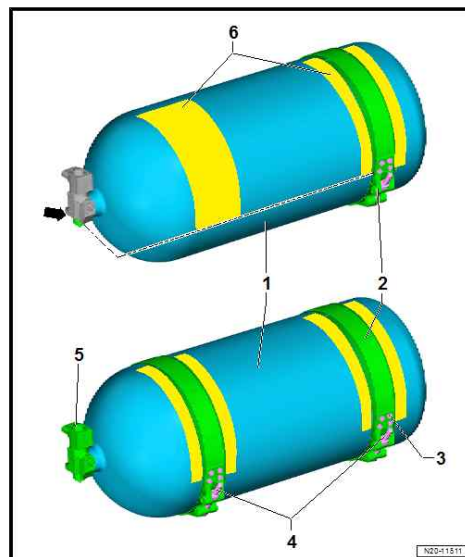
- Mark installation positions of securing strap pads and securing straps ⇒ [“2.14 Aligning securing strap pads”, page 73](#) .
- To do this, mark horizontal and vertical alignment -arrows- on fuel tank -1-, securing straps -2- and securing strap pads -3-.
- Mark installation position with a felt-tip pen.
- Take care to not damage painted surface.
- If new fuel tanks are to be installed, mark the installation position on the old tanks, measure the position and note the values.
- Remove fuel tank
⇒ [“2.10.2 Removing and installing fuel tank 2”, page 42](#) .
- Install fuel tank shut-off valve , and tighten it to specified torque
⇒ [“2.8 Removing and installing fuel tank shut-off valve”, page 26](#) .
- Mark installation position on new fuel tanks.
- Take care to not damage painted surface.
- Set fuel tank on bracket - T10351- and secure it against falling.
- Thoroughly clean fuel tanks.





Attach top protective film:

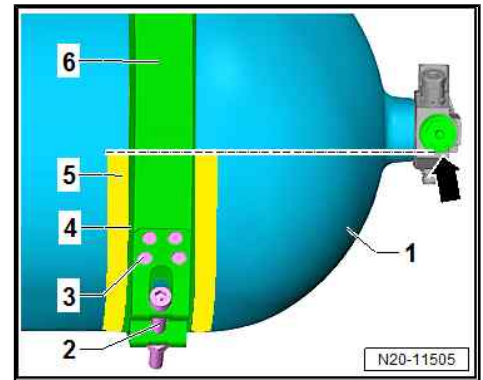
- Position fuel tank in bracket - T10351- as shown.
- The mechanical shut-off valve -arrow- on fuel shut-off valve -5- is the reference point for the bonding surface.
- The nut of the threaded connection for the securing strap -4- faces upwards.
- The protective film must reach at least to the reference line.
- Installation position for the protective film
⇒ Fig. ““Installation position of protective film””, page 78 .
- The protective film may extend beyond the reference line.
- The protective film can extend upwards as far as possible.
- The protective film must be bonded centred beneath the securing straps and securing strap pads.
- Do not allow the protective films to overlap.
- Adapt new protective film as necessary using suitable workshop equipment.
- Mark a reference line beginning from the mechanical shut-off valve -arrow- on the fuel tank -1- as shown.
- Mark installation position of protective film -6-.
- Take care to not damage painted surface.
- Fit securing straps and pads to check bonding surfaces
⇒ Fig. ““Installation position of protective film””, page 78 .
- Align securing straps and pads according to marked installation position.
- Remove securing straps and pads again.
- Thoroughly clean bonding surface on fuel tank.
- Attach protective films free of creases and bubbles.





Attach bottom protective film:

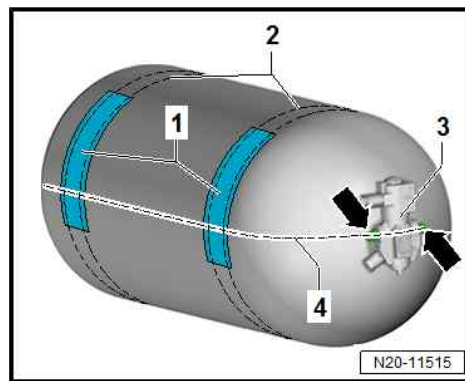
- Position fuel tank on bracket - T10351- as shown, with the mechanical shut-off valve -arrow- facing upwards.
- The mechanical shut-off valve -arrow- serves as the reference point for the bonding surface.
- When the tank is positioned on the bracket - T10351- , the bolt head of the threaded connection for the securing strap -2- must face upwards.
- The protective film must reach at least to the reference line.
- Installation position for the protective film
⇒ Fig. ““Installation position of protective film””, page 78 .
- The protective film must cover the area where the ends of the tensioning straps overlap.
- The protective film may extend beyond the reference line.
- The protective film may extend upwards as far as the upper protective film.
- Do not allow the protective films to overlap.
- The protective film must be bonded centred beneath the securing straps and securing strap pads.
- Adapt new protective film as necessary using suitable workshop equipment.
- Mark a reference line beginning from the mechanical shut-off valve -arrow- on the fuel tank -1- as shown.
- Mark installation position of protective film -5-.
- Take care to not damage painted surface.
- Fit securing straps and pads -4- to check bonding surfaces
⇒ Fig. ““Installation position of protective film””, page 78 .
- Align securing straps and pads according to marked installation position.
- Remove securing straps and pads again.
- Thoroughly clean bonding surface on fuel tank.
- Attach protective films free of creases and bubbles.





Forward protective film in direction of travel:

- Position fuel tank on bracket - T10351- , as shown, with the solenoid valve -3- facing upwards.
- The two line connections serve as reference points for the bonding surface.
- Draw a reference line -4- on the fuel tank starting from the two line connections -arrow- as shown.
- The reference line must go over the two line connections. This will achieve the correct alignment of the reference line.
- The transition area on the tank between the bracket and the supporting straps must be covered ➔ [Item 1 \(page 62\)](#) .
- Mark installation position of protective film -1-.
- Take care to not damage painted surface.
- Fit securing straps and pads -2- to check bonding surfaces ➔ [Fig. “Installation position of protective film” , page 78](#) .
- Align securing straps and pads according to marked installation position.
- The protective film must be bonded centred beneath the securing straps and securing strap pads.
- Remove securing straps and pads again.
- Thoroughly clean bonding surface on fuel tank.
- Attach protective films free of creases and bubbles.
- Adapt new protective film as necessary using suitable workshop equipment.



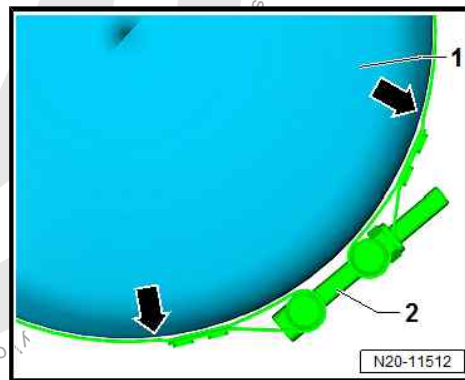
Installation position of protective film

Due to the construction, a »wedge« is formed near the rivets. It is imperative that this area is covered by the protective film.

The protective film must cover the area where the ends of the tensioning straps overlap.

Ensure that the section of the fuel tank near the rivets is covered with protective film -1-.

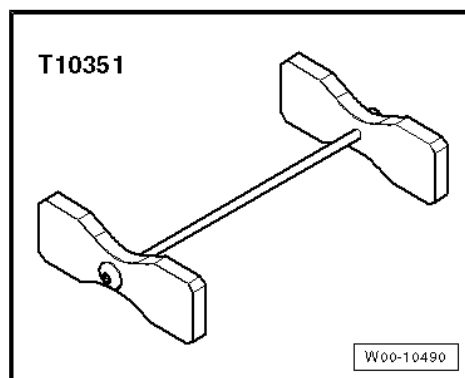
Note installation position of securing straps -2-.



2.15.2 Attaching protective film to fuel tank 1

Special tools and workshop equipment required

- ♦ Bracket - T10351-





Note

- ◆ *Protective films are attached to the fuel tanks.*
- ◆ *Check protective film for damage, and renew them if necessary.*
- ◆ *For allocation of protective film, refer to ⇒ ETKA .*
- ◆ *Thoroughly clean adhesive surfaces before fitting new protective film.*
- ◆ *Before a new fuel tank is fitted, the protective film must be bonded in the same position as for the old tank.*
- ◆ *The bonding surfaces of the protective film must be oriented to the fuel tank shut-off valve .*
- ◆ *The supplied protective films are larger than those originally fitted.*
- ◆ *Adapt new protective film as necessary using suitable workshop equipment.*

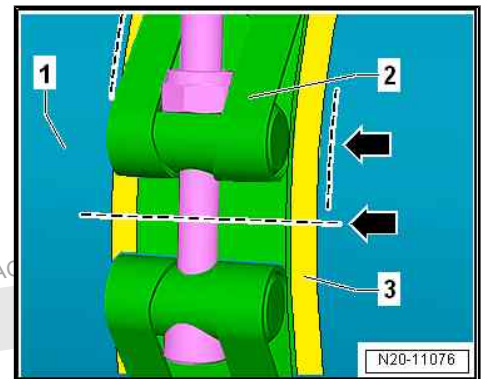
Allocation of fuel tanks

⇒ [“1.1 Overview of fitting locations - fuel system”, page 7](#) .

Assembly overview

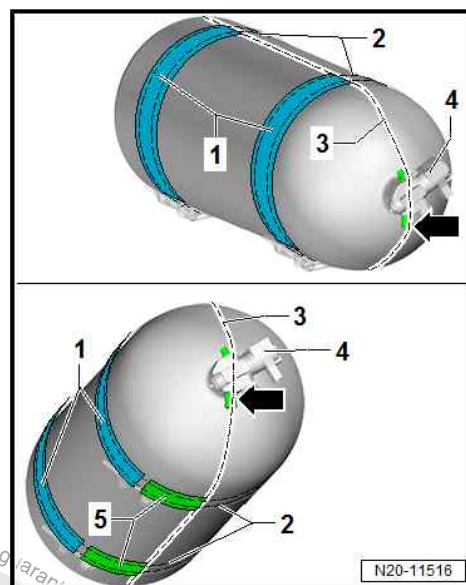
⇒ [“2.12.1 Assembly overview – fuel tank 1, natural gas”, page 59](#) .

- Mark installation positions of securing strap pads and securing straps ⇒ [“2.14 Aligning securing strap pads”, page 73](#) .
- Mark installation position with a felt-tip pen.
- Take care to not damage painted surface.
- To do this, mark horizontal and vertical alignment -arrows- on fuel tank -1-, securing straps -2- and securing strap pads -3-.
- If new fuel tanks are to be installed, mark the installation position on the old tanks, measure the position and note the values.
- Remove fuel tank
⇒ [“2.10.1 Removing and installing fuel tank 1”, page 36](#) .
- Install fuel tank shut-off valve , and tighten it to specified torque
⇒ [“2.8 Removing and installing fuel tank shut-off valve”, page 26](#) .
- Mark installation position on new fuel tanks.
- Take care to not damage painted surface.
- Set fuel tank on bracket - T10351- and secure it against falling.
- Thoroughly clean fuel tanks.





- Position fuel tank in bracket - T10351- as shown.
- Position fuel tank in support.
- The line connection and thermal fuse -arrow- on fuel shut-off valve -4- are the reference points for the bonding surface.
- The bolt head of the threaded connection for the securing strap faces downwards.
- Installation position of protective film
⇒ Fig. "Installation position of protective film", page 80 .
- The protective film may extend beyond the reference line.
- The protective film may extend downwards as far as the lower protective film.
- Do not allow the protective films to overlap.
- The protective film must be bonded centred beneath the securing straps and securing strap pads.
- Draw a reference line starting from thermal fuse -arrow- and line connection as shown.
- The reference line must go over both components. This will achieve the correct alignment of the reference line.
- Using a felt-tip pen, draw a line on the top and bottom of the fuel tank.
- Take care to not damage painted surface.
- Mark the installation position of the protective film in the direction of the threaded connection for the securing strap.
- Fit securing straps and pads to check bonding surfaces
⇒ Fig. "Installation position of protective film", page 80 .
- Align securing straps and pads according to marked installation position.
- Remove securing straps and pads again.
- Thoroughly clean bonding surface on fuel tank.
- Attach protective films free of creases and bubbles.
- Do not allow the protective films to overlap.
- Adapt new protective film as necessary using suitable workshop equipment.



Installation position of protective film

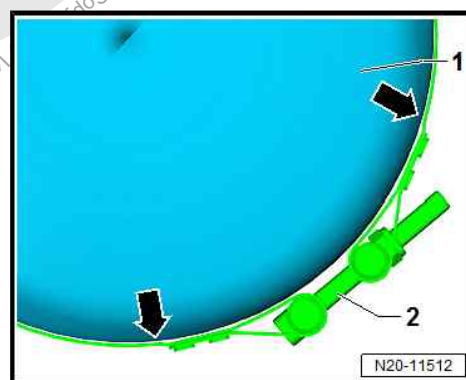
Due to the construction, a »wedge« is formed near the rivets. It is imperative that this area is covered by the protective film.

The protective film must cover the area where the ends of the tensioning straps overlap

⇒ Fig. "Installation position of protective film", page 78 .

Ensure that the section of the fuel tank -1- near the rivets -arrows- is covered with protective film.

Note installation position of securing straps -2-.

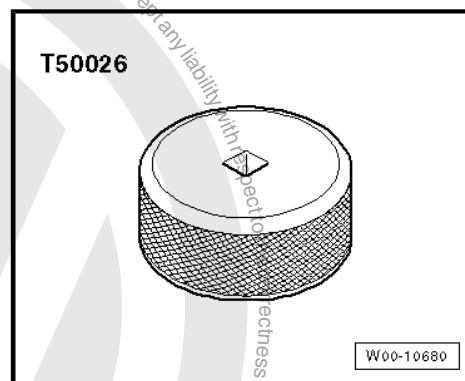


2.16 Releasing pressure in high-pressure line

Special tools and workshop equipment required

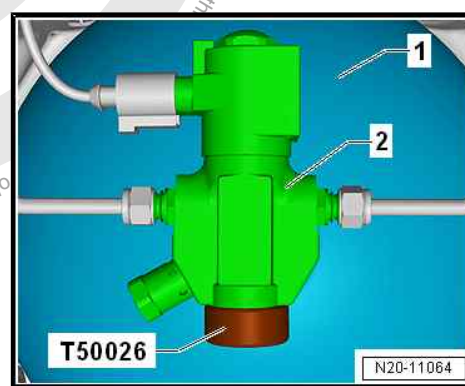


◆ Handwheel - T50026



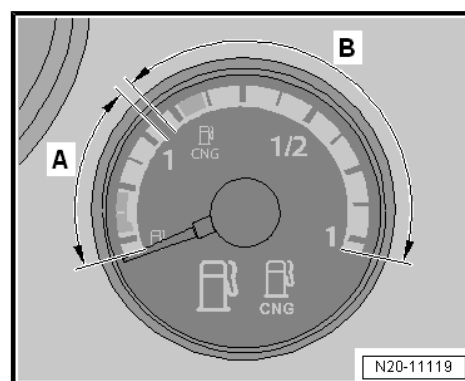
◆ Vehicle diagnostic tester

- Remove underbody cladding beneath fuel tanks ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody cladding .
- Close mechanical shut-off valves -2- on fuel tank shut-off valves -N361/N362- on all fuel tanks (for natural gas) -1-.
- Use hand wheel - T50026- to do this.
- Close shut-off valves by turning hand wheel in clockwise direction.
- Connect the vehicle diagnostic tester .
- Use vehicle diagnostic tester to release pressure in high-pressure line ⇒ Vehicle diagnostic tester.
- Select option [Release pressure in natural gas high-pressure line] in [Guided functions].
- Follow instructions on vehicle diagnostic tester .



Note

- ◆ *The operating mode of the fuel system is displayed in the dash panel insert.*
- ◆ *In area -A- of the gauge, the fill level of the fuel system (petrol) is displayed.*
- ◆ *In area -B- of the gauge, the fill level of the natural gas system is displayed.*
- ◆ *If the needle is in area -B- of the gauge, the vehicle is in natural gas mode.*



3 Fuel delivery unit, fuel gauge sender

⇒ [“3.1 Assembly overview - fuel delivery unit/fuel gauge sender”, page 82](#)

⇒ [“3.2 Removing and installing fuel delivery unit, fuel gauge sender”, page 83](#)

⇒ [“3.3 Removing and installing fuel gauge sender G ”, page 86](#)

3.1 Assembly overview - fuel delivery unit/fuel gauge sender

1 - Supply line

- ☐ black
- ☐ Clipped onto side of fuel tank.
- ☐ Ensure firm seating

2 - Union nut

- ☐ Loosen using union nut tool - 3217-
- ☐ 80 Nm

3 - Flange

- ☐ For fuel delivery unit.
- ☐ Note installation position of flange on fuel tank

⇒ [Fig. “Installation position of fuel delivery unit flange”](#), page 83 .

4 - Fuel gauge sender - G-

- ☐ Removing and installing
⇒ [“3.3 Removing and installing fuel gauge sender G ”](#), page 86

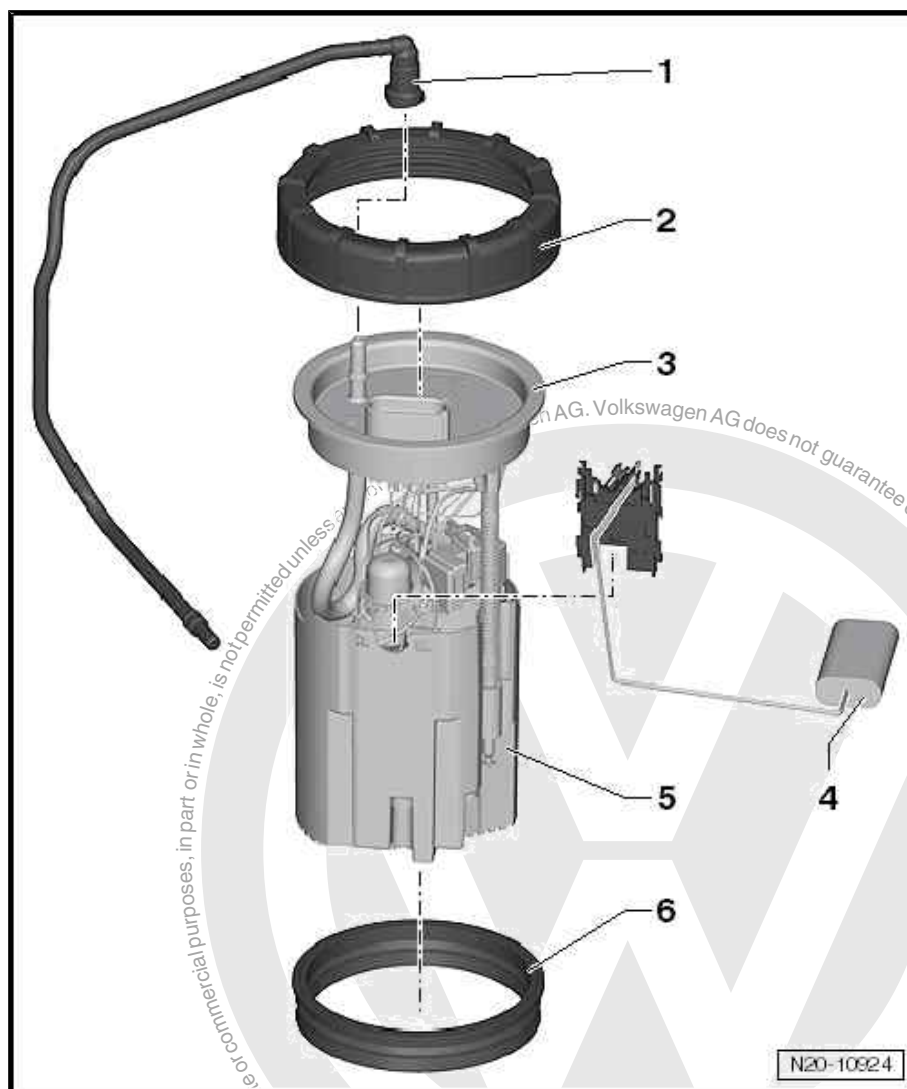
5 - Fuel delivery unit

- ☐ Removing and installing
⇒ [“3.2 Removing and installing fuel delivery unit, fuel gauge sender”, page 83](#)
- ☐ With fuel system pressurisation pump - G6-
- ☐ Checking fuel system pressurisation pump - G6-

⇒ [“8.1 Checking fuel system pressurisation pump G6 ”](#), page 104 .

6 - Seal

- ☐ Renew after removal
- ☐ When installing, fit dry in fuel tank opening.
- ☐ Moisten with fuel only when installing flange.

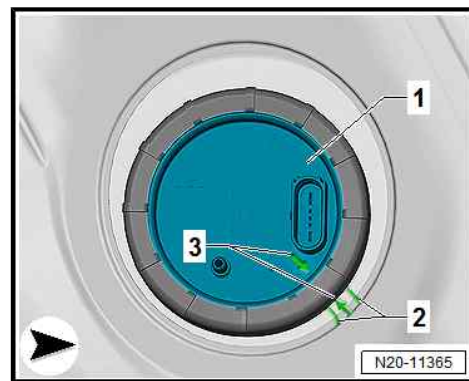




Installation position of fuel delivery unit flange

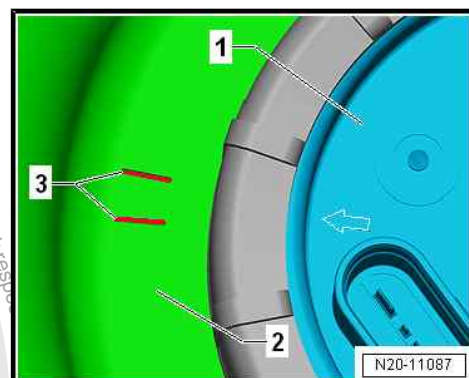
Version 1:

- There is an arrow between markings -2- on fuel tank.
- The lines -2- point towards the filler neck of the fuel tank.
- There is also an arrow on flange -1-.
- The two arrows -3- must be aligned when installing.



Version 2:

- There are two lines -3- on the fuel tank.
- The lines -3- point towards the filler neck of the fuel tank.
- There is also an arrow on flange -1-.
- The arrow must be between the marks during installation.



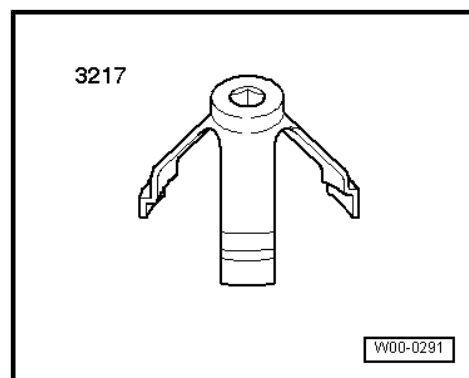
3.2 Removing and installing fuel delivery unit, fuel gauge sender

Special tools and workshop equipment required

- ◆ Fuel extractor - VAS 5190-



- ◆ Union nut tool - 3217-

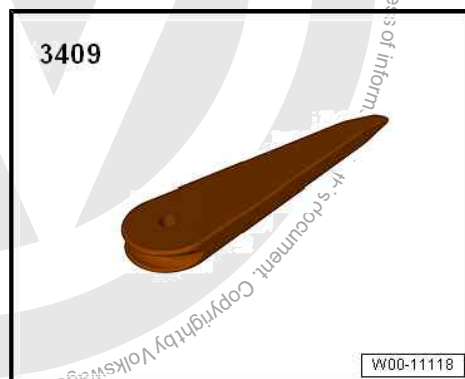




- ◆ Torque wrench - V.A.G 1332-



- ◆ Removal wedge - 3409

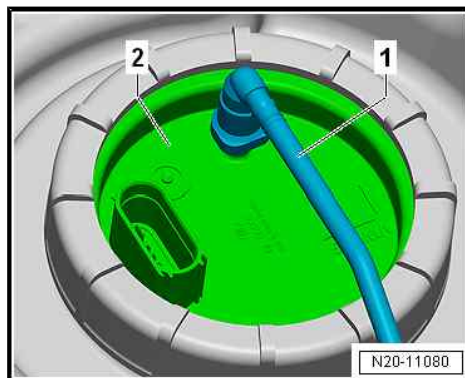


Removing



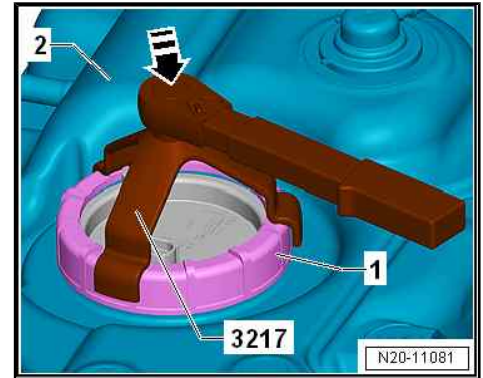
Note

- ◆ *Danger due to fuel running out.*
- ◆ *The fuel tank must not be more than $\frac{3}{4}$ full. This ensures that the fill level is below the flange of the fuel delivery unit.*
- Drain fuel tank with fuel extractor - VAS 5190-
⇒ [“2.2 Emptying fuel tank”, page 11](#) .
- Remove fuel tank
⇒ [“2.3 Removing and installing fuel tank”, page 15](#) .
- Release and pull off fuel line -1- on fuel delivery unit -2-. Separate plug-in connectors
⇒ [“4.1 Separating plug-in connectors”, page 88](#) .





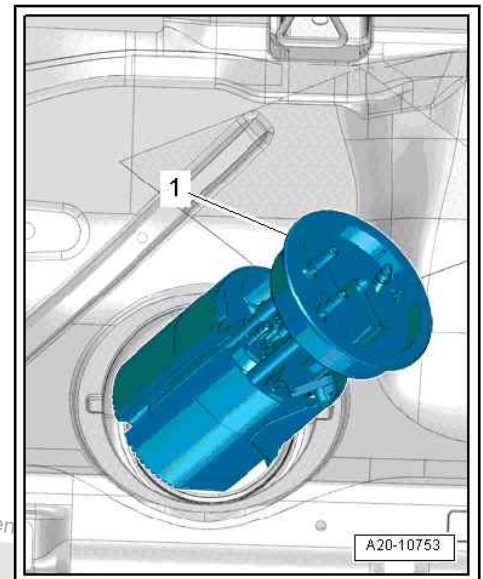
- Fit union nut tool - 3217- to union nut -1- on fuel tank -2-, as shown in illustration.
- Loosen union nut -1- using union nut tool - 3217- .



- Pull sealing flange -1- out of the opening in fuel tank.
- Remove seal from opening in fuel tank.
- Place a cloth underneath to absorb fuel.
- Carefully pull out fuel delivery unit with fuel gauge sender - G- through opening of fuel tank.
- Turn and tilt it as necessary while doing so.

i Note

- ◆ *When removing the fuel delivery unit, ensure that the float arm of the fuel gauge sender is not bent.*
- ◆ *If delivery unit is to be renewed, old delivery unit must be drained before disposal.*
- ◆ *Observe environmental regulations for disposal.*
- ◆ *Check fuel tank for foreign bodies and dirt.*



Installing

Install in reverse order of removal. Observe the following:

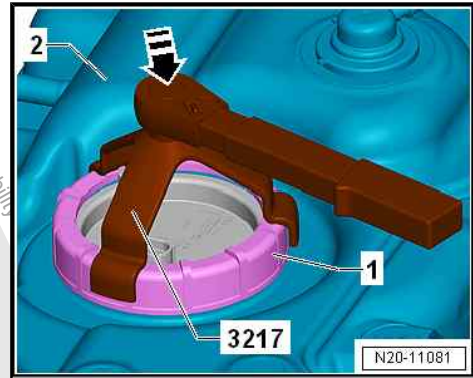
i Note

Separate plug-in connectors
 ⇒ [“4.1 Separating plug-in connectors”, page 88](#) .

- Renew seal.
- Insert seal for fuel delivery unit dry into opening of fuel tank.
- Coat inner side of seal with fuel.
- When flange is inserted, ensure that seal is not damaged or squashed.
- When inserting fuel delivery unit, ensure that fuel gauge sender is not bent.
- Observe installation position of fuel delivery unit
 ⇒ [Fig. “Installation position of fuel delivery unit flange”, page 83](#) .



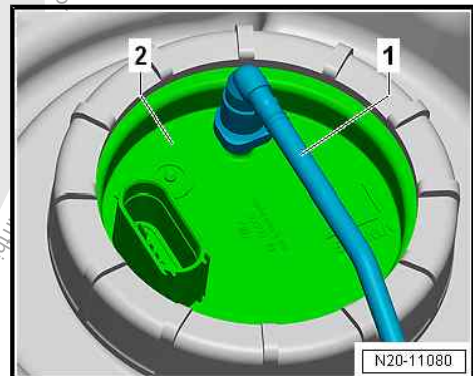
- Tighten union nut with union nut tool - 3217- .



- Connect fuel line -1- to fuel delivery unit -2-.
 - Check fuel line is secured properly by pulling.
- After installing fuel delivery unit, fill fuel tank with at least 5 litres of fuel.

Torque settings

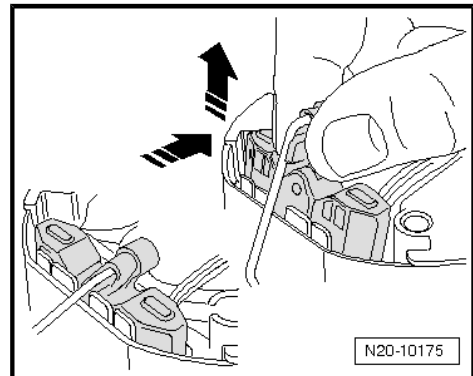
- ♦ ⇒ [“3.1 Assembly overview - fuel delivery unit/fuel gauge sender”, page 82](#)
- ♦ ⇒ [“2.1 Assembly overview - fuel tank”, page 9](#)



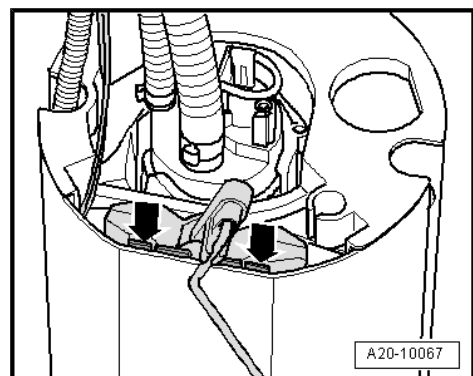
3.3 Removing and installing fuel gauge sender - G-

Removing

- Remove fuel delivery unit
⇒ [“3.2 Removing and installing fuel delivery unit, fuel gauge sender”, page 83](#) .
- Pull fuel gauge sender - G- slightly to side and upwards at the same time.

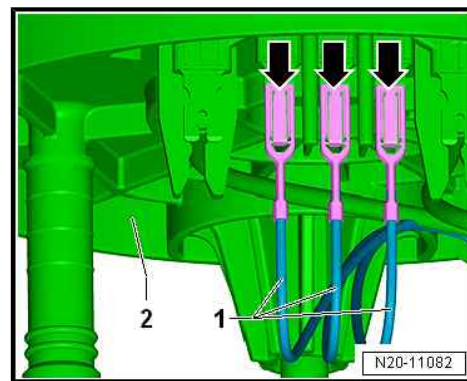


- Push locking lugs -arrows- inwards to unlock.
- Pull fuel gauge sender - G- upwards out of fuel delivery unit.



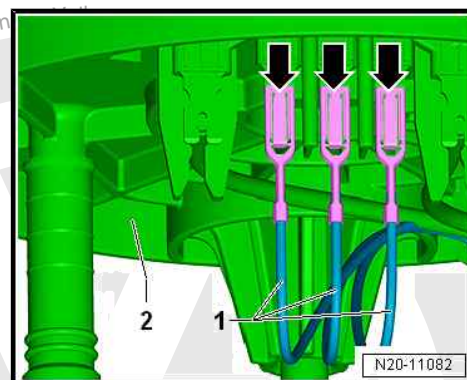


- Note colour assignment of wires -1- for re-installation.
- Release and pull off connectors -1- on connections -arrows- of fuel delivery unit -2-.
- To do this, bend back locking lugs of connectors.



Installing:

- Connect connector -1- to connections -arrows-.
- Note colour assignment.
- Bend back the locking hooks of the connectors.
- Ensure connectors are firmly seated on fuel delivery unit -2- by pulling.
- Insert fuel gauge sender - G- into guide on fuel delivery unit -2- and press it down until it engages.
- Install fuel delivery unit
⇒ ["3.2 Removing and installing fuel delivery unit, fuel gauge sender", page 83](#) .





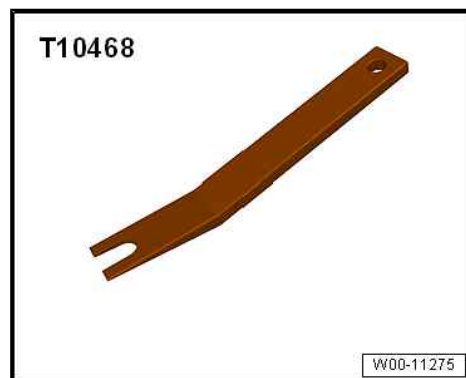
4 Plug-in connectors

⇒ "4.1 Separating plug-in connectors", page 88

4.1 Separating plug-in connectors

Special tools and workshop equipment required

- ◆ Lever - T10468-



Assignment of plug-in connectors



Note

- ◆ The plug-in connectors for fuel, vacuum and breather lines are colour coded. There is either a coloured dot on the plug-in connector or the release button is of the respective colour ⇒ [page 88](#).
- ◆ Plug-in connectors for fuel lines must engage »audibly« when joined.
- ◆ Ensure plug-in connector is secured properly by pulling it.

Colour assignment

Plug-in connector	Colour code on plug-in connector
Fuel supply	black
Fuel return line	blue
Breather	White, beige
Vacuum	green

⚠ CAUTION

The fuel system is pressurised.

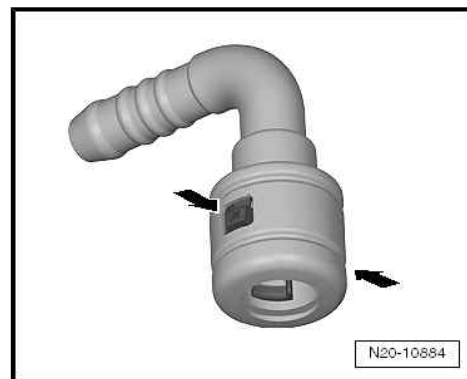
Danger of injury through fuel spray.

- Wear protective goggles.
- Wear protective gloves.
- To release pressure, wrap a clean cloth around the connection and carefully loosen the connection.



Version 1

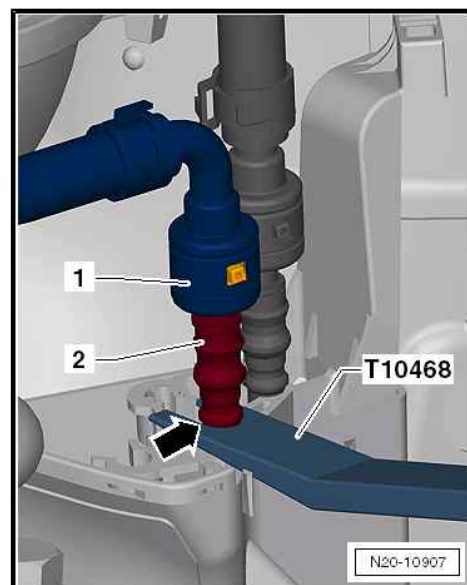
Plug-in connector with release buttons -arrows- on right and left



Open

Counterhold at the coupling point for fuel -1- in the engine compartment.

- Insert lever - T10468- between heat shield and stop -arrow- of fuel line -2- and counterhold.



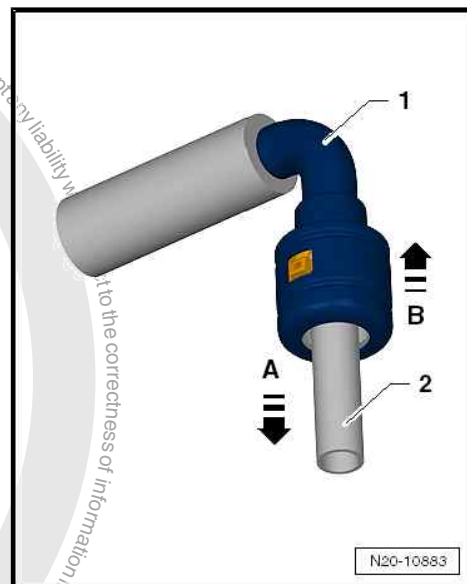
Continuation for all separating points of fuel system:

- Push plug-in connector -1- in -direction of arrow A-.
- Press and hold release buttons.
- Pull plug-in connector -1- off fuel line -2- in -direction of arrow B-.

Note colour assignment during installation ⇒ [page 88](#) :

Plug-in connectors for fuel lines must engage »audibly« when joined.

- Ensure plug-in connector is secured properly by pulling it.





Version 2

Plug-in connector with pull-release mechanism -arrow-.

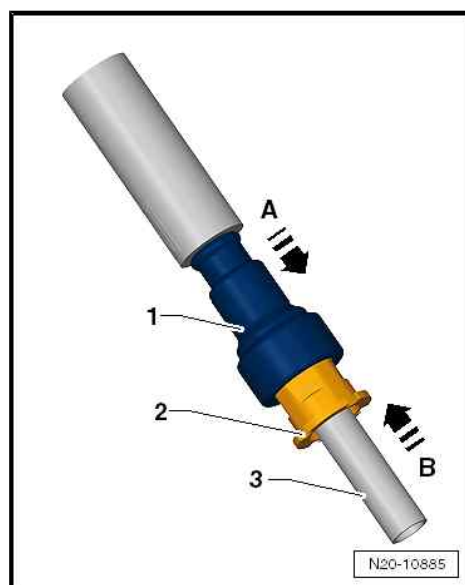
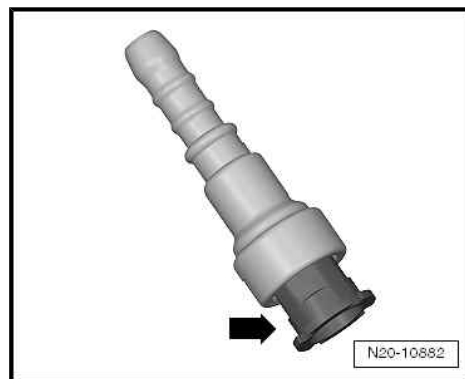
Open

- Push plug-in connector -1- in -direction of arrow A-.
- Pull pull-release mechanism -2- in -direction of arrow B-.
- Pull plug-in connector -1- off fuel line -3- in -direction of arrow B-.

Note colour assignment during installation ➤ [page 88](#) .

Plug-in connectors for fuel lines must engage »audibly« when joined.

- Ensure plug-in connector is secured properly by pulling it.



Version 3

Plug-in connector with button in front -arrow-.

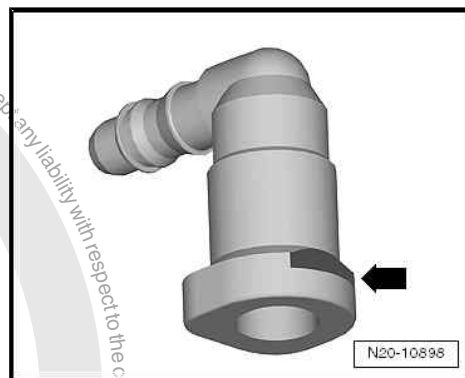
Open

- Press release button -arrow- and pull off plug-in connectors.

Note colour assignment during installation ➤ [page 88](#) .

Plug-in connectors for fuel lines must engage »audibly« when joined.

- Ensure plug-in connector is secured properly by pulling it.



Version 4

Plug-in connector with release button -arrows- on right and left:

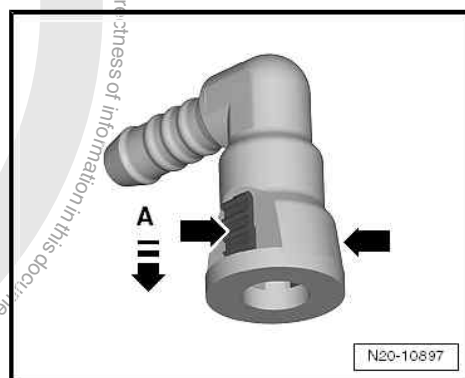
Open

- Push plug-in connector in -direction of arrow A-.
- Press release buttons -arrows- and pull off plug-in connector.

Note colour assignment during installation ➤ [page 88](#) .

Plug-in connectors for fuel lines must engage »audibly« when joined.

- Ensure plug-in connector is secured properly by pulling it.





Version 5

Plug-in connector with release buttons -arrows- on right and left:

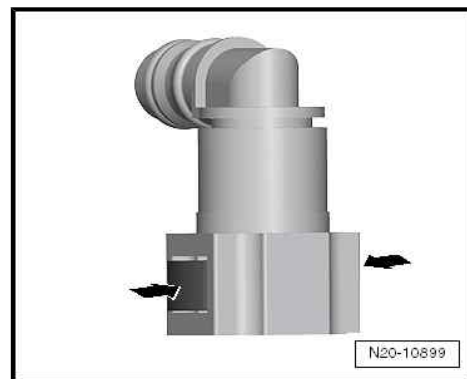
Open

- Press release buttons -arrows- and pull off plug-in connector.

Note colour assignment during installation ➔ [page 88](#) .

Plug-in connectors for fuel lines must engage »audibly« when joined.

- Ensure plug-in connector is secured properly by pulling it.



Version 6

Plug-in connector with release buttons -arrows- on right and left:

Open

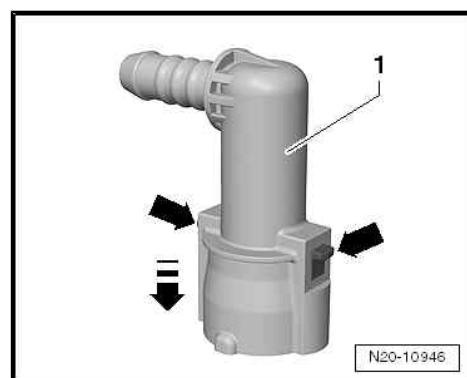
- Push plug-in connector -1- in -direction of arrow- and maintain pressure.

- Press release buttons -arrows- and pull off plug-in connector.

Note colour assignment during installation ➔ [page 88](#) .

Plug-in connectors for fuel lines must engage »audibly« when joined.

- Ensure plug-in connector is secured properly by pulling it.



Version 7

Plug-in connector -1- with release buttons -2- on right and left:

Open

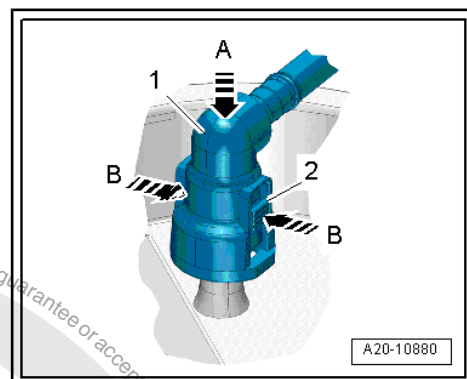
- Press plug-in connector -1- in -direction of arrow A- and maintain pressure.

- Press release button -2- in -direction of arrow B- and pull off plug-in connector -1-.

Note colour assignment during installation ➔ [page 88](#) .

Plug-in connectors for fuel lines must engage »audibly« when joined.

- Ensure plug-in connector is secured properly by pulling it.



CAUTION

Risk of fire due to escaping fuel.

Risk of severe injuries and burns.

- Before testing, check all connected lines for secure fit by pulling.
- Take any fuel-soaked cloths away from area of vehicle.



5 Fuel filter

Pressure limiting valve and fuel filter are integrated in fuel delivery unit and cannot be renewed individually ⇒ [page 82](#) .



6 Activated charcoal filter system

⇒ [“6.1 Assembly overview – activated charcoal filter system”, page 93](#)

⇒ [“6.3 Checking fuel tank breather”, page 95](#)

⇒ [“6.2 Removing and installing activated charcoal filter”, page 94](#)

6.1 Assembly overview – activated charcoal filter system

1 - Activated charcoal filter

- ☐ Removing and installing
⇒ [“6.2 Removing and installing activated charcoal filter”, page 94](#)
- ☐ Checking breather
⇒ [“6.3 Checking fuel tank breather”, page 95](#)

2 - Nut

- ☐ Qty. 2
- ☐ 20 Nm ±1 Nm

3 - Bracket

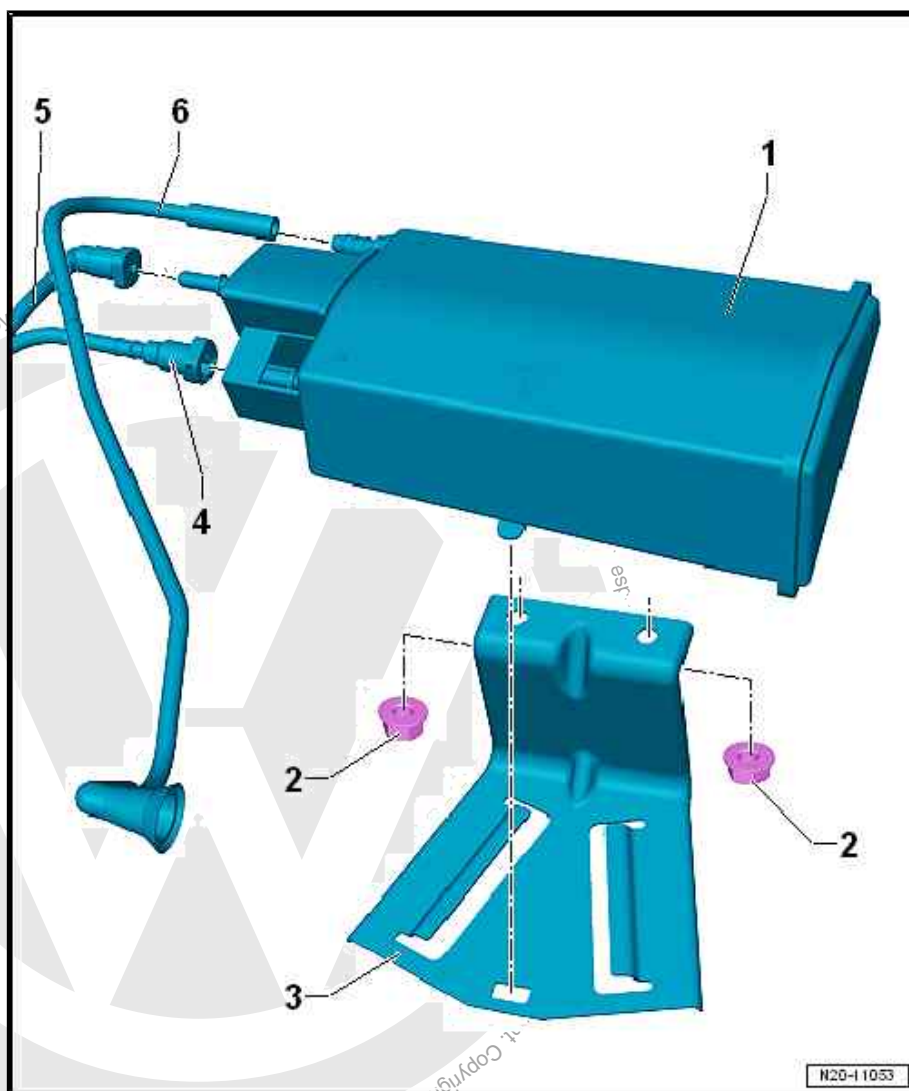
4 - Breather line

- ☐ To engine
- ☐ Ensure firm seating
- ☐ Between connecting point on underbody and fuel tank

5 - Connection hose

- ☐ To gravity valve on fuel tank
- ☐ Ensure firm seating

6 - Breather hose



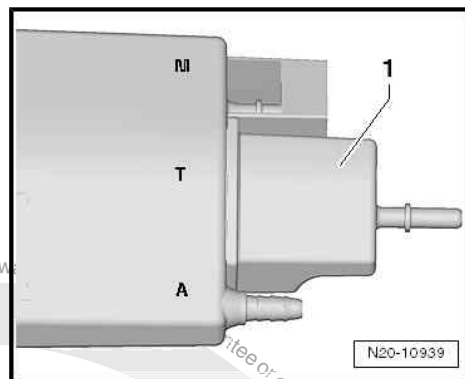


Connections on activated charcoal filter

M - Connection for breather line leading to engine
⇒ [Item 4 \(page 93\)](#)

T - Connection to gravity valve on fuel tank ⇒ [Item 5 \(page 93\)](#)

A - Breather connection ⇒ [Item 6 \(page 93\)](#)



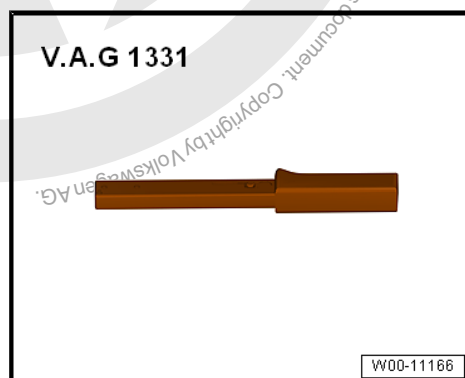
6.2 Removing and installing activated charcoal filter

Special tools and workshop equipment required

◆ Removal wedge - 3409-



◆ Torque wrench - V.A.G 1331-



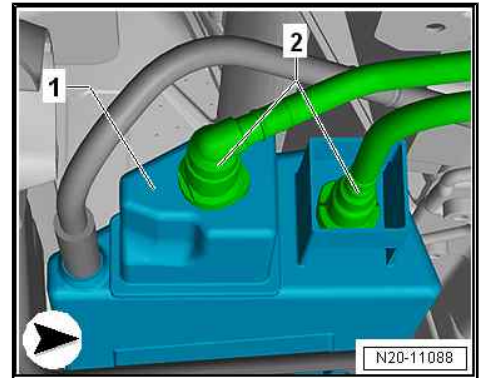
◆ Engine and gearbox jack - V.A.G 1383 A-



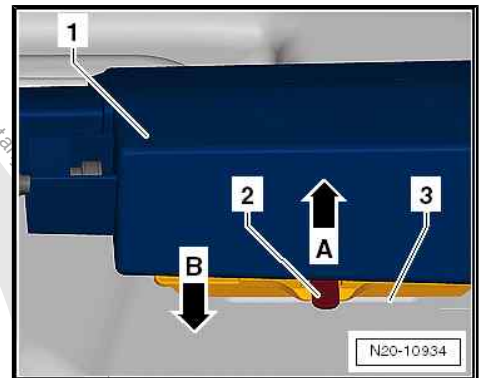


Removing

- Release and disconnect lines -2- from connections -M- and -T- on activated charcoal filter -1-. Separate plug-in connectors ➔ [page 88](#) .
- Unclip line ➔ [Item 6 \(page 93\)](#) on bracket for fuel tank 1.



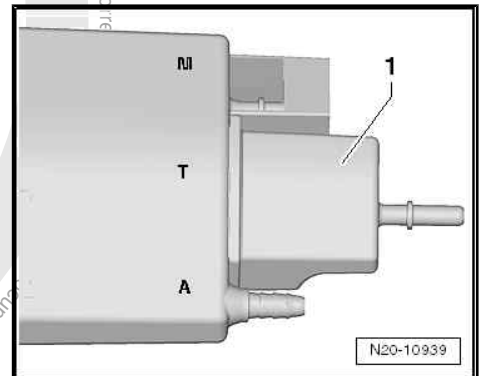
- Loosen activated charcoal filter -1- from bracket -3-.
- To do this, release locking lug -2- upwards in -direction of arrow A-.
- Pull activated charcoal filter -1- in -direction of arrow B- out of bracket -3-.



Installing

Install in reverse order of removal. Observe the following:

- ◆ Note installation position of earth connection.
- ◆ Ensure that the filler neck of the fuel tank is correctly inserted into the opening in the body.
- ◆ Use engine and gearbox jack - V.A.G 1383 A- to position fuel tank on underbody.
- ◆ Ensure proper seating of activated charcoal filter in bracket on fuel tank.
- ◆ Install breather lines and fuel lines free of kinks.
- ◆ Ensure that line connections are tight.
- ◆ After installing fuel tank, check that supply and breather lines are still clipped onto fuel tank.
- ◆ Note the schematic diagram on activated charcoal filter.



M - Connection for breather line leading to engine
 ➔ [Item 4 \(page 93\)](#)

T - Connection to gravity valve on fuel tank ➔ [Item 5 \(page 93\)](#)

A - Breather connection ➔ [Item 6 \(page 93\)](#)

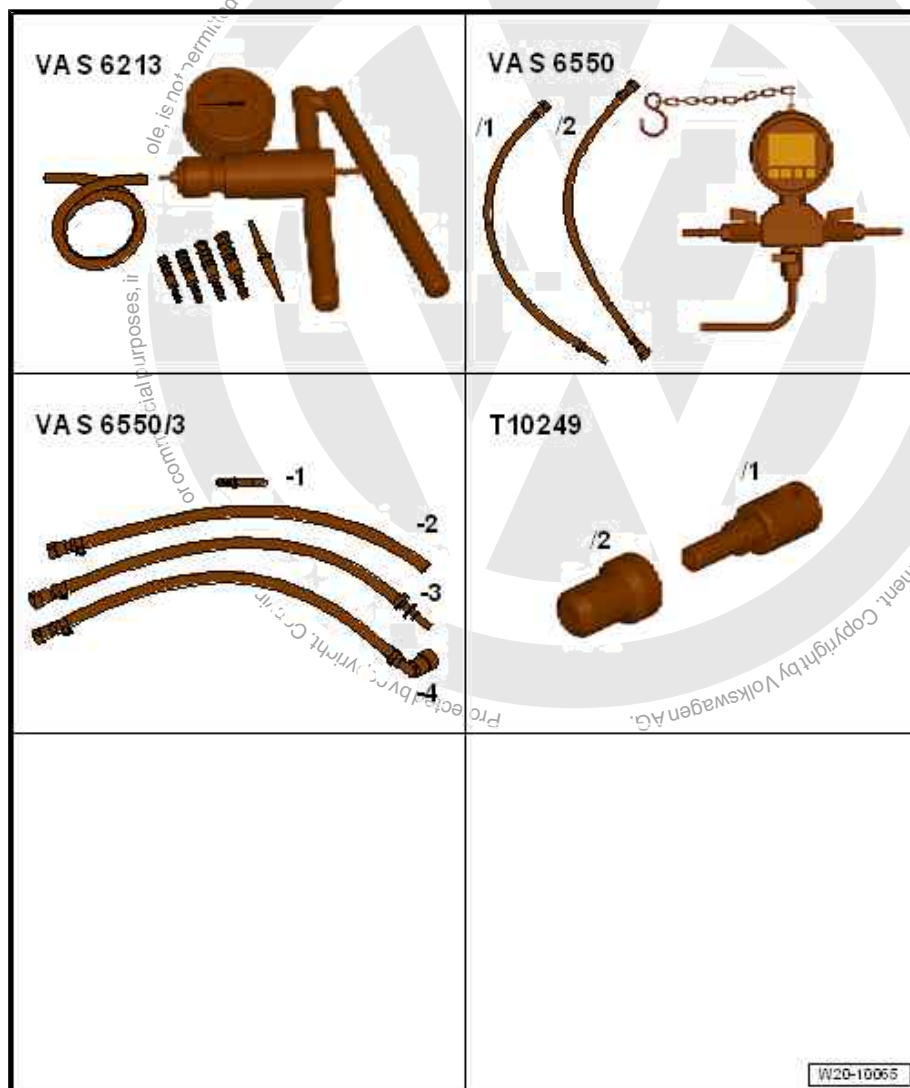
Torque settings

- ◆ ➔ [“6.1 Assembly overview – activated charcoal filter system”, page 93](#)

6.3 Checking fuel tank breather



Special tools and workshop equipment required



- ◆ Hand operated vacuum pump - VAS 6213-
- ◆ Pressure gauge - VAS 6550-
- ◆ Adapter set - VAS 6550/3-
- ◆ Sealing tool - T10249-

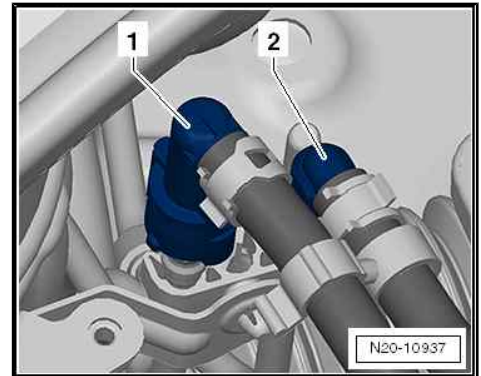
Test conditions

- Seal all open lines immediately after disconnecting.
- Note connections on activated charcoal filter
⇒ [Fig. "Connections on activated charcoal filter"](#) , page 94 .
- Ignition must be switched off.

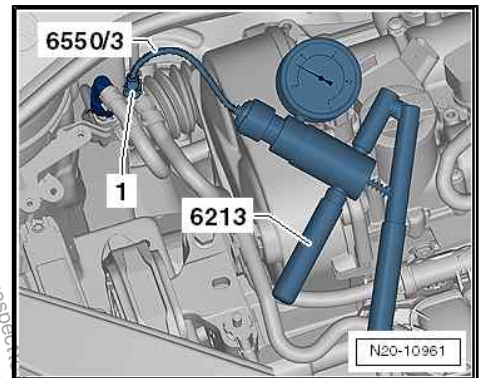


Test sequence

- Release and disconnect breather line -2- (white). Separate plug-in connectors
 ⇒ [“4.1 Separating plug-in connectors”, page 88](#) .

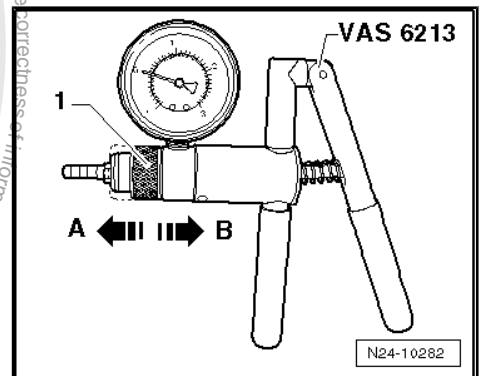


- Connect hand vacuum pump - VAS 6213- with adapter set - VAS 6550/3- to line -1- leading to activated charcoal filter.



- Move slide ring -1- on hand vacuum pump - VAS 6213- to position -A- for “vacuum”.
- Operate hand vacuum pump - VAS 6213- several times. There must be no development of vacuum.

If vacuum builds up:

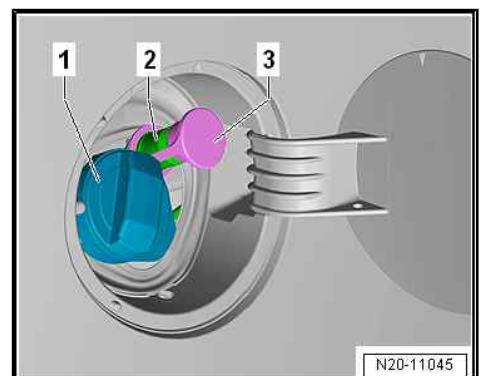


- Open tank flap unit.
- Clean area around fuel filler neck.
- Open cap -1-.
- Repeat test.

If vacuum does not build up:

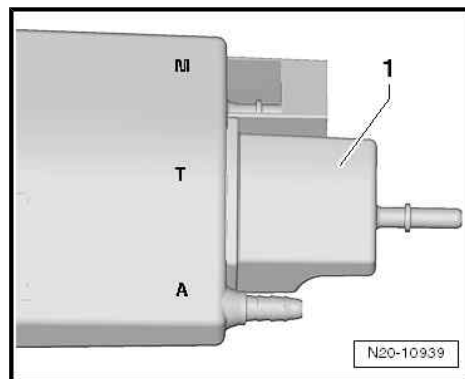
- Check breather hose ⇒ [Item 5 \(page 93\)](#) on activated charcoal filter for soiling and clean if necessary.

Check for leaks





- Disconnect lines from connections -T- ➔ [Item 5 \(page 93\)](#) and -A- ➔ [Item 6 \(page 93\)](#) . Separate plug-in connectors ➔ [“4.1 Separating plug-in connectors”, page 88](#) .



- Join connections -T- and -A- using a standard hose -2-, in order to seal connections.



Note

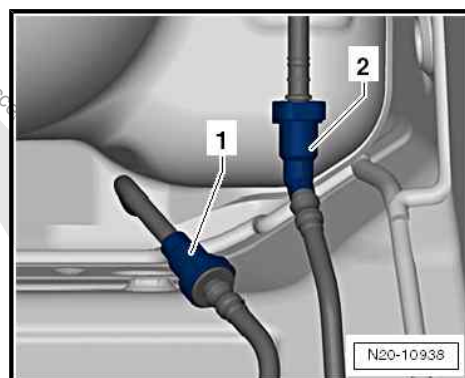
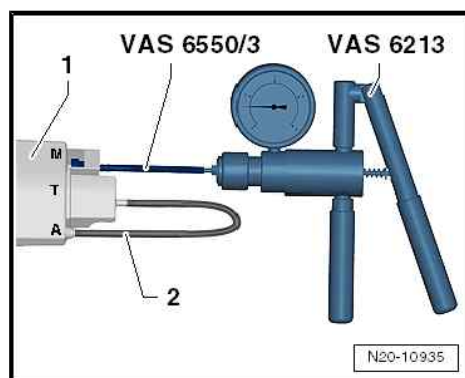
Connection -T- can also be sealed with the sealing tool - T10249/2- . Connection -A- must then also be sealed using suitable means.

- Operate hand vacuum pump - VAS 6213- several times. Vacuum must build up.

If vacuum does not build up:

Proceed as follows to check activated charcoal filter system at connecting point on underbody:

- Disconnect line -1- (white) on underbody. Separate plug-in connectors ➔ [“4.1 Separating plug-in connectors”, page 88](#) .



- Connect line to activated charcoal filter -1- with hand vacuum pump - VAS 6213- , adapter - VAS 6550/3-1- and a standard hose.

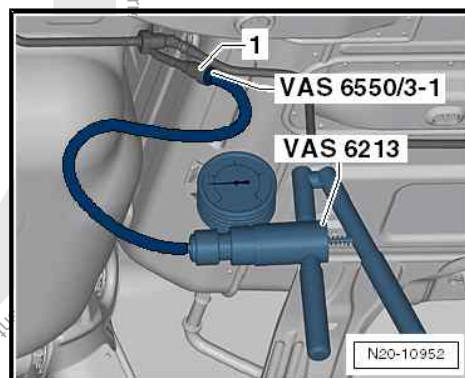
- Connections -A- and -T- are sealed by means of a standard hose ➔ [page 98](#) .

- Operate hand vacuum pump - VAS 6213- several times. Vacuum must build up.

If vacuum builds up:

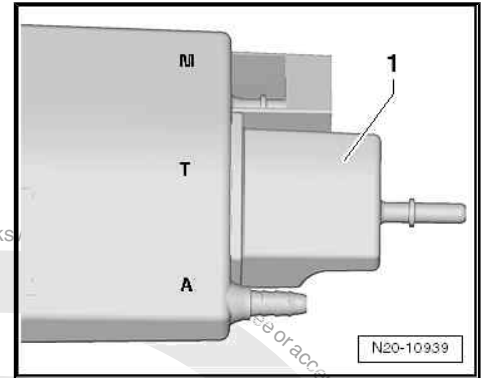
- Check line between connecting point in engine compartment and connecting point on underbody and renew, if necessary.

If vacuum does not build up:



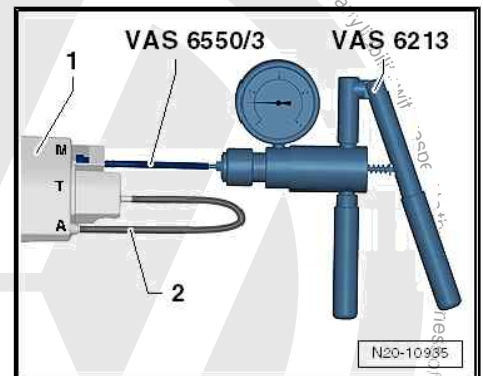


- Disconnect line from connection -M- of activated charcoal filter. Separate plug-in connectors
 ⇒ [“4.1 Separating plug-in connectors”, page 88](#) .



- Connect hand vacuum pump - VAS 6213- with adapter - VAS 6550/3- to connection -M- of activated charcoal filter -1-.
- Join connections -T- and -A- using a standard hose -2-, in order to seal connections.
- Operate hand vacuum pump - VAS 6213- several times. Vacuum must build up.

If vacuum builds up:



- Check line between connecting point -1- (white) on underbody and connection -M- on activated charcoal filter and renew, if necessary.

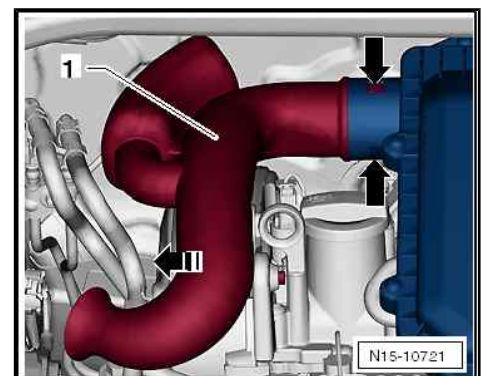
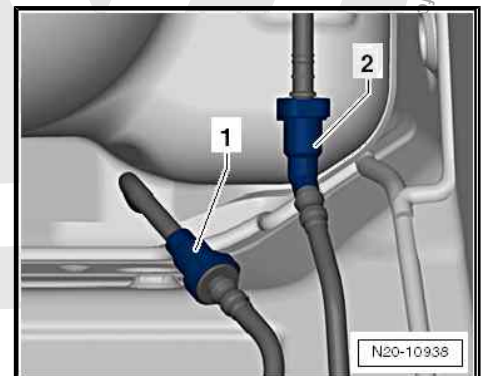
If vacuum does not build up:

- Renew activated charcoal filter
 ⇒ [“6.2 Removing and installing activated charcoal filter”, page 94](#) .

If vacuum builds up and lines are OK, proceed as follows:

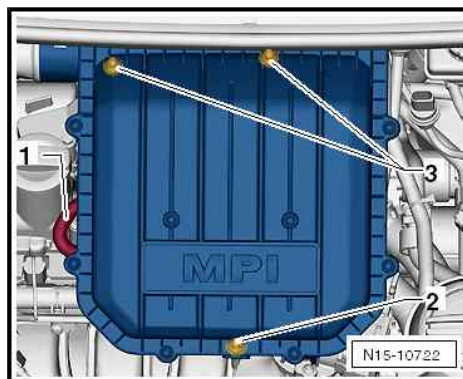
Check activated charcoal filter system solenoid valve 1 -N80- as follows:

- Ignition switched off
- Press locking lugs -arrows- and pull intake connection off -1- in -direction of arrow-.

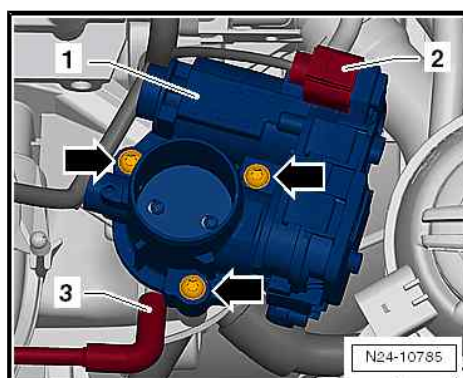




- Pull hose -1- off air filter housing.
- Pull air filter housing upwards off studs at positions -2- and -3-.



- Seal line -3- between activated charcoal filter solenoid valve 1 - N80- and throttle valve module - J338- .
- To do this, use hose clips up to 25 mm - 3094- .



- Disconnect bleeder line -2- (white). Separate plug-in connectors ➔ [“4.1 Separating plug-in connectors”, page 88](#) .
- Using a connecting nipple - VAS 6213- and a standard hose, connect hand vacuum pump - VAS 6550/3-1- to line leading to active charcoal filter system solenoid valve 1 - N80- .
- Operate hand vacuum pump - VAS 6213- several times. Vacuum must build up.

If vacuum does not build up:

- Check lines and renew, if necessary.

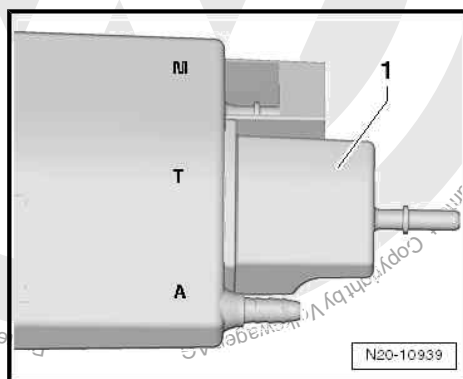
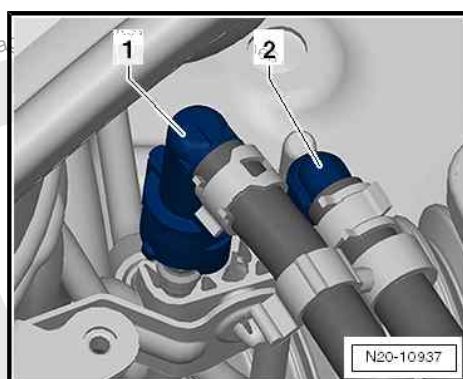
If no fault is found:

- Replace the activated charcoal filter system solenoid valve 1 - N80- .

Installing

Install in reverse order of removal. Observe the following:

- ◆ Note installation position of earth connection.
- ◆ Ensure that the filler neck of the fuel tank is correctly inserted into the opening in the body.
- ◆ Use engine and gearbox jack - V.A.G 1383 A- to position fuel tank on underbody.
- ◆ Ensure proper seating of activated charcoal filter in bracket on fuel tank.
- ◆ Install breather lines and fuel lines free of kinks.
- ◆ Ensure that line connections are tight.
- ◆ After installing fuel tank, check that supply and breather lines are still clipped onto fuel tank.
- ◆ Note the schematic diagram on activated charcoal filter.





7 Accelerator pedal

⇒ [“7.1 Assembly overview - accelerator module”, page 101](#)

⇒ [“7.2 Removing and installing accelerator pedal module GX2”, page 102](#)

7.1 Assembly overview - accelerator module

1 - Brake pedal

- ❑ Removing and installing
⇒ Brake system; Rep.
gr. 46 ; Brake pedal

2 - Connector

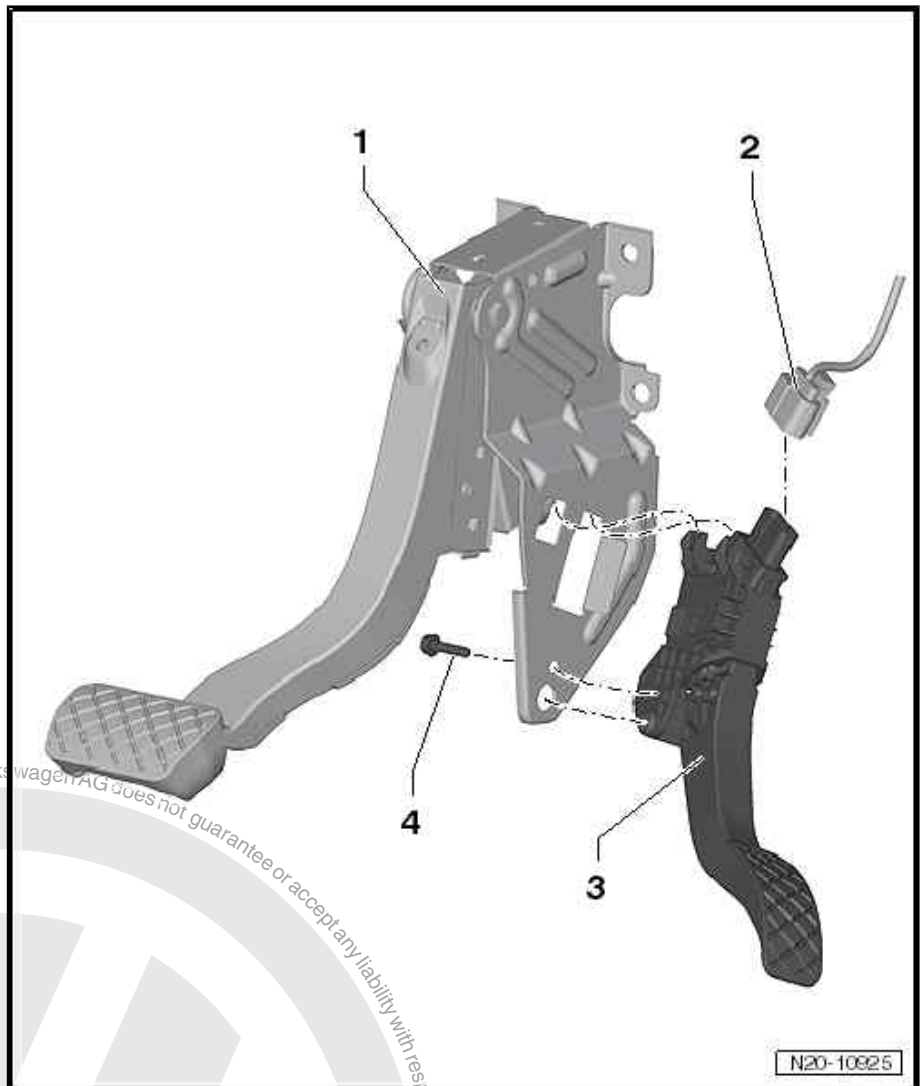
- ❑ black

3 - Gas pedal module

- ❑ Removing and installing
accelerator pedal mod-
ule
⇒ [“7.2 Removing and in-
stalling accelerator ped-
al module GX2”,
page 102](#)

4 - Bolt

- ❑ 6 Nm

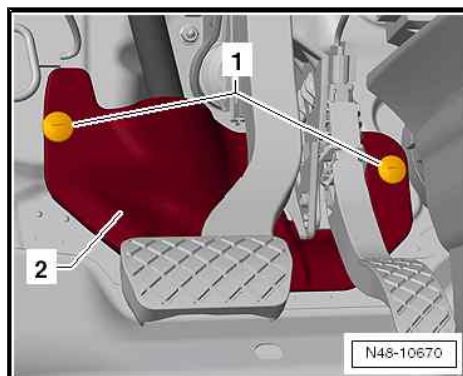




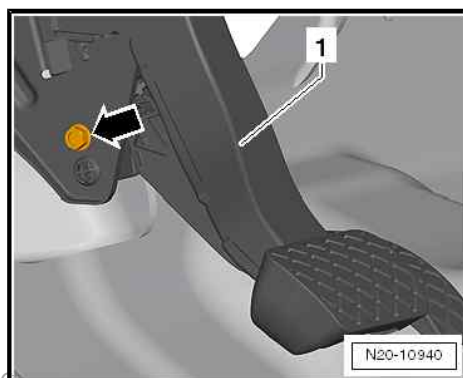
7.2 Removing and installing accelerator pedal module - GX2-

Removing

- Unscrew bolts -1- to remove steering column trim -2-.
- Release connector ➔ [Item 2 \(page 101\)](#) and pull it off accelerator module.



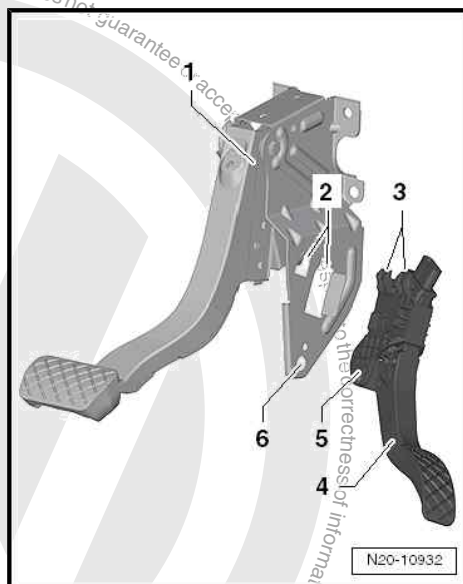
- Unscrew securing bolt -arrow- from brake pedal support.



- Pull accelerator module -4- downwards out of guides -2-.
- Remove accelerator module.

Installing

Install in reverse order of removal. Observe the following:

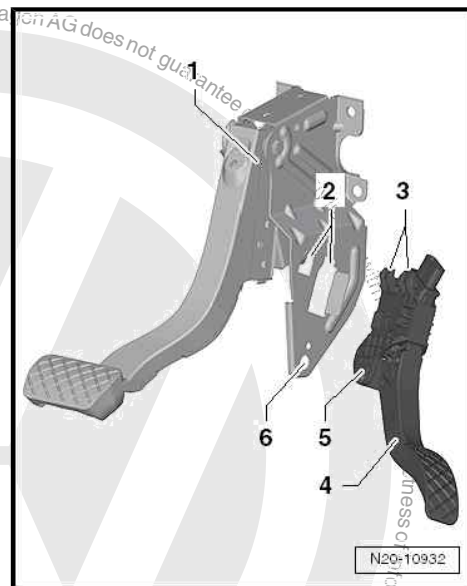




- Insert retaining lugs -3- of accelerator module -4- into guide -2- on brake pedal support -1-.
- Ensure that guide -5- of accelerator module -4- is properly seated in hole -6- on brake pedal support -1-.

Torque setting

- ◆ ⇒ ["7.1 Assembly overview - accelerator module", page 101](#)





8 Fuel pump

⇒ ["8.1 Checking fuel system pressurisation pump G6", page 104](#)

8.1 Checking fuel system pressurisation pump - G6-

⇒ ["8.1.1 Checking function and voltage supply of fuel system pressurisation pump G6", page 104](#)

⇒ ["8.1.2 Checking fuel pressure", page 106](#)

⇒ ["8.1.3 Checking holding pressure", page 110](#)

⇒ ["8.1.4 Checking fuel delivery rate", page 114](#)

⇒ ["8.1.5 Checking current consumption", page 120](#)

8.1.1 Checking function and voltage supply of fuel system pressurisation pump - G6-

Special tools and workshop equipment required



- ◆ Removal wedge - 3409-
- ◆ Multimeter, e.g. hand-held multimeter - V.A.G 1526E-



- ◆ Adapter set - V.A.G 1594C-
- ◆ Test instrument adapter/DSO (5-pin) - VAS 5565-
- ◆ Vehicle diagnostic tester

Test conditions:

- Battery voltage must be at least 11.5 V. If necessary, charge battery ⇒ Electrical system; Rep. gr. 27 ; Battery; Charging battery .
- Fuse for fuel system pressurisation pump - G6- OK ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

Test sequence



Note

Function of fuel pump is checked using final control diagnosis.

- Connect ⇒ Vehicle diagnostic tester:
- Switch on ignition.
- Press following buttons on display one after the other:

- ◆ Vehicle self-diagnosis
- ◆ Engine electronics
- ◆ Final control diagnosis
- ◆ Electric fuel pump
- ◆ ▶
- ◆ Button

The fuel pump must now run slowly up to maximum speed.



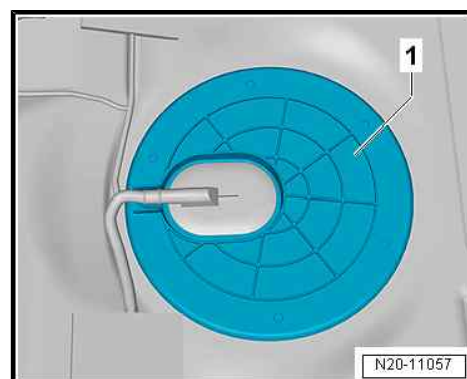
Note

- ◆ *The fuel pump runs very quietly.*
- ◆ *If the final control diagnosis is to be carried out several times in succession, it may be necessary to start the engine briefly before repeating the final control diagnosis.*

- Switch off ignition.

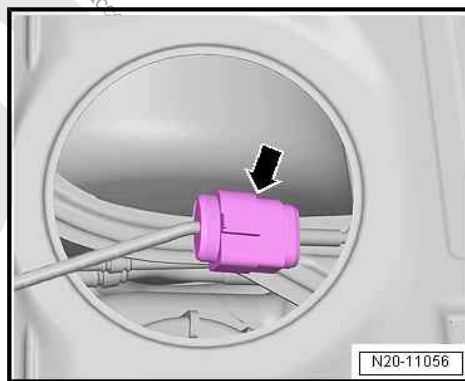
If fuel pump does not run:

- Remove bench seat ⇒ General body repairs, interior; Rep. gr. 72 ; Rear seats; Removing and installing bench seat/individual seats .
- Unclip cover -1- at retaining tabs using removal wedge - 3409- .

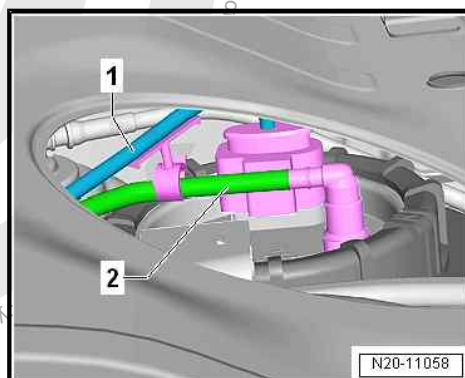




- Check that connector -arrow- is fitted securely by pulling connector without pressing catch. If connector was not inserted correctly, repeat functional check of fuel pump.
- Check contacts of connector for damage.



- Check that connector -1- is fitted securely by pulling connector without pressing catch. If connector was not inserted correctly, repeat functional check of fuel pump.
- Release and pull off connector.
- Check contacts on connector for damage.



- Connect test instrument adapter/DSO (5-pin) - VAS 5565- to connector and fuel delivery unit.
- Connect multimeter - V.A.G 1526E- to cables -1- and -5- of test instrument adapter/DSO (5-pin) - VAS 5565- .
- Initiate final control diagnosis again and measure voltage at fuel pump.
- Specification: approx. battery voltage.

If specification is not obtained

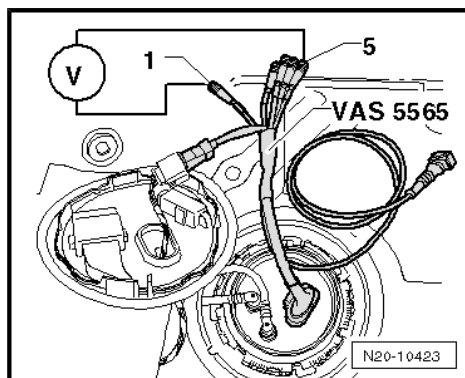
- Locate and eliminate open circuit referring to current flow diagram ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

If reading matches specification:

- Remove fuel delivery unit
⇒ [“3.2 Removing and installing fuel delivery unit, fuel gauge sender”, page 83](#) .
- Check that electrical wires between flange and fuel pump are connected.
- Check contacts for damage.

If no open circuit can be found:

- Fuel pump is defective; renew fuel delivery unit
⇒ [“3.2 Removing and installing fuel delivery unit, fuel gauge sender”, page 83](#) .

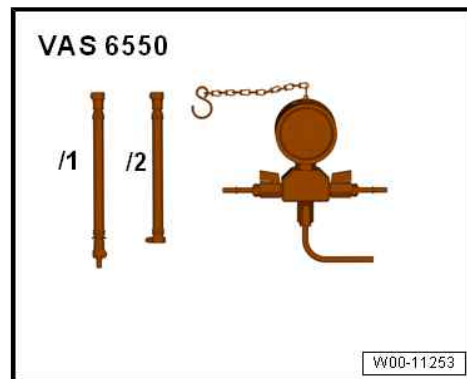


8.1.2 Checking fuel pressure

Special tools and workshop equipment required



◆ Pressure gauge - VAS 6550-



◆ Removal wedge - 3409-



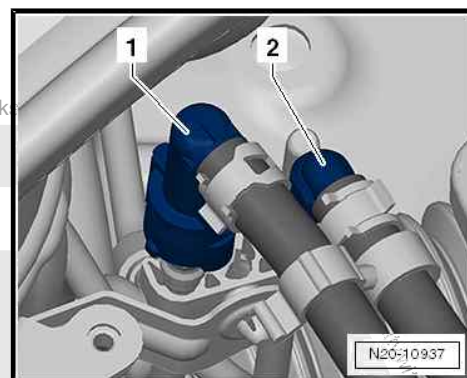
◆ Vehicle diagnostic tester

- Voltage supply OK.
- Pull off supply line (metal connector) -1-. Separate plug-in connectors ⇒ [“4.1 Separating plug-in connectors”, page 88](#).

⚠ CAUTION

The fuel system is pressurised.
Danger of injury through fuel spray.

- Wear protective goggles.
- Wear protective gloves.
- To release pressure, wrap a clean cloth around the connection and carefully loosen the connection.



- Collect escaping fuel with a cleaning cloth.



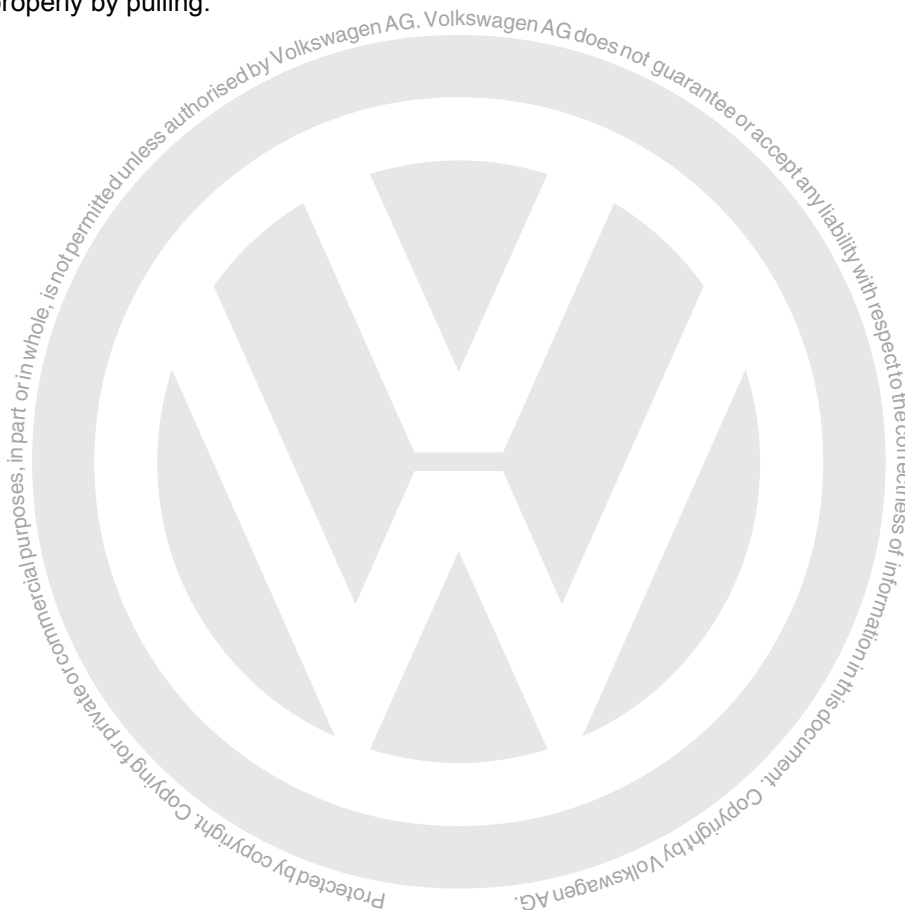
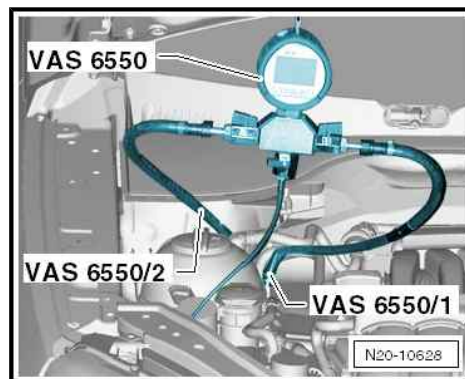
- Connect pressure tester - VAS 6550- to fuel supply line with adapter - VAS 6550/1- and -VAS 6550/2- .
- Connect hose - VAS 6550/1- to engine fuel supply line and to shut-off tap -B-.
- Connect hose - VAS 6550/2- to connection -A- of pressure tester - VAS 6550- .
- Use hose - VAS 6550- to connect fuel line leading to fuel tank with pressure tester - VAS 6550/2- .

⚠ CAUTION

Risk of fire due to escaping fuel.

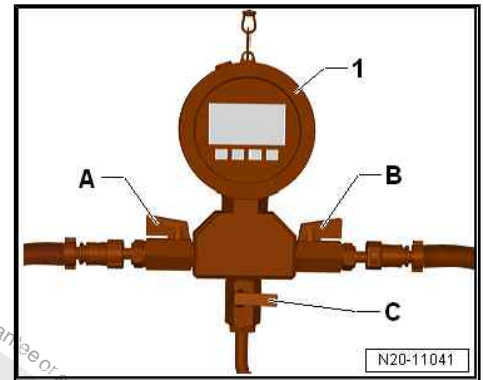
Risk of severe injuries and burns.

- **Before testing, check all connected lines for secure fit by pulling.**
 - **Take any fuel-soaked cloths away from area of vehicle.**
-
- Ensure plug-in connectors are secure properly by pulling.





- Ensure that drain tap -C- on pressure tester - VAS 6550- -1- is closed.
- Shut-off taps -A- and -B- on pressure tester - VAS 6550- -1- must be open.
- Connect the vehicle diagnostic tester .
- Press following buttons on display one after the other:
 - ◆ Vehicle self-diagnosis
 - ◆ Engine electronics
 - ◆ Final control diagnosis
 - ◆ Electric fuel pump
 - ◆ ▶
 - ◆ Button



Note

The fuel pump is now actuated to build up fuel pressure.

- Read off fuel pressure on pressure gauge.
- Specification: 3.0...3.3 bar.

If fuel pressure is OK, check holding pressure
 ⇒ [“8.1.3 Checking holding pressure”, page 110](#) .

If the specification is exceeded:

- Renew fuel delivery unit
 ⇒ [“3.2 Removing and installing fuel delivery unit, fuel gauge sender”, page 83](#) .

If specification is not obtained

- Check fuel line for possible restrictions (kinks) or blockages.
- Check fuel line for leaks and damage.

If no fault is found:

Proceed as follows to check fuel pressure at connecting point on underbody:

Checking fuel pressure at connecting point on underbody:

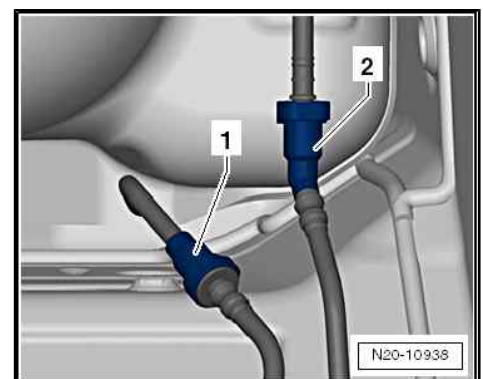
- Disconnect fuel supply line -2-. Separate plug-in connectors
 ⇒ [“4.1 Separating plug-in connectors”, page 88](#) .

CAUTION

The fuel system is pressurised.

Danger of injury through fuel spray.

- Wear protective goggles.
- Wear protective gloves.
- To release pressure, wrap a clean cloth around the connection and carefully loosen the connection.



- Collect escaping fuel with a cleaning cloth.



- Connect pressure tester - VAS 6550- with adapters - VAS 6550/1- and -VAS 6550/2- to plug-in connector of fuel supply line.
- Connect adapter - VAS 6550/1- to fuel line (leading to engine compartment) and to shut-off tap -B-.
- Connect hose - VAS 6550/2- to fuel line (leading to fuel tank) and to shut-off tap -A-.

⚠ CAUTION

Risk of fire due to escaping fuel.

Risk of severe injuries and burns.

- Before testing, check all connected lines for secure fit by pulling.
- Take any fuel-soaked cloths away from area of vehicle.

- Ensure plug-in connectors are secure properly by pulling.

- Ensure that drain tap -C- on pressure tester - VAS 6550- -1- is closed.
- Shut-off taps -A- and -B- on pressure tester - VAS 6550- -1- must be open.
- Repeat **Final control diagnosis** to build up fuel pressure.

If reading matches specification:

- Fuel pump OK, check fuel line leading to engine compartment for possible restrictions (kinks) or blockages.
- Check fuel line for leaks and damage.

If specification is not obtained

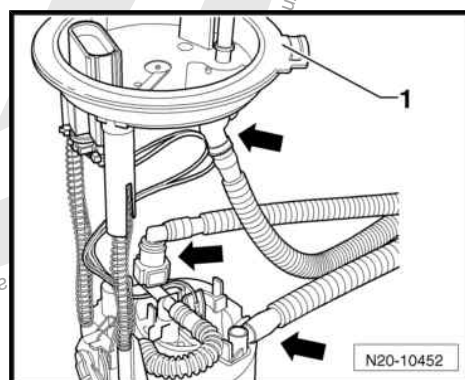
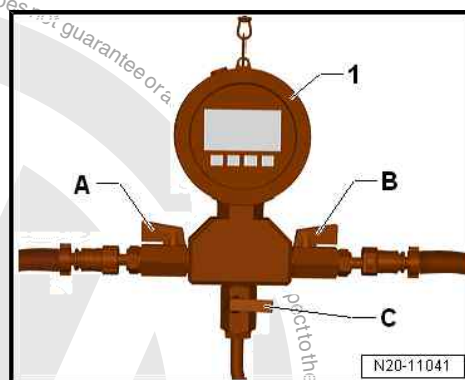
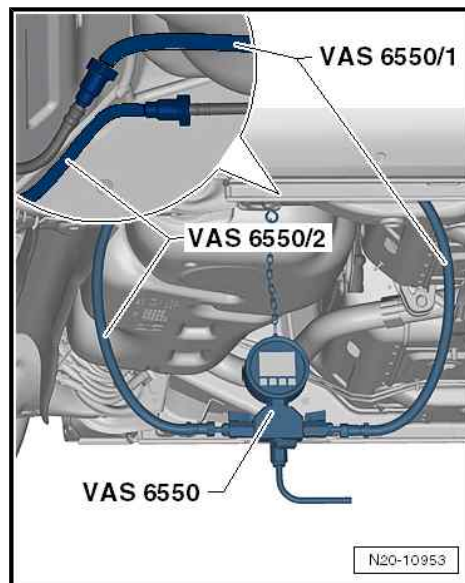
- Check fuel lines between fuel delivery unit and underbody for possible restrictions (kinks) or blockages.
- Check fuel line between fuel delivery unit and underbody for leaks and damage.

If no fault is found:

- Remove fuel delivery unit
⇒ **“3.2 Removing and installing fuel delivery unit, fuel gauge sender”, page 83** and check for contamination.
- Check that all hose connections -arrows- are connected.
- Check fuel lines for possible restrictions (kinks) or blockages.
- Check fuel lines for leaks and damage.

If no fault is found:

- Fuel pump is defective; renew fuel delivery unit
⇒ **“3.2 Removing and installing fuel delivery unit, fuel gauge sender”, page 83**.

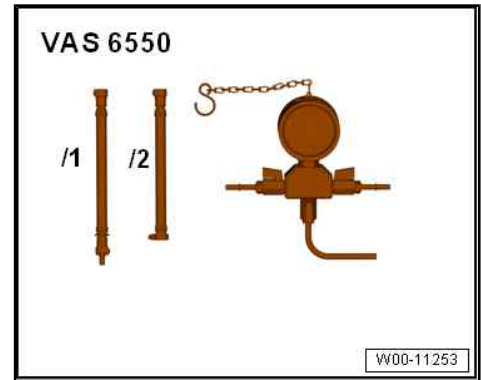


8.1.3 Checking holding pressure

Special tools and workshop equipment required



◆ Pressure gauge - VAS 6550-



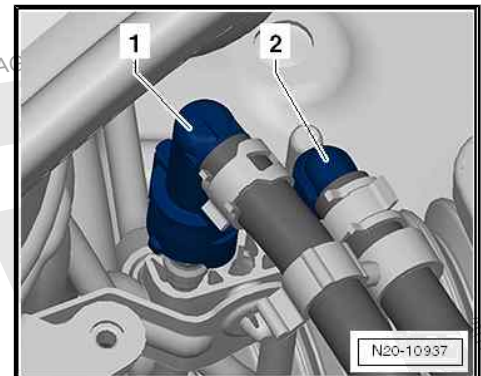
◆ Vehicle diagnostic tester

- Voltage supply OK.
- Fuel pressure OK
 ⇒ ["8.1.2 Checking fuel pressure", page 106](#) .
- Pull off supply line (metal connector) -1-. Separate plug-in connectors ⇒ ["4.1 Separating plug-in connectors", page 88](#) .

! CAUTION

The fuel system is pressurised.
 Danger of injury through fuel spray.

- Wear protective goggles.
- Wear protective gloves.
- To release pressure, wrap a clean cloth around the connection and carefully loosen the connection.

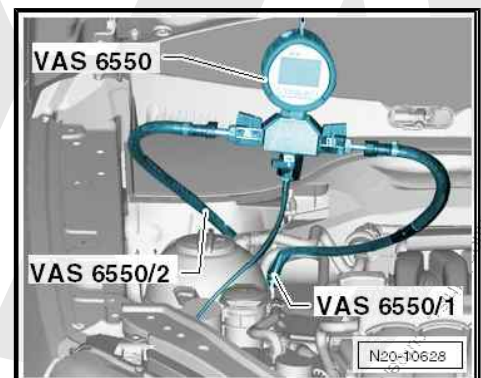


- Collect escaping fuel with a cleaning cloth.
- Connect pressure tester - VAS 6550- to fuel supply line with adapter - VAS 6550/1- and -VAS 6550/2- .
- Connect hose - VAS 6550/1- to engine fuel supply line and to shut-off tap -B-.
- Connect hose - VAS 6550/2- to connection -A- of pressure tester - VAS 6550- .
- Use hose - VAS 6550- to connect fuel line leading to fuel tank with pressure tester - VAS 6550/2- .

! CAUTION

Risk of fire due to escaping fuel.
 Risk of severe injuries and burns.

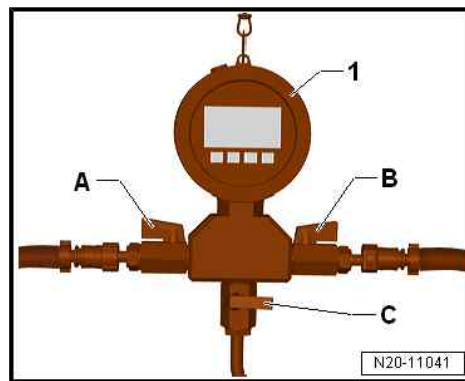
- Before testing, check all connected lines for secure fit by pulling.
- Take any fuel-soaked cloths away from area of vehicle.



- Ensure plug-in connectors are secure properly by pulling.



- Ensure that drain tap -C- on pressure tester - VAS 6550- -1- is closed.
- Shut-off taps -A- and -B- on pressure tester - VAS 6550- -1- must be open.
- Connect the vehicle diagnostic tester .
- Press following buttons on display one after the other:
 - ◆ Vehicle self-diagnosis
 - ◆ Engine electronics
 - ◆ Final control diagnosis
 - ◆ Electric fuel pump
 - ◆ ▶
 - ◆ Button



Note

The fuel pump is now actuated to build up fuel pressure.

- Read off fuel pressure on pressure gauge.
 - Specification: 3.0 ... 3.3 bar
- Observe pressure drop on pressure gauge. After 10 minutes, the pressure must not drop by more than 1.0 bar.

If the pressure drops:

- Check fuel lines in engine compartment for leaks and damage.

If no fault is detected:

- Actuate fuel pump with Final control diagnosis to build up fuel pressure.



- After pressure has built up, close shut-off tap -B- of pressure tester immediately. Lever is then at right angle to direction of flow.

If the pressure does not drop now:



Note

Search for leak on engine side.

Proceed as follows to check holding pressure on engine side
⇒ [page 113](#).

If the pressure drops again:



Note

Search for leak on fuel tank side.

Proceed as follows to check holding pressure at connecting point on underbody ⇒ [page 113](#).

Checking holding pressure on engine side:



Note

Search for leak on engine side. Repeat holding pressure check. This time, close shut-off valve -B- to check whether leak actually is on engine side.

If there is a leak on engine side:

- Check surfaces of fuel lines for leaks.
- Check surfaces of fuel rail and injectors for leaks ⇒ Rep. gr. 24 ; Injectors; Assembly overview - fuel rail with injectors .

If no fault is found:

- Check injectors for leaks ⇒ Rep. gr. 24 ; Injectors; Checking injectors .

Checking holding pressure on fuel tank side:

- Disconnect fuel supply line -2- (black). Separate plug-in connectors ⇒ [“4.1 Separating plug-in connectors”, page 88](#) .

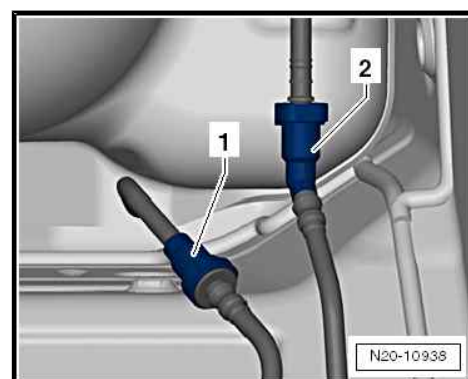
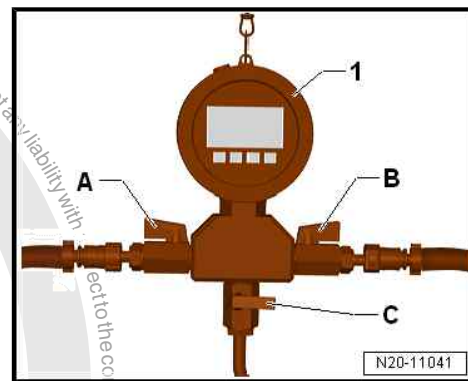
⚠ CAUTION

The fuel system is pressurised.

Danger of injury through fuel spray.

- Wear protective goggles.
- Wear protective gloves.
- To release pressure, wrap a clean cloth around the connection and carefully loosen the connection.

- Collect escaping fuel with a cleaning cloth.





- Connect pressure tester - VAS 6550- with hose - VAS 6550/1- and hose - VAS 6550/2- to plug-in connectors of fuel supply line.
- Connect hose - VAS 6550/1- to fuel line (leading to engine) and to shut-off tap -B-.
- Connect hose - VAS 6550/2- to connection -A- of pressure tester - VAS 6550- .
- Use hose - VAS 6550- to connect fuel line leading to fuel tank with pressure tester - VAS 6550/2- .

⚠ CAUTION

Risk of fire due to escaping fuel.

Risk of severe injuries and burns.

- Before testing, check all connected lines for secure fit by pulling.
- Take any fuel-soaked cloths away from area of vehicle.

- Ensure plug-in connectors are secure properly by pulling.
- Ensure that drain tap -C- on pressure tester VAS 6550- -1- is closed.
- Shut-off taps -A- and -B- on pressure tester VAS 6550- -1- must be open.
- Repeat Final control diagnosis to build up fuel pressure.
- After pressure has built up, close shut-off valve -A- of pressure tester immediately. Lever is then at right angle to direction of flow.
- Observe pressure drop on pressure gauge.

If the pressure drops:

Check for leaks in components located further towards engine.

- Check fuel line for leaks and damage.

If the pressure does not drop:

In the event of leaks, check components which are located further towards fuel tank.

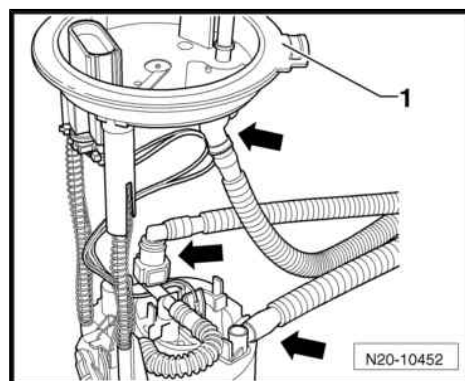
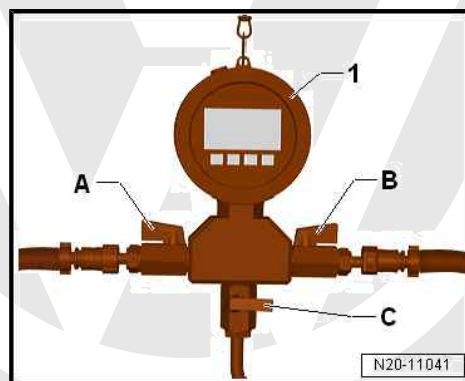
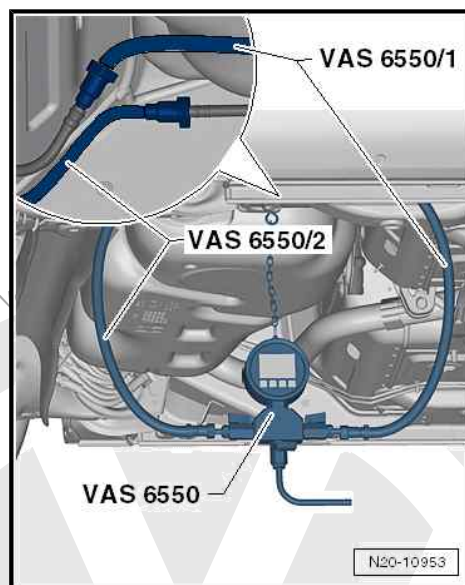
- Check fuel line for leaks and damage.

If no fault is found:

- Remove fuel delivery unit
⇒ [“3.2 Removing and installing fuel delivery unit, fuel gauge sender”, page 83](#) .
- Check that all hose connections -arrows- are connected.
- Check fuel lines for leaks and damage.

If no fault is found:


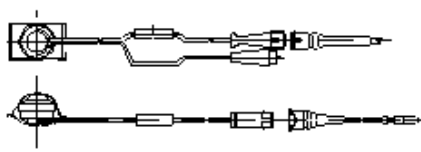

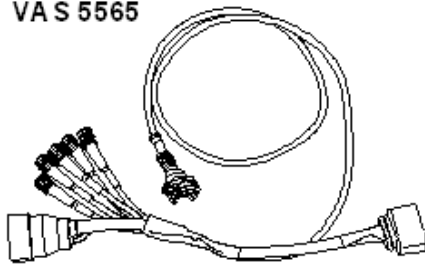
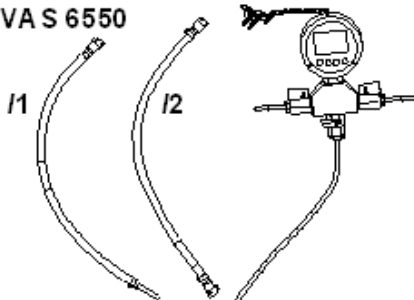
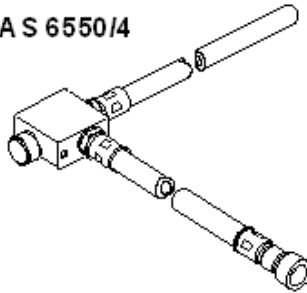
- Pressure retention valve in fuel pump is defective.
- Renew fuel delivery unit
⇒ [“3.2 Removing and installing fuel delivery unit, fuel gauge sender”, page 83](#) .



8.1.4 Checking fuel delivery rate



Special tools and workshop equipment required

<p>3409</p> 	<p>V.A.G 1348/3A</p> 
<p>V.A.G 1526 E</p> 	<p>VAS 5565</p> 
<p>VAS 6550</p> 	<p>VAS 6550/4</p>  <p>W20-10059</p>

- ◆ Removal wedge - 3409-
- ◆ Remote control for V.A.G 1348 - V.A.G 1348/3A-
- ◆ Multimeter, e.g. hand-held multimeter - V.A.G 1526E-
- ◆ Test instrument adapter/DSO (5-pin) - VAS 5565-
- ◆ Pressure gauge - VAS 6550-
- ◆ Pressure regulating valve - VAS 6550/4-
- ◆ Vehicle diagnostic tester

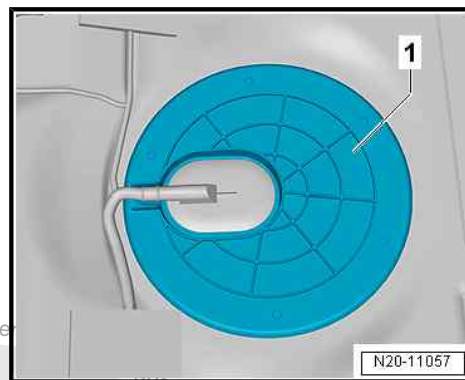


Note

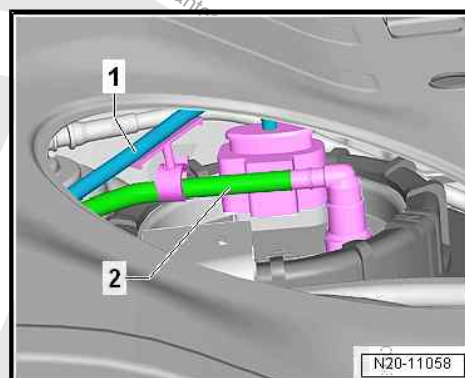
- ◆ *Separate plug-in connectors*
 ⇒ *"4.1 Separating plug-in connectors", page 88.*
- ◆ *When driving characteristic problems occur when the fuel tank is a approx. 1/4 filled, then check fuel delivery rates with approx. 1/4 filled tank or less.*
- Voltage supply OK
 ⇒ *"8.1.1 Checking function and voltage supply of fuel system pressurisation pump G6", page 104.*



- Fuel pressure OK
⇒ ["8.1.2 Checking fuel pressure", page 106](#) .
- Battery voltage must be at least 11.5 V. If necessary, connect battery charger ⇒ Electrical system; Rep. gr. 27 ; Battery; Charging battery .
- Fuel pump control unit - J538- OK ⇒ Vehicle diagnostic tester.
- Connect battery charger ⇒ Electrical system; Rep. gr. 27 ; Battery; Charging battery .
- Remove bench seat ⇒ General body repairs, interior; Rep. gr. 72 ; Rear seats; Removing and installing bench seat/individual seats .
- Unclip cover -1- at retaining tabs using removal wedge - 3409- .



- Check that connector -1- is fitted securely by pulling connector without pressing catch. If connector was not inserted correctly, repeat functional check of fuel pump.
- Release and pull off connector.
- Check contacts on plug and on fuel delivery unit for damage.

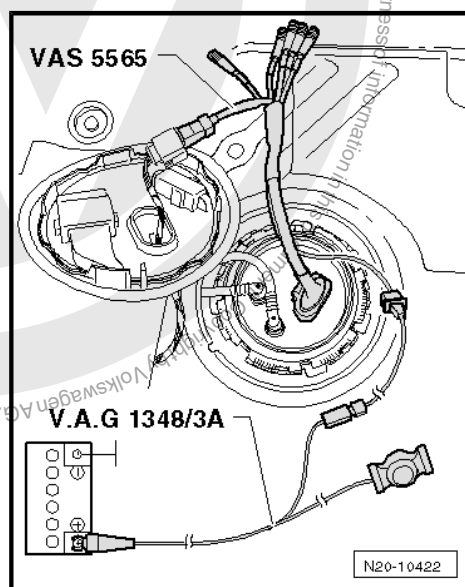


- Connect test instrument adapter/DSO (5-pin) - VAS 5565- to connector and fuel delivery unit.
- Connect remote control V.A.G 1348/3A- to adapter - VAS 5565- and to battery positive terminal in engine compartment.



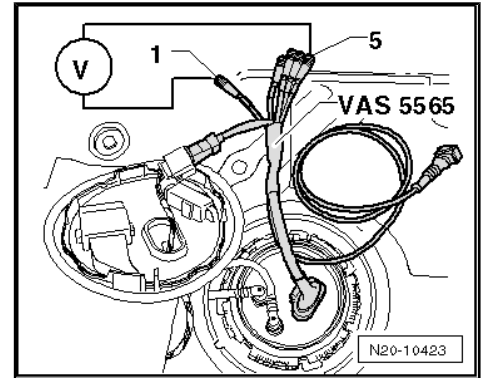
Note

This step serves only to have the fuel pump running when the engine is stopped.





- The quantity delivered by the fuel pump depends on the battery voltage. Therefore, also connect multimeter to outputs -1- and -5- of test instrument/DSO adapter 5-pin - VAS 5565- .



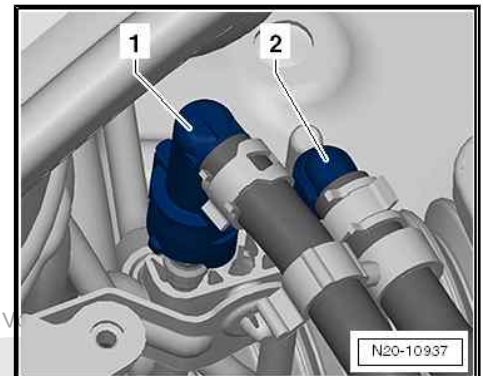
- Pull off supply line -1-. Separate plug-in connectors
 ⇒ ["4.1 Separating plug-in connectors", page 88](#) .

⚠ CAUTION

The fuel system is pressurised.

Danger of injury through fuel spray.

- Wear protective goggles.
- Wear protective gloves.
- To release pressure, wrap a clean cloth around the connection and carefully loosen the connection.



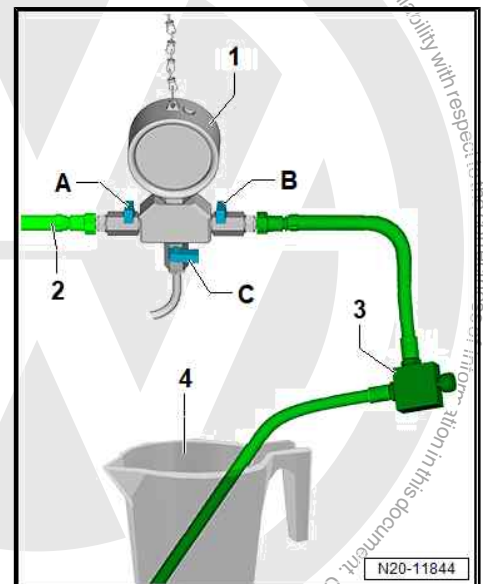
- Collect escaping fuel with a cleaning cloth.
- Using hose - VAS 6550- , connect pressure tester - VAS 6550/2- to fuel supply line coming from fuel tank.
- Connect hose - VAS 6550/2- to connection -A- of pressure tester - VAS 6550- -1-.
- Connect pressure regulator valve - VAS 6550/4- -3- to connection -B- of pressure tester - VAS 6550- .
- Hold end of hose of pressure regulating valve in measuring container -4-. Have a second mechanic hold the measuring container and hose.

⚠ CAUTION

Risk of fire due to escaping fuel.

Risk of severe injuries and burns.

- Before testing, check all connected lines for secure fit by pulling.
- Take any fuel-soaked cloths away from area of vehicle.
- Place measuring container down outside vehicle and ensure that its base is secure.
- Have a second mechanic ensure that end of hose remains in measuring container during test and measuring container does not tip over.





- Ensure that drain tap -C- on pressure tester - VAS 6550- -1- is closed.
- Shut-off taps -A- and -B- on pressure tester - VAS 6550- -1- must be open.

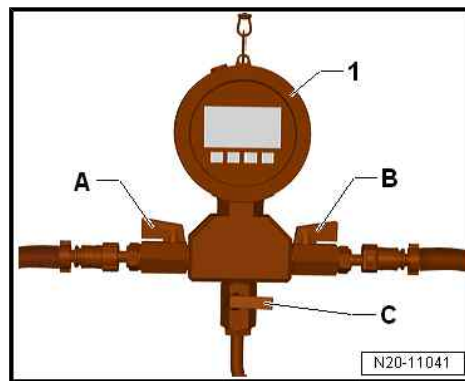
Test sequence

CAUTION

The fuel system is pressurised.

Danger of injury through fuel spray.

- Wear protective goggles.
- Wear protective gloves.
- To release pressure, wrap a clean cloth around the connection and carefully loosen the connection.



- Hold container in front of open connection of pressure tester - VAS 6550- .
- Press remote control - V.A.G 1348/3A- .



Note

The fuel system pressurisation pump - G6- will be actuated.

- Adjust pressure on pressure regulating valve - VAS 6550/4- to 3 bar.
- Set pressure on pressure regulating valve - VAS 6550/4- using adjuster wheel -arrow-.
- From this point on do not change position of adjuster wheel any more.
- Drain measuring container.
- Press remote control for 60 seconds whilst measuring voltage at fuel pump.
- Compare delivered quantity of fuel with specification.

The specification is approx. 1050 cm³/60 s.

If specification is not obtained

- Open tank flap unit.
- Clean area around fuel filler neck.
- Unscrew cap -1- for fuel filler neck.
- Repeat test ➔ [page 118](#)

If reading matches specification:

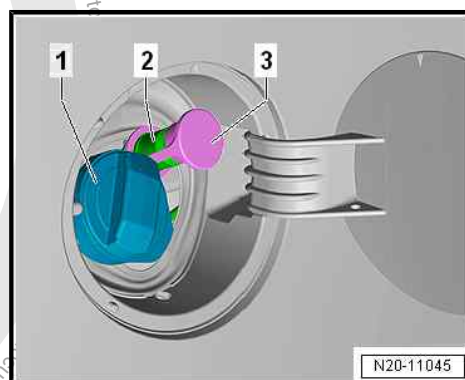
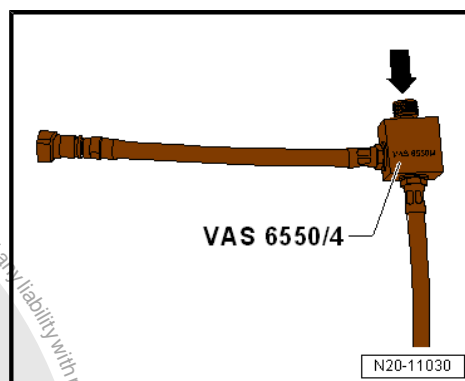
- Check fuel tank breather
➔ [“6.3 Checking fuel tank breather”, page 95](#) .

If specification is not obtained

- Check fuel lines for possible restrictions (kinks) or blockages.
- Check fuel lines for leaks and damage.

If no fault is found:

Check fuel delivery rate at connecting point on underbody as follows:





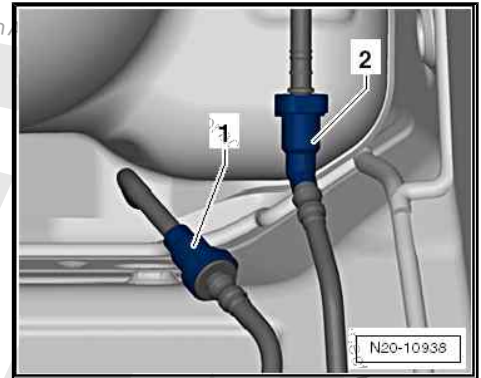
Checking fuel delivery rate at connecting point on underbody:

- Disconnect fuel supply line -2-. Separate plug-in connectors
 ⇒ [“4.1 Separating plug-in connectors”](#), page 88 .

CAUTION

The fuel system is pressurised.
 Danger of injury through fuel spray.

- Wear protective goggles.
- Wear protective gloves.
- To release pressure, wrap a clean cloth around the connection and carefully loosen the connection.

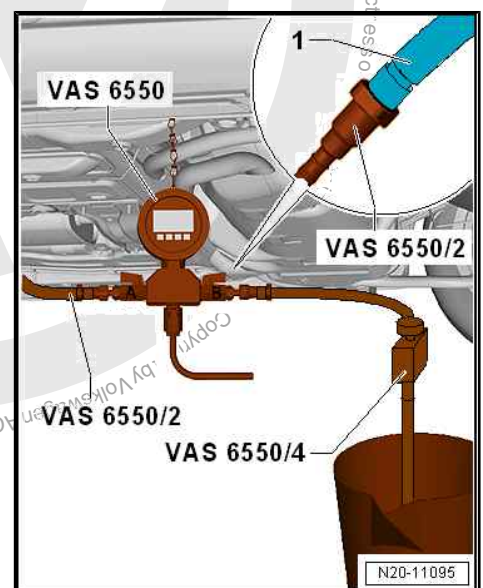


- Collect escaping fuel with a cleaning cloth.
- Using hose - VAS 6550- , connect pressure tester - VAS 6550/2- to shut-off tap -A-.
- Using hose - VAS 6550- , connect pressure tester - VAS 6550/2- to fuel supply line -1- coming from fuel tank.
- Connect pressure regulating valve - VAS 6550/4- to connection -B- of pressure tester - VAS 6550- .
- Hold end of hose of pressure regulating valve - VAS 6550/4- in measuring container.

CAUTION

Risk of fire due to escaping fuel.
 Risk of severe injuries and burns.

- Before testing, check all connected lines for secure fit by pulling.
- Take any fuel-soaked cloths away from area of vehicle.
- Place measuring container down outside vehicle and ensure that its base is secure.
- Have a second mechanic ensure that end of hose remains in measuring container during test and measuring container does not tip over.



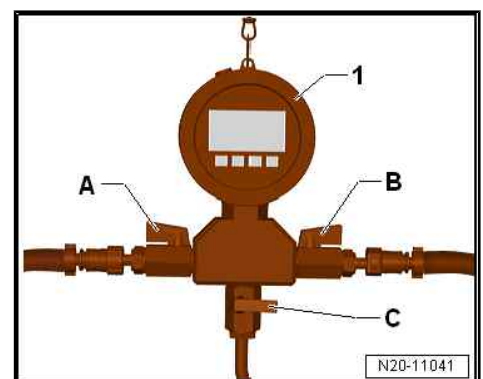
- Ensure that drain tap -C- on pressure tester - VAS 6550- -1- is closed.
- Shut-off taps -A- and -B- on pressure tester - VAS 6550- -1- must be open.
- Repeat test ⇒ [page 118](#)

If reading matches specification:

- Check fuel lines leading to engine for possible restrictions (kinks) or blockages.
- Check fuel lines leading to engine for leaks and damage.

If specification is not obtained

- Check fuel lines between fuel delivery unit and connecting point for possible restrictions (kinks) or blockages.
- Check fuel lines between fuel delivery unit and connecting point for leaks and damage.



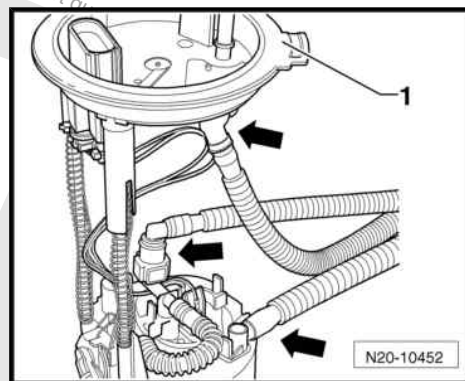


If no fault is found:

- Remove fuel delivery unit
⇒ [“3.2 Removing and installing fuel delivery unit, fuel gauge sender”, page 83](#) .
- Check filter strainer for soiling.
- Check that all fuel delivery unit -1- hose connections -arrows- are connected.
- Check fuel lines for possible restrictions (kinks) or blockages.
- Check fuel lines for leaks and damage.

If no fault is detected:

- Renew fuel delivery unit
⇒ [“3.2 Removing and installing fuel delivery unit, fuel gauge sender”, page 83](#)



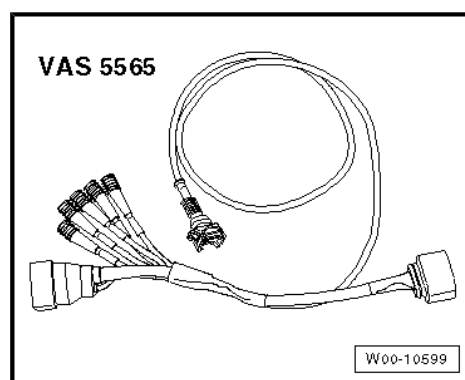
8.1.5 Checking current consumption

Special tools and workshop equipment required

- ◆ Multimeter, e.g. hand-held multimeter - V.A.G 1526E-



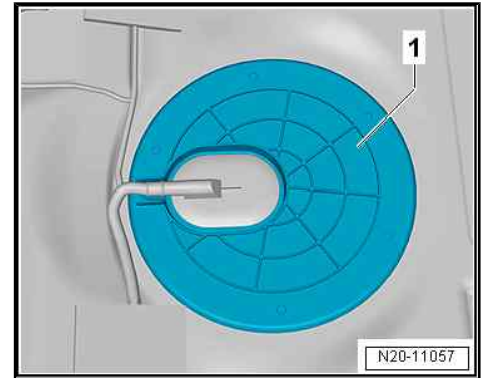
- ◆ Pick-up clamp e.g. pick-up clamp - V.A.G 1526B/2-
- ◆ Test instrument adapter/DSO (5-pin) - VAS 5565-



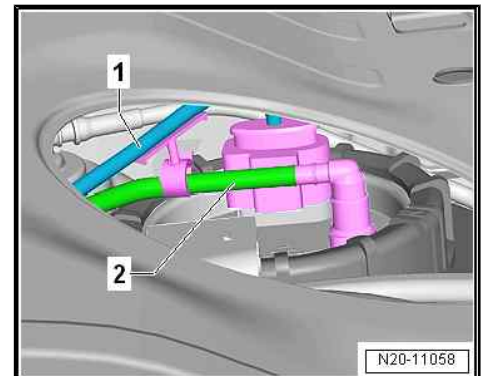
- Battery charger connected.
- Voltage supply OK
⇒ [“8.1.1 Checking function and voltage supply of fuel system pressurisation pump G6”, page 104](#) .
- Remove bench seat ⇒ General body repairs, interior; Rep. gr. 72 ; Rear seats; Removing and installing bench seat/individual seats .



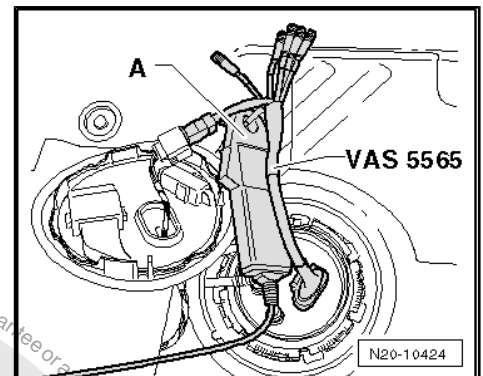
- Unclip cover -1- at retaining tabs using removal wedge - 3409- .



- Check that connector -1- is fitted securely by pulling connector without pressing catch. The connector can cause a fault if it has not been fitted correctly.
- Release and pull off connector.
- Check contacts on plug and on fuel delivery unit for damage.



- Connect test instrument adapter/DSO (5-pin) - VAS 5565- to connector and fuel delivery unit.
- Connect pick-up clamp -A- to red terminal with lettering "pick-up clamp" for test instrument adapter/DSO (5-pin) - VAS 5565- .
- Start engine and allow to idle.
- Measure current draw of fuel pump.
- Specification: max. 8 amps



Note

- ◆ *The starting current for the fuel pump can be briefly above specifications when starting the engine.*
- ◆ *If the fault in the fuel system is only sporadically evident, the check can also be carried out during a road test. A 2nd person is required to do this, however.*

If the current draw is exceeded:

- Remove fuel delivery unit
 ⇒ ["3.2 Removing and installing fuel delivery unit, fuel gauge sender", page 83](#) .
- Check filter strainer for soiling.

Check OK:

- Fuel pump is defective, renew fuel delivery unit
 ⇒ ["3.2 Removing and installing fuel delivery unit, fuel gauge sender", page 83](#) .