Workshop Manual

Golf Variant 2007 ➤
Golf Variant 2010 ➤
Jetta 2005 ➤

Auxiliary heater

Edition 03.2010

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List of Workshop Manual Repair GroupsList of Workshop Manual Repair GroupsList of Workshop Manual Repair Groups

Repair Group

82 - Auxiliary heating

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

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Contents

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82 – Auxiliary heating

1 Auxiliary heater Thermo Top V

1.1 Safety measures for working on vehicles with auxiliary heaters

- The auxiliary heater must not be in operation or switched on in areas in which there is a risk of fire or explosion.
- The auxiliary heater must not be in operation or switched on (including via a preset switch-on time) in closed rooms without an exhaust extraction system.
- When working on a fuel system, always observe applicable safety regulations and rules for cleanliness. ⇒ Rep. Gr. 20
- If fuel system components (e.g. metering pump, fuel lines, fuel gauge sender) are removed or opened, the vehicle engine must not be started.
- Before beginning repair work on the auxiliary heater:

WARNING

Danger of scalding injuries.

The cooling system is pressurised. When the engine is warm, the coolant temperature may be above 100° C.

If necessary, release pressure before carrying out repairs.

- After completing repair work on the auxiliary heater or the fuel system, check the operation of the auxiliary heater.
- After completing repairs on the auxiliary heater, carry out self-diagnosis using vehicle diagnosis, testing and information system -VAS 5051B- .

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2 Notes on general repairs on vehicles with auxiliary heaters

Note

One method of switching off the auxiliary heater is to press the ECON.

- Read self-diagnosis of auxiliary heater using vehicle diagnosis, testing and information system -VAS 5051B- .
- If parts of the fuel system were removed or renewed, ensure that all components for fuel delivery to the auxiliary heater are properly installed.
- Following repair work in the vicinity of the auxiliary heater fuel line, check:

– that the fuel line fits flush with the vehicle underbody and is protected from mechanical damage.

– that the auxiliary heater fuel line is protected from heating which might disturb operation.

– that the fuel line does not come in contact with vehicle parts which heat up.

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3 Rules for cleanliness when working on the auxiliary heater and the fuel system

- Thoroughly clean all connections and adjacent areas before disconnecting.
- Place parts that have been removed on a clean surface (use sheeting or paper, but no fluffy cloths) and cover.
- Carefully cover opened components or seal if the repair cannot be carried out immediately.
- Install clean parts only:

– Remove replacement parts from their packages only immediately before installing them.

– Do not use any parts which have not been stored in their packaging (e.g. in a tool box).

- If fuel line has been opened:

– do not work with compressed air.

– do not move vehicle.

– do not start engine.

– Do not switch auxiliary heater on.

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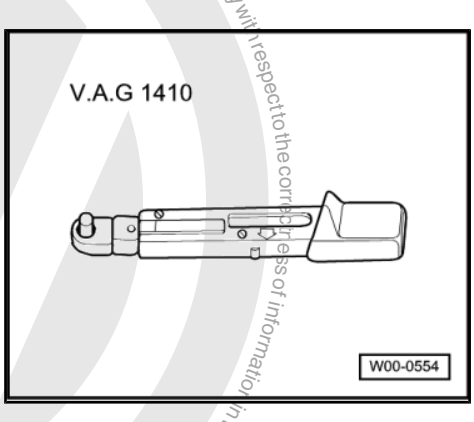
4 Repairing auxiliary heater Thermo Top V

Before beginning repair work, perform the following steps:

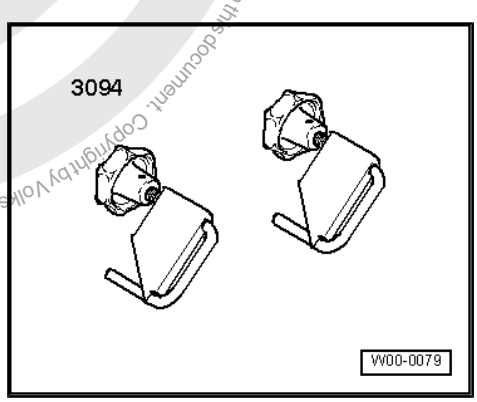
– Disconnect the battery ⇒ Rep. Gr. 27 .

Special tools and workshop equipment required

♦ Torque wrench -V.A.G 1410- (4…20 Nm)



♦ Hose clamps up to 25 mm Ø -3094-



Note

♦ *A manufacturer's plate is fitted on the auxiliary heater unit. This manufacturer's plate provides information about which version is installed in vehicle: diesel Thermo Top V ⇒ page 6 .*

♦ *The coolant circuit must be bled after it is opened ⇒ Rep. Gr. 19 .*

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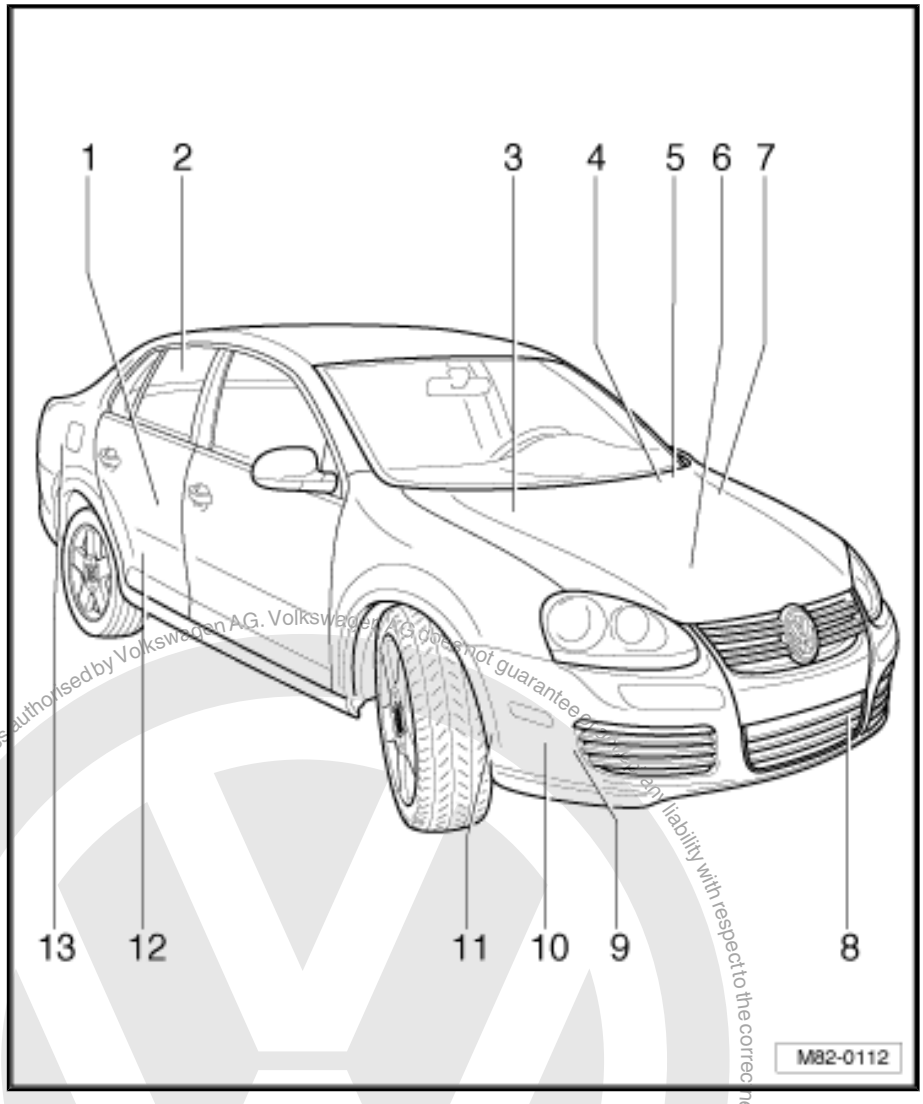

1 - Fuel gauge sender -G-

- ❑ Installation location: under rear bench seat, right.
- ❑ Removing and installing ⇒ Rep. Gr. 20

2 - Aerial for telephone, navigation system, auxiliary heating -R66-

- ❑ In rear window
- ❑ For vehicles with auxiliary heater and remote control

3 - Heater coolant shut-off valve -N279-

Note

- ❑ Secured to engine compartment bulkhead.
- ❑ Removing and installing ⇒ page 19

4 - Fresh air blower relay -J13-

- ❑ Not in vehicles with Climatronic.
- ❑ Location: relay and fuse carrier below dash panel on left
- ❑ Checking ⇒ Current flow diagrams, Electrical fault finding and Fitting locations

5 - Fuse carrier

- ❑ Location: under dash panel on left ⇒ Current flow diagrams, Electrical fault finding and Fitting locations

6 - Coolant temperature sender -G62-

- ❑ Location: on cylinder head connection

7 - Battery -A-

- ❑ Location: in engine compartment on left

8 - Ambient temperature sensor -G17-

- ❑ Checking: vehicle diagnosis, testing and information system -VAS 5051B- .
- ❑ Removing and installing ⇒ page 7

9 - Circulation pump -V55-

- ❑ Located on the auxiliary heater
- ❑ Removing and installing ⇒ page 14

10 - Auxiliary heater Thermo Top V

- ❑ With auxiliary heating control unit -J364- .
- ❑ Location: below front bumper on right.
- ❑ Removing and installing ⇒ page 9

11 - Exhaust system

- ❑ For auxiliary heating.
- ❑ Removing and installing ⇒ page 8

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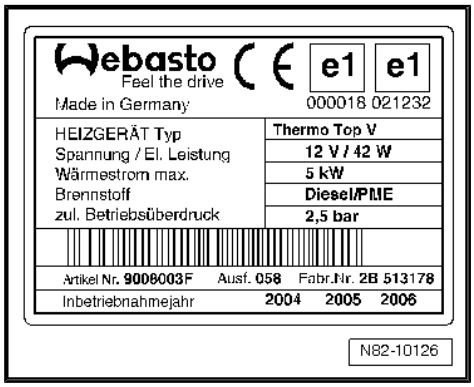
12 - Metering pump -V54-

- Location: right side of fuel tank.
- Fuel supply to auxiliary heater ⇒ page 27 .
- It is possible that the metering pump ticks audibly but still does not deliver fuel because there is air in the intake. The control unit then switches it off completely. You should therefore read the fault memory using vehicle diagnosis, testing and information system -VAS 5051B- , Self-diagnosis of Thermo Top V auxiliary heater. Erase fault memory and carry out final control diagnosis of Thermo Top V auxiliary heater.
- Removing and installing ⇒ page 29
- Testing quantity of fuel delivered ⇒ page 31

13 - Remote control receiver for auxiliary coolant heater -R149-

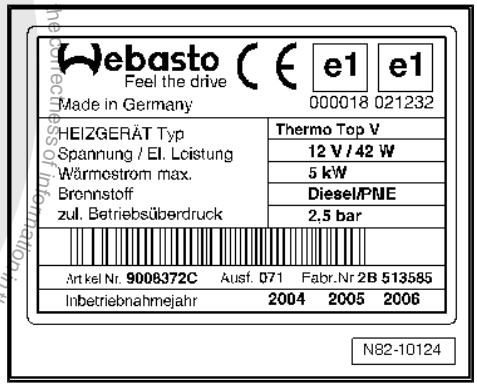
- Removing and installing ⇒ page 8

Manufacturer's plate on heater unit for Thermo Top V, diesel



Manufacturer's plate on heater unit for Thermo Top V, petrol

Manufacturer's plate on heater unit for Thermo Top V, diesel (preheater without auxiliary heating function)



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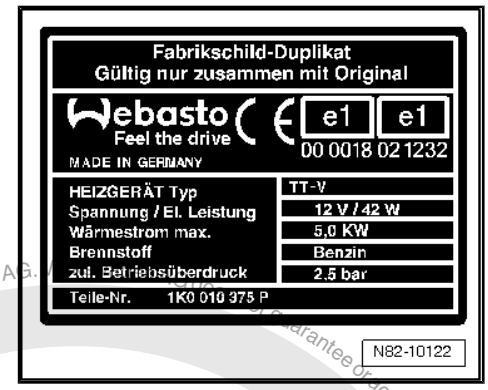
Manufacturer's plate (duplicate) on lock carrier for Thermo Top V, diesel

Manufacturer's plate (duplicate) for Thermo Top V, petrol



Manufacturer's plate (duplicate) on lock carrier for Thermo Top V, diesel (preheater without auxiliary heating function)

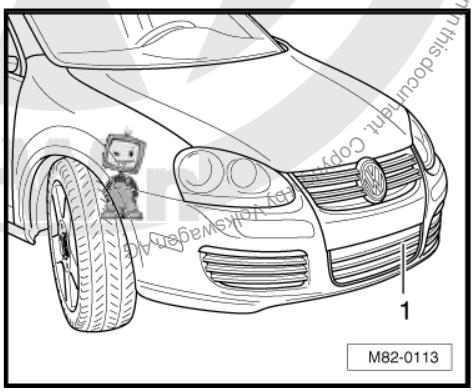
Note

- *The most important technical data are shown on upper part of manufacturer's plate.*
- *The date of first use is entered on the lower part of manufacturer's plate.*
- *The year the unit was first put into use must be entered on the "Genuine part" manufacturer's plate. The heat exchanger of the coolant heater does not need to be renewed after 10 years. Legislation in Germany dictates only that air heaters must be renewed.*

Removing and installing ambient temperature sensor -G17-

– Remove centre grille ⇒ Rep. Gr. 63 .

– Unclip ambient temperature sensor -G17- -1- and separate connector.



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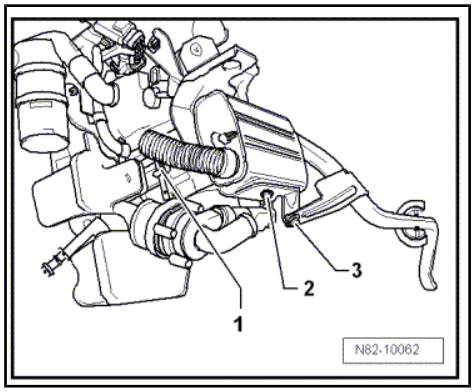
Removing and installing exhaust system



WARNING

Danger of burn injuries.

Silencer could be hot.

Before removing silencer, let it cool off.

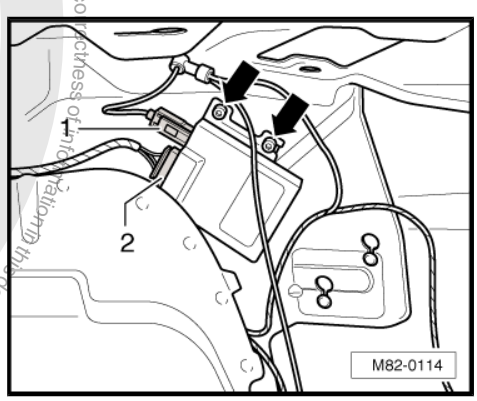
– Remove front part of front right wheel housing liner ⇒ Rep. Gr. 66 .
– Loosen securing clamp on exhaust pipe -1- and remove bolts -2- and -3- (6 Nm).
– Remove exhaust system.

Caution

The exhaust system must be routed so that wiring harness does not touch exhaust system (danger of short circuit).

4.1 Removing and installing remote control receiver for auxiliary coolant heater - R149-

4.1.1 Removing



– Remove right-hand luggage compartment trim ⇒ Rep. Gr. 70 .
– Pull off connectors -1- and -2-.
– Remove bolts -arrows- from remote control receiver for auxiliary coolant heater -R149- .
– Remove remote control receiver for auxiliary coolant heater - R149- .

4.1.2 Installing

Note

Ensure that the connectors are properly seated.

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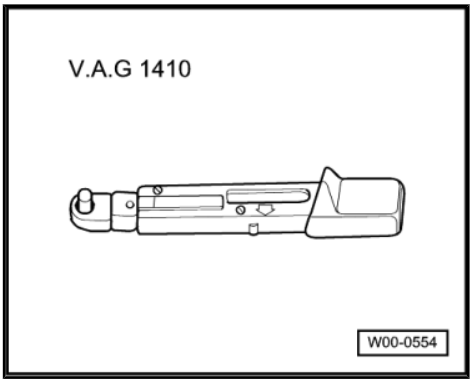
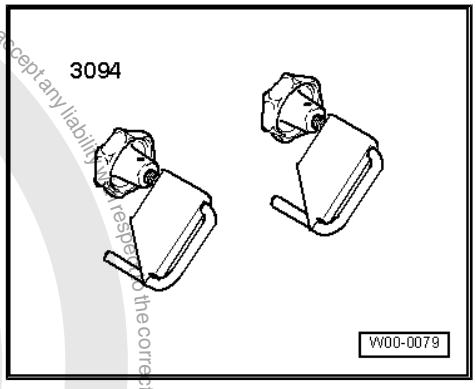
5 Removing and installing auxiliary heater Thermo Top V

Special tools and workshop equipment required

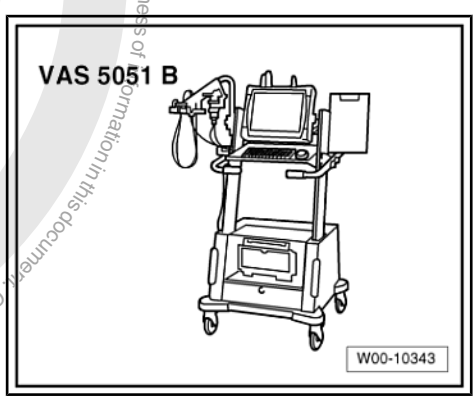
- Torque wrench -V.A.G 1410- (4…20 Nm)



- Hose clamps up to 25 mm Ø -3094-



- Vehicle diagnosis, testing and information system -VAS 5051B- or earlier model



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Note

- *A manufacturer's plate is fitted on the auxiliary heater unit. This manufacturer's plate provides information about which version is installed in vehicle, for example, diesel Thermo Top V ⇒ page 6 .*
- *The coolant circuit must be bled after it is opened ⇒ Rep. Gr. 19 .*
- *Cooling system is pressurized when engine is warm. If necessary, release pressure before carrying out repairs.*

5.1 Components of auxiliary heater Thermo Top V

1 - Auxiliary heater Thermo Top V

- ❑ With auxiliary heating control unit -J364- .
- ❑ Removing ⇒ page 10

2 - Fuel line with quick-release coupling

- ❑ Routing of fuel line ⇒ page 27 .

3 - Exhaust system

- ❑ Removing and installing ⇒ page 8

4 - Air intake silencer

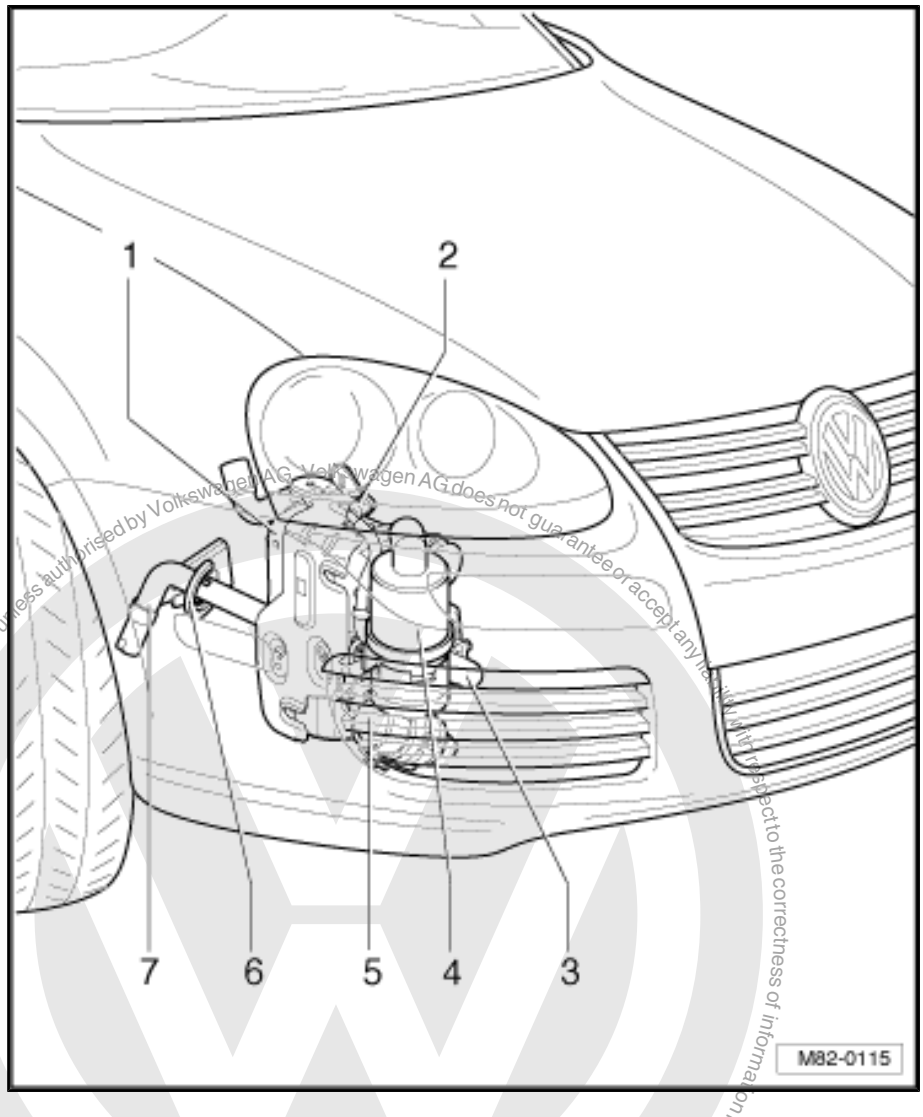
- ❑ Removing and installing ⇒ page 14

5 - Circulation pump -V55-

- ❑ Removing and installing ⇒ page 14

6 - Chafing protection

7 - End pipe



5.2 Removing auxiliary heater Thermo Top V

Note

If the Thermo Top V is to be renewed, first connect vehicle diagnosis, testing and information system -VAS 5051B- and start the "Renew heater" function under the guided functions.

Special tools and workshop equipment required

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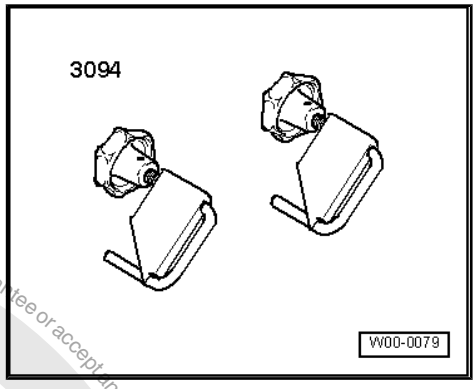
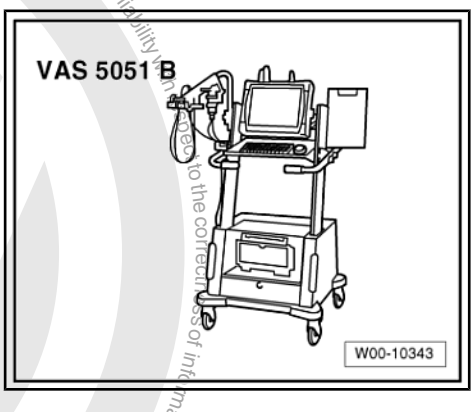
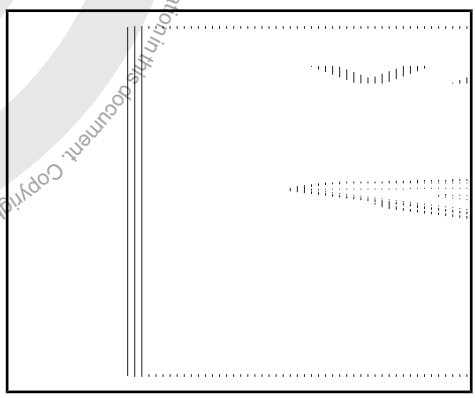
- Hose clamps up to 25 mm Ø -3094-



- Vehicle diagnosis, testing and information system -VAS 5051B-



- Drip tray for workshop hoist -VAS 6208-



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Note

- *The coolant circuit must be bled after it is opened ⇒ Rep. Gr. 19 .*
- *After the auxiliary heater has been detached, it must be secured to the body with welding wire to prevent damage to the coolant hoses.*
- *The auxiliary heater is removed and installed together with the windscreen washer reservoir.*

– Remove lower front right wheel housing liner ⇒ Rep. Gr. 66 .

WARNING

Danger of burn injuries.

Parts of the exhaust system may be hot.

Before removing exhaust system, let it cool off.

– Remove end pipe from silencer on auxiliary heater ⇒ page 15 .

WARNING

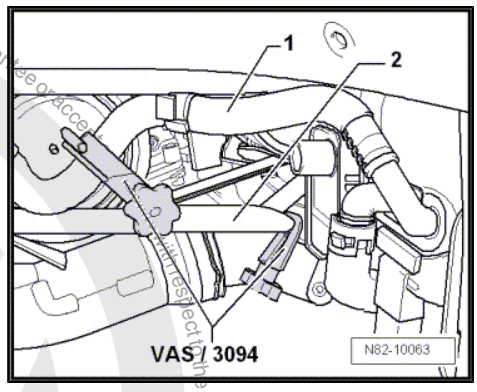
Danger of scalding injuries.

When the engine is warm, the coolant temperature may be above 100° C. The cooling system is pressurised.

If necessary, release pressure before carrying out repairs.

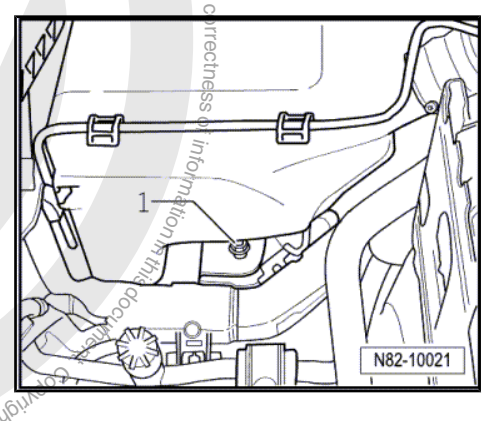
– Clamp off coolant hoses -1- and -2- using hose clamps up to Ø 25 mm -3094- and pull coolant hoses off auxiliary heater.

Do not separate coolant hoses that are connected to each other.



– Remove fuel filter with bracket ⇒ Rep. Gr. 20 .

– Remove securing bolt -1- (8 ± 0.8 Nm) below reservoir for windscreen washer system.



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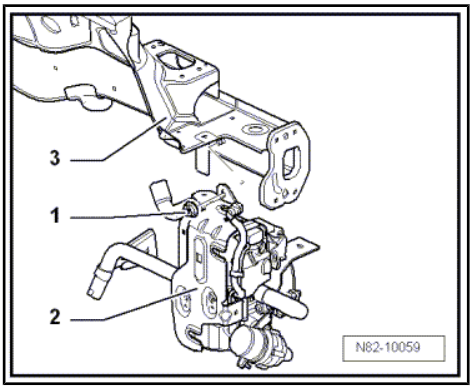
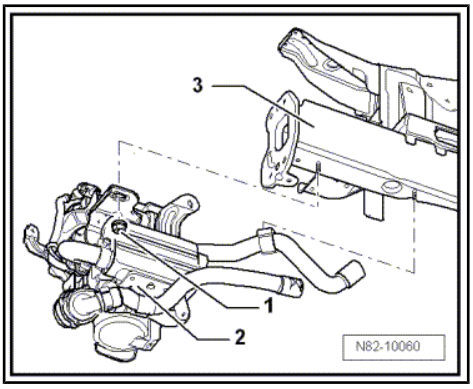
– Remove securing nut -1- (8 ± 0.8 Nm) from auxiliary heater -2- on right longitudinal member -3-.



– Remove securing nut -1- (15 ± 1.5 Nm) from auxiliary heater -2- on right longitudinal member -3-.



WARNING

Danger of fuel escaping.

Fuel system is under pressure.

Before opening system, wrap a cloth around the connection. Then release pressure by carefully loosening the connection.

– Disconnect fuel line at quick-release coupling and seal fuel lines with appropriate plugs.

Caution

Auxiliary heater control unit -J364- could get damaged.

Overvoltages can occur at the connectors.

First pull out 8-pin connector.

– Unplug the other connectors at the auxiliary heater.

– Remove all necessary connectors and hoses from windscreen washer reservoir.

– Remove auxiliary heater with windscreen washer reservoir.

5.3 Installing auxiliary heater Thermo Top V

Note

If the Thermo Top V is not to be renewed, connect vehicle diagnostic, testing and information system -VAS 5051B- and start "Release heater" function under Guided Functions.

Installation is carried out in the reverse order. When installing, note the following:

The auxiliary heater is installed together with the windscreen washer reservoir.

– After installing auxiliary heater, bleed coolant circuit ⇒ Rep. Gr. 19 .

– Then start the auxiliary heater.

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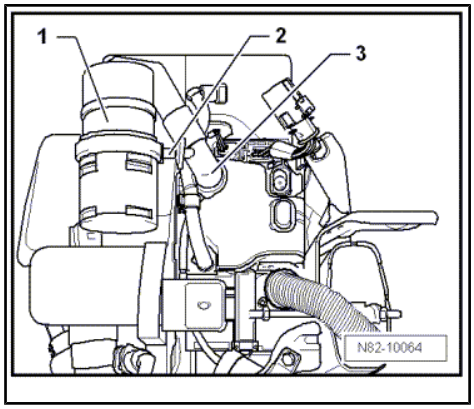
5.4 Removing ancillaries of auxiliary heater Thermo Top V

5.4.1 Removing air intake silencer

– Unclip air intake silencer -1- from bracket -2- and pull off intake pipe -3-.



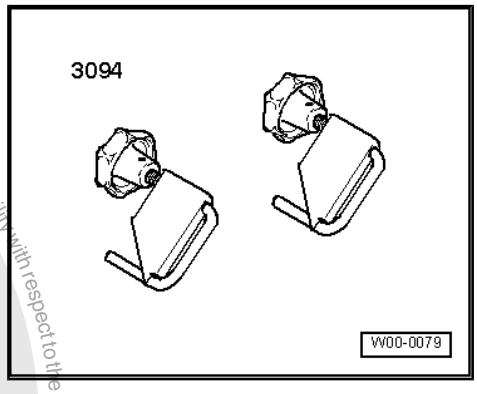
5.4.2 Installing

– Push air intake silencer onto intake pipe -3- far enough that it can be clipped into bracket -2-.

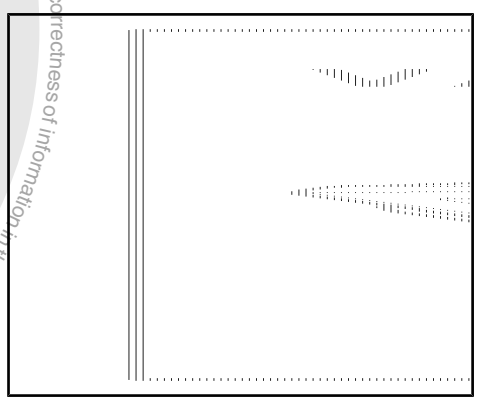
5.4.3 Removing circulation pump -V55-

Special tools and workshop equipment required

♦ Hose clamps up to 25 mm Ø -3094-



♦ Drip tray for workshop hoist -VAS 6208-



– Clamp off coolant hoses using hose clamps up to 25 mm Ø -3094- .

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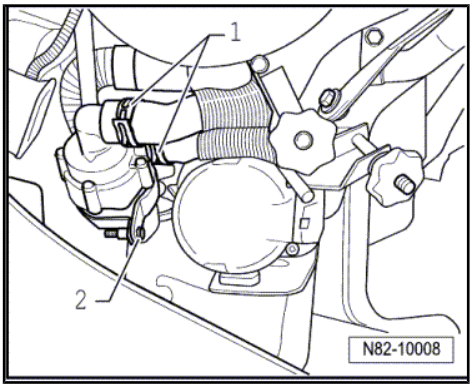
– Place drip tray for workshop hoist -VAS 6208- under vehicle.
– Loosen clip -1-.



WARNING

Danger of scalding injuries.

When the engine is warm, the coolant temperature may be above 100° C. The cooling system is pressurised.

If necessary, release pressure before carrying out repairs.

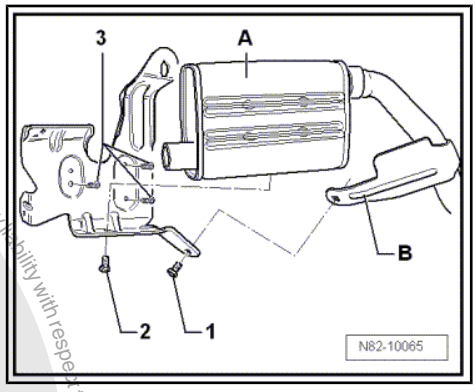
– Pull coolant hoses off circulation pump -V55- .
– Pull connector off circulation pump -V55- .
– Remove bolt -2- and remove circulation pump -V55- .

5.4.4 Installing

Installation is carried out in the reverse order. When installing, note the following:

– After installing circulation pump -V55- , bleed coolant circuit ⇒ Rep. Gr. 19 .

5.4.5 Removing and installing silencer with bracket



WARNING

Danger of burn injuries.

Silencer could be hot.

Before removing silencer, let it cool off.

– Loosen pipe connections from silencer -A-.
– Remove bolt -1- from support -B- and lay exhaust pipe to side.
– Remove bolt -2- from silencer -A-.
– Remove silencer -A-.
– Remove bolts -3- from bracket.
– Separate bracket from centring tabs and remove.
– Install in reverse order.

Note

When installing bracket, observe centring tabs.

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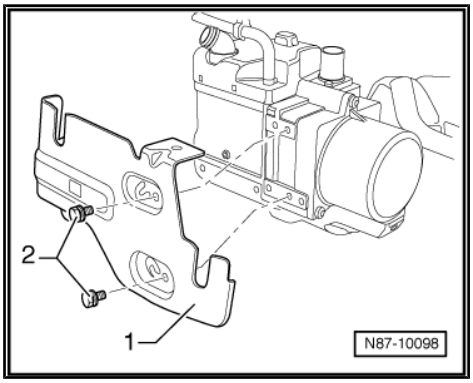
5.4.6 Removing and installing bracket for auxiliary heater

– Remove bolts -2- and remove bracket -1-.

– Install in reverse order.



Note

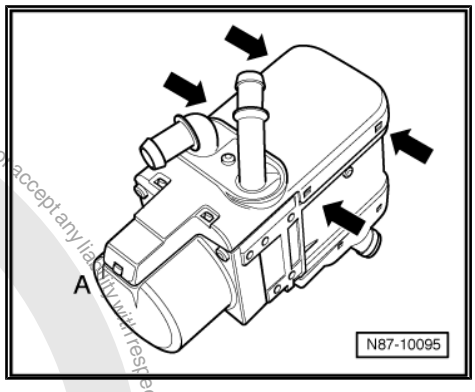
When installing bracket -1-, observe centring tabs.

5.4.7 Removing and installing cover

– Mark fitting position of coolant connections and remove them (bolt 4 Nm).

– Unclip cover at -arrows- and pull cover over locking lugs -A-.

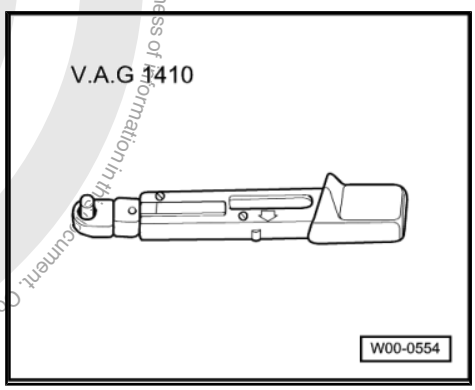
– Install in reverse order.



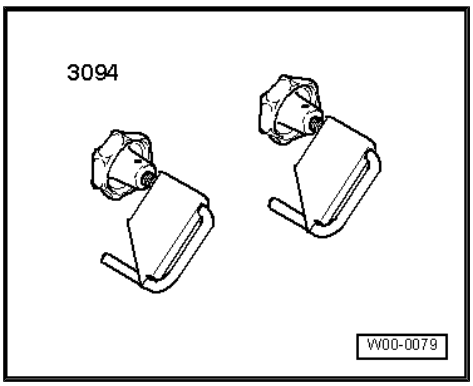
5.5 Dismantling and assembling auxiliary heater Thermo Top V

Special tools and workshop equipment required

♦ Torque wrench -V.A.G 1410- (4…20 Nm)



♦ Hose clamps up to 25 mm Ø -3094-



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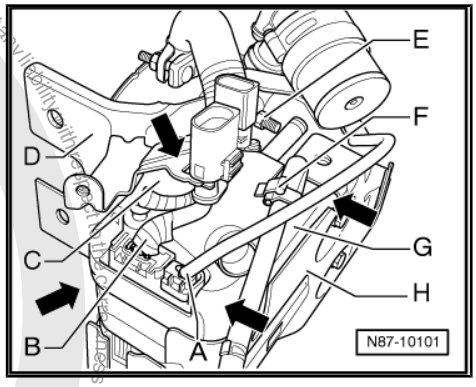
– Remove auxiliary heater Thermo Top V ⇒ page 10 .
– Loosen securing clamp -E- and remove silencer with bracket -D- ⇒ page 15 .
– Remove bracket -H- ⇒ page 16 .
– Pull off connectors -A-, -B- and -C-.



WARNING

Danger of fuel escaping.

Fuel system is under pressure.

Before opening system, wrap a cloth around the connection. Then release pressure by carefully loosening the connection.

– Open O-type clip and pull fuel line -F- off connection. Renew O-type clip with screw-type clip.
– Seal fuel lines using suitable plugs.
– Unclip cover -G- -arrows-.

5.6 Inner components of auxiliary heater

1 - Cover for auxiliary heating control unit -J364- .
- ❑ Removing and installing ⇒ page 16

2 - Temperature sensor -G18-
- ❑ Removing and installing ⇒ page 19

3 - Overheating sensor -G189-
- ❑ Removing and installing ⇒ page 19

4 - Combustion tube

Note

- ❑ Removing and installing ⇒ page 16

5 - Heat exchanger
- ❑ Removing and installing ⇒ page 16

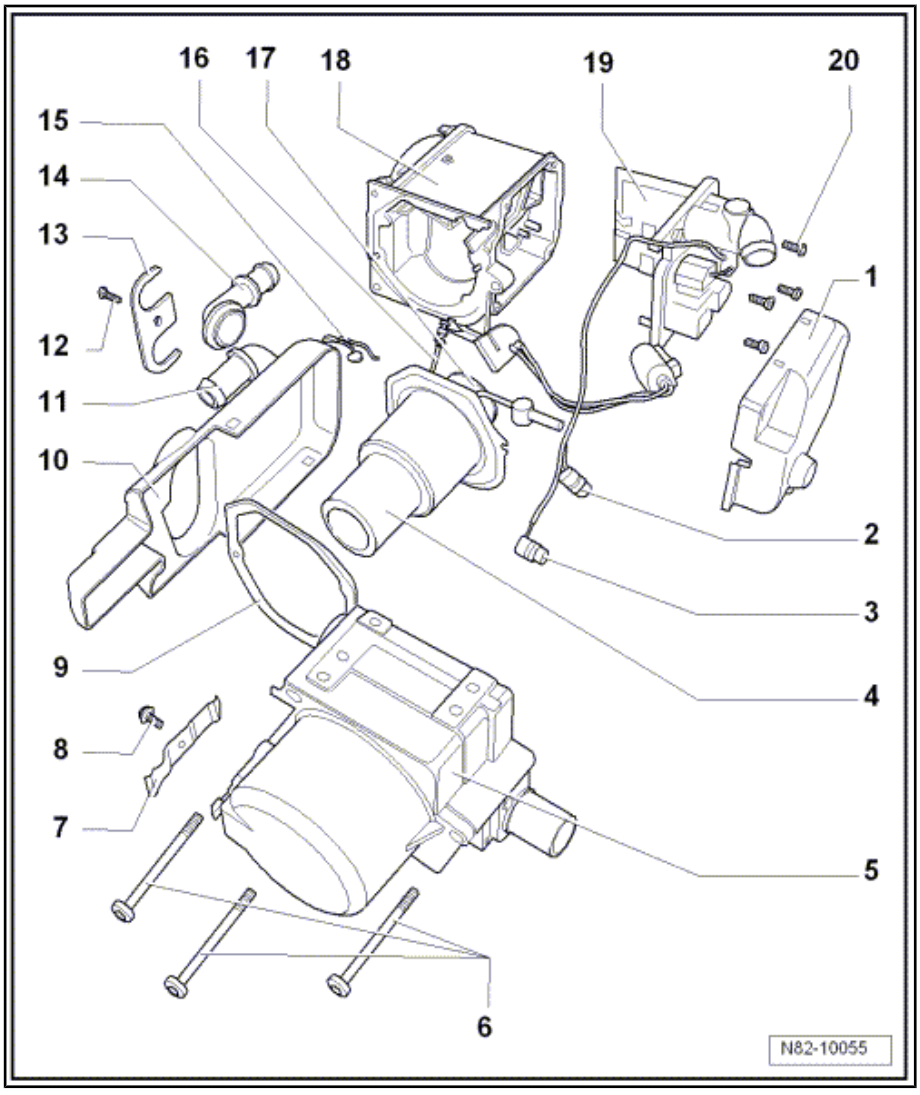
6 - 7 Nm
- ❑ Qty. 3

7 - Retaining spring

8 - 4 Nm

9 - Seal
- ❑ Must be renewed after every opening.

10 - Cover
- ❑ Removing and installing ⇒ page 16



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11 - Coolant connection

- ❑ Mark fitting position.

12 - 4 Nm

13 - Retaining plate

14 - Coolant connection

- ❑ Mark fitting position.

15 - Retaining clip

16 - Glow plug with flame monitoring -Q8-

- ❑ Ensure correct seating.
- ❑ Removing and installing ⇒ page 19 is possible only with petrol version.

Note

17 - Burner

- ❑ Removing and installing ⇒ page 16

18 - Combustion air blower -V6-

- ❑ The combustion air blower -V6- and housing are one component and cannot be dismantled.
- ❑ Removing and installing ⇒ page 16

19 - Auxiliary heater control unit -J364-

- ❑ Removing and installing ⇒ page 18

20 - 4 Nm

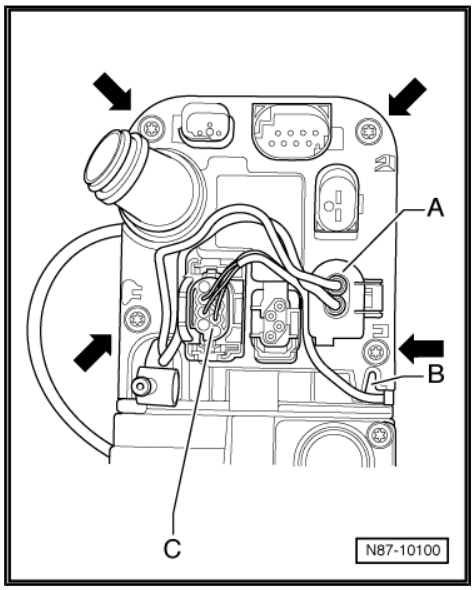
- ❑ Qty. 4

5.6.1 Removing and installing auxiliary heater control unit -J364-

– Remove cover for auxiliary heating control unit -J364- .

– Dismantling and assembling auxiliary heater Thermo Top V ⇒ page 16 .

– Pull off connectors -A- and -C- and remove bolts -arrows-.



Note

- ♦ *During assembly, wiring harness for connector -C- must lie in notch -B-.*
- ♦ *Ensure that side cover for wiring harness is properly seated.*

5.6.2 Removing and installing glow plug with flame monitoring -Q8-

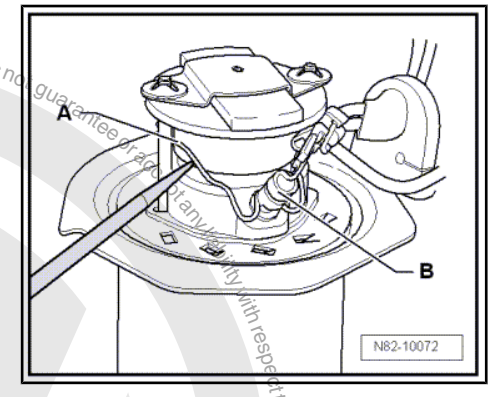
Note

With the diesel version, a heating element for preheating fuel -Z66- is permanently installed on the combustion tube. The wires are connected to wires of glow plug with flame monitoring -Q8- . With this version, the entire combustion tube must be renewed if the glow plug with flame monitoring -Q8- is defective.

– Dismantling and assembling auxiliary heater Thermo Top V ⇒ page 16 .

Note

The figure shows the diesel version with heating element for preheating fuel -Z66- on combustion tube.



– Using a suitable screwdriver, raise retaining clip -A- on both sides and remove glow plug with flame monitoring -Q8- .

Note

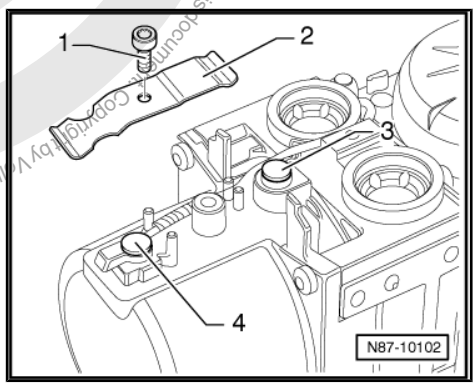
- *During assembly, retaining clip must seat in groove.*
- *Ensure proper seating of glow plug with flame monitoring -Q8- -B-.*

5.6.3 Removing and installing temperature sensor -G18- and overheating sensor -G189-

– Dismantling and assembling auxiliary heater Thermo Top V ⇒ page 16 .

– Remove bolt -1- and remove retaining spring -2-.

– Pull out temperature sensor -G18- -3-and overheating sensor -G189- -4- using needle-nose pliers.



Note

- *When assembling, ensure that retaining spring is in proper position -2-.*
- *Sensors cannot be renewed separately.*

5.6.4 Removing and installing heater cooler shut-off valve -N279-

Special tools and workshop equipment required

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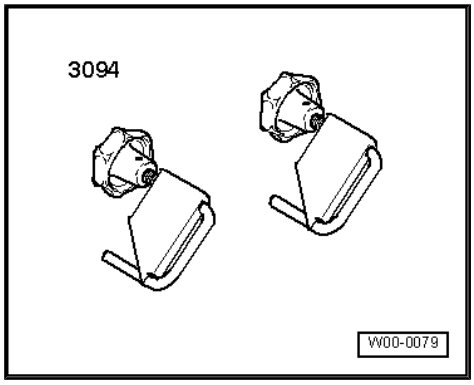
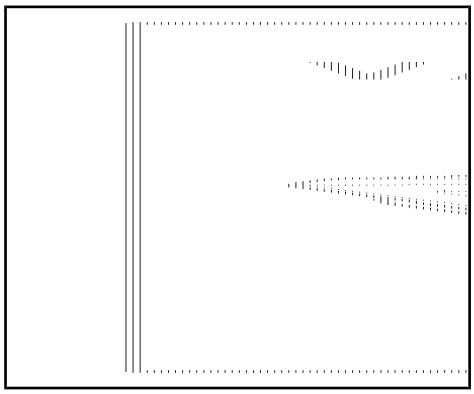
♦ Hose clamps up to 25 mm Ø -3094-

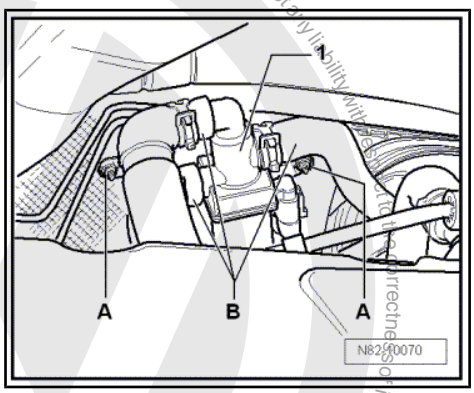


♦ Drip tray for workshop hoist -VAS 6208-



Removing

– Remove engine cover.
– Pull out noise insulation and remove intake hose to turbo-charger ⇒ Rep. Gr. 21 .
– Place drip tray for workshop hoist -VAS 6208- under vehicle.
– Remove securing nuts (10 N) -A- from heater coolant shut-off valve -N279- -1-.
– Clamp off coolant hoses -B- using hose clamps up to Ø 25 mm -3094- .



WARNING

Danger of scalding injuries.

The cooling system is pressurised. When the engine is warm, the coolant temperature may be above 100° C.

If necessary, release pressure before carrying out repairs.

– Pull coolant hoses -B- off valve.
– Unclip connecting wire from retainer and separate connector.

Installing

– Install in reverse order.
– Tighten securing nuts -A- on valve -1- to 10 Nm torque.

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6 Connecting auxiliary heater Thermo Top V to coolant circuit

WARNING

Danger of scalding injuries.

The cooling system is pressurised. When the engine is warm, the coolant temperature may be above 100° C.

If necessary, release pressure before carrying out repairs.

Note

The coolant circuit must be free of air for the auxiliary heater to heat properly.

6.1 Connection diagram for coolant hoses in vehicles with auxiliary heating, engine codes BKC and BLS

1 - Coolant expansion tank

2 - Heat exchanger for heater

3 - Non-return valve

4 - Heater coolant shut-off valve -N279-

- Location: secured to engine compartment bulkhead ⇒ page 19

5 - Cylinder head and cylinder block

6 - ATF cooler

- Only vehicles with automatic transmission

7 - Engine oil cooler

8 - Radiator

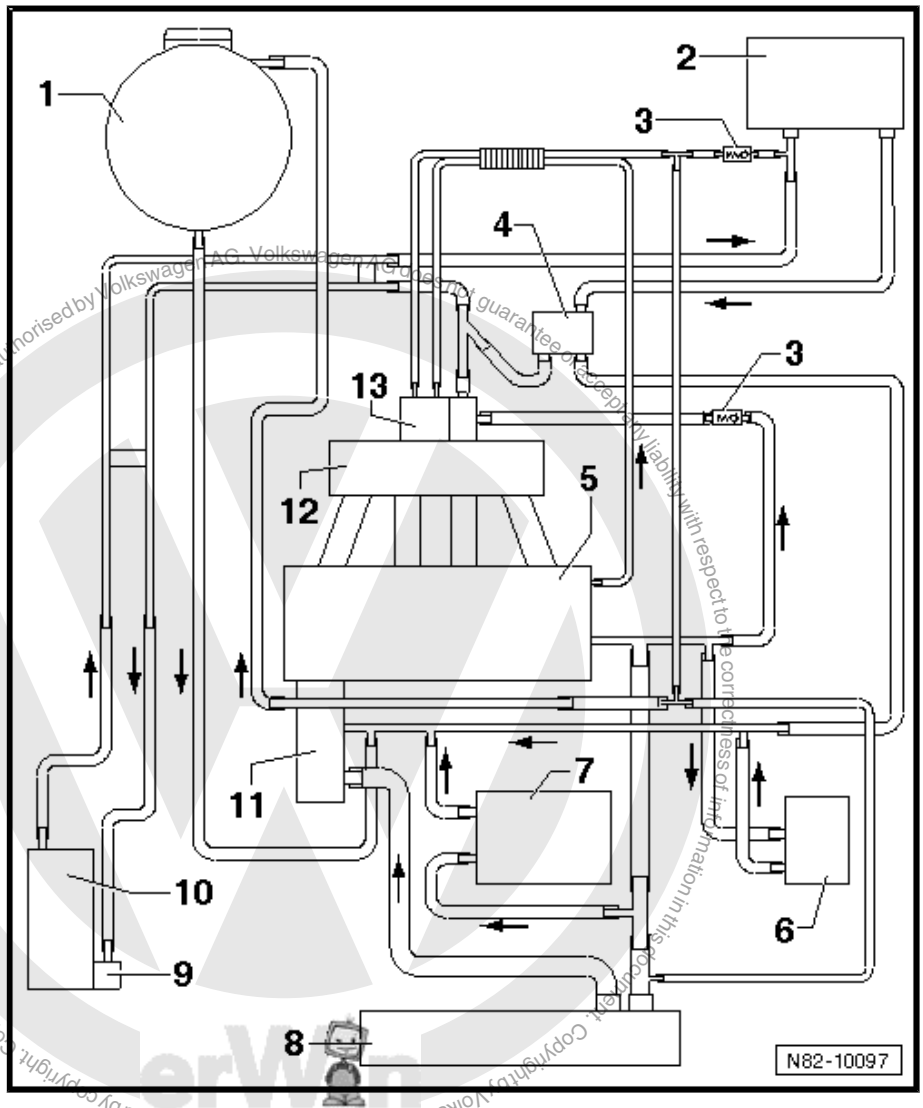
9 - Circulation pump -V55-

10 - Auxiliary heater Thermo Top V

11 - Water pump

12 - Intake manifold

13 - Exhaust gas recirculation (water cooled)



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6.2 Connection diagram for coolant hoses in vehicles with auxiliary heating, engine codes AZV, BKD and BMM

1 - Coolant expansion tank

2 - Heat exchanger for heater

3 - Non-return valve

4 - Heater coolant shut-off valve -N279-

- Location: secured to engine compartment bulkhead ⇒ page 19

5 - Radiator

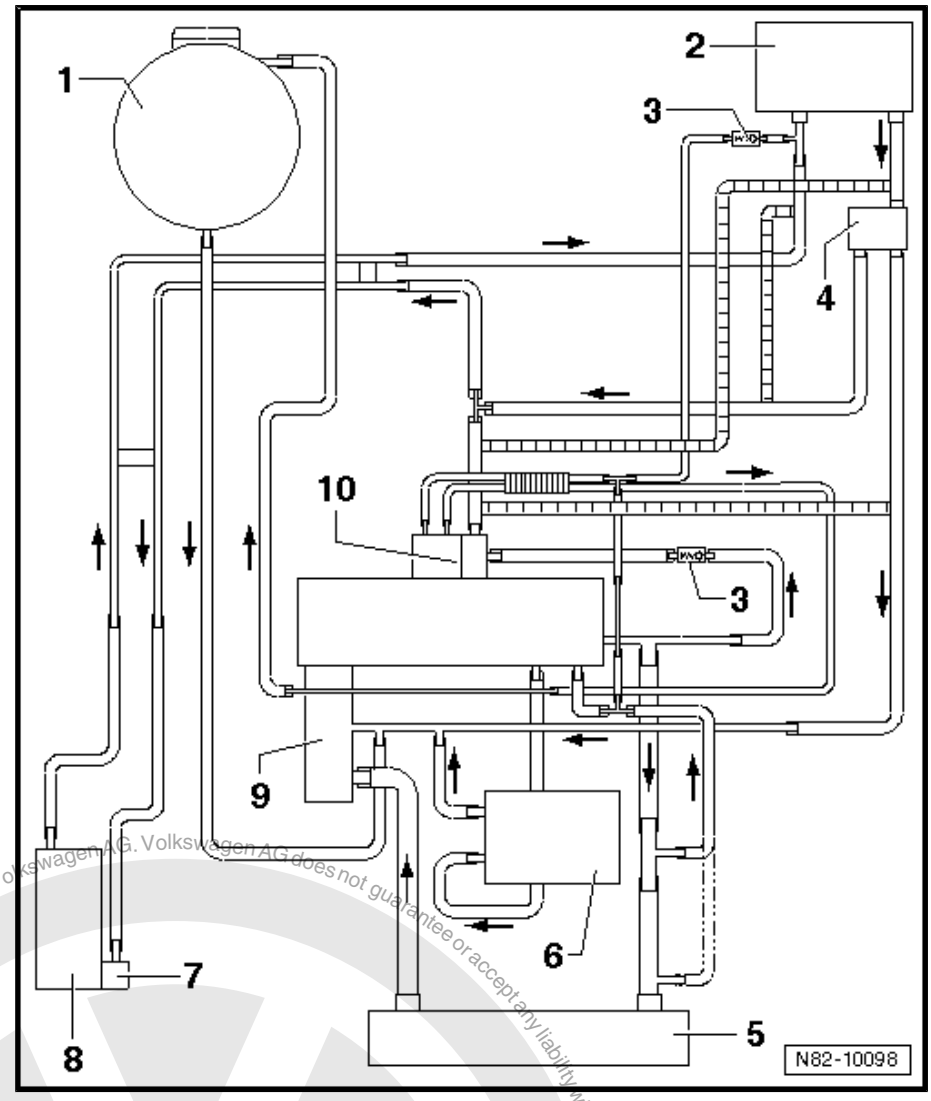
6 - Engine oil cooler

7 - Circulation pump -V55-

8 - Auxiliary heater Thermo Top V

9 - Water pump

10 - Exhaust gas recirculation (water cooled)



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6.3 Connection diagram for coolant hoses in vehicles with auxiliary heating, engine code BLF

1 - Coolant expansion tank

2 - Non-return valve

3 - Restrictor

4 - Heat exchanger for heater

5 - Heater coolant shut-off valve -N279-

- Location: secured to engine compartment bulkhead ⇒ page 19

6 - Exhaust gas recirculation (water cooled)

7 - Intake manifold

8 - Thermostat housing

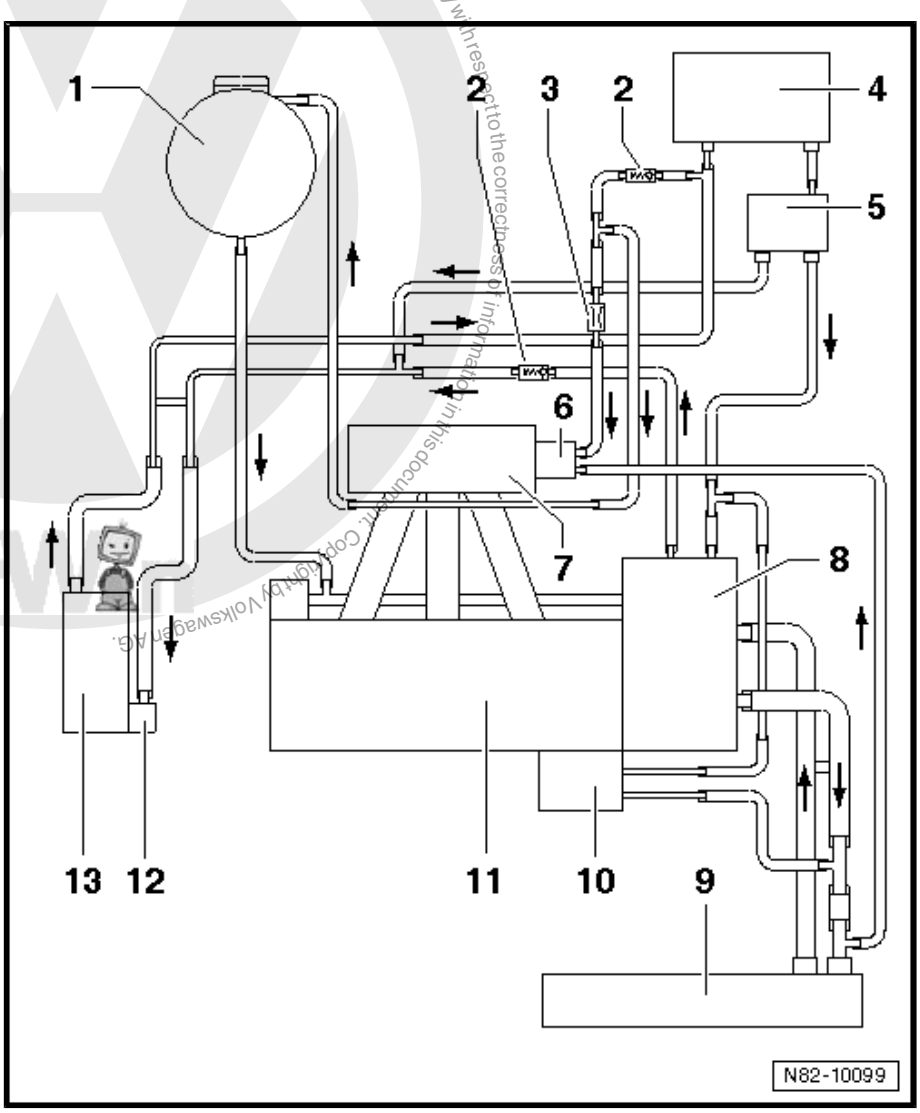
9 - Radiator

10 - Engine oil cooler

11 - Cylinder head and cylinder block

12 - Circulation pump -V55-

13 - Auxiliary heater Thermo Top V



Golf Variant 2007 ➢ , Golf Variant 2010 ➢ , Jetta 2005 ➢ Auxiliary heater - Edition 03.2010
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6.4 Connection diagram for coolant hoses in vehicles with auxiliary heating, engine codes BSE and BSF

1 - Coolant expansion tank

2 - Non-return valve

3 - Heat exchanger for heater

4 - Heater coolant shut-off valve -N279-

◆ Location: secured to engine compartment bulkhead
⇒ page 19

5 - Intake manifold

6 - Cylinder head and cylinder block

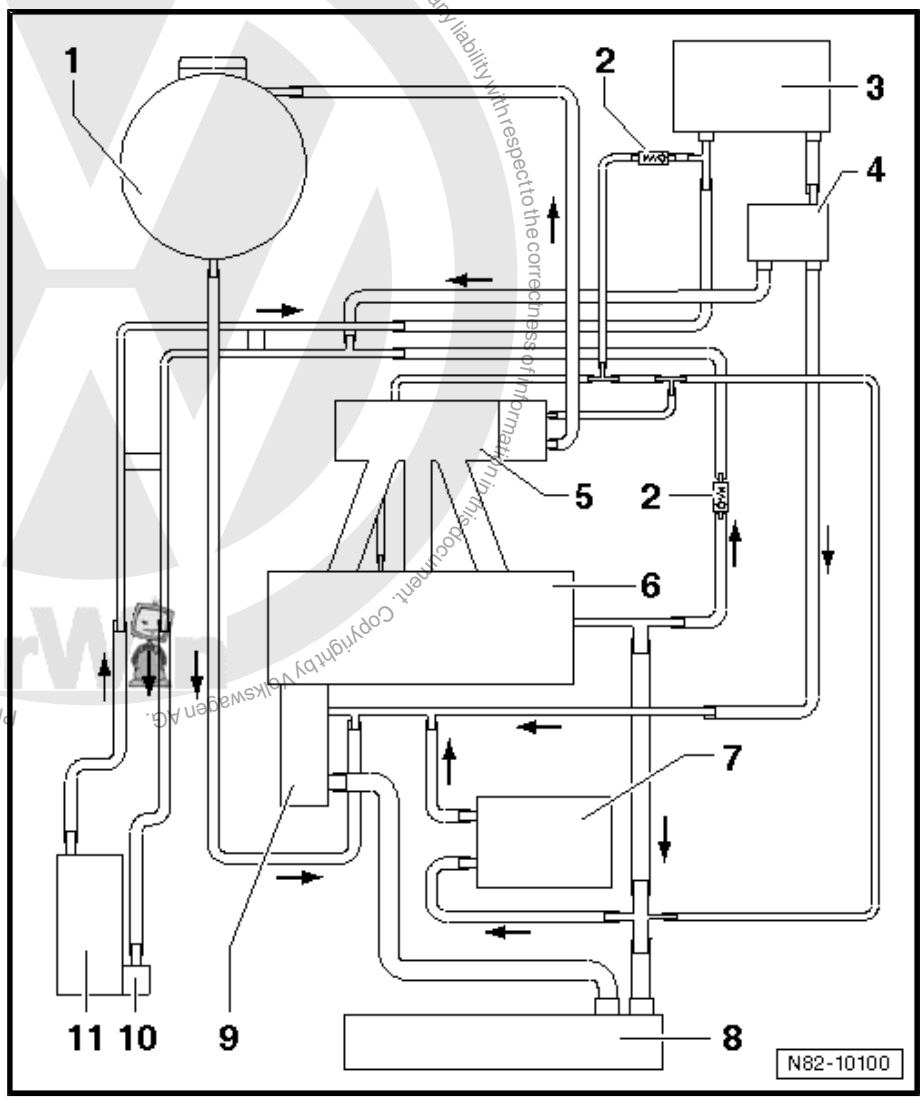
7 - Engine oil cooler

8 - Radiator

9 - Water pump

10 - Circulation pump -V55-

11 - Auxiliary heater Thermo Top V



6.5 Connection diagram for coolant hoses in vehicles with auxiliary heating, engine codes AXX and BPY

1 - Coolant expansion tank

2 - Heat exchanger for heater

3 - Cylinder head and cylinder block

4 - Coolant connection

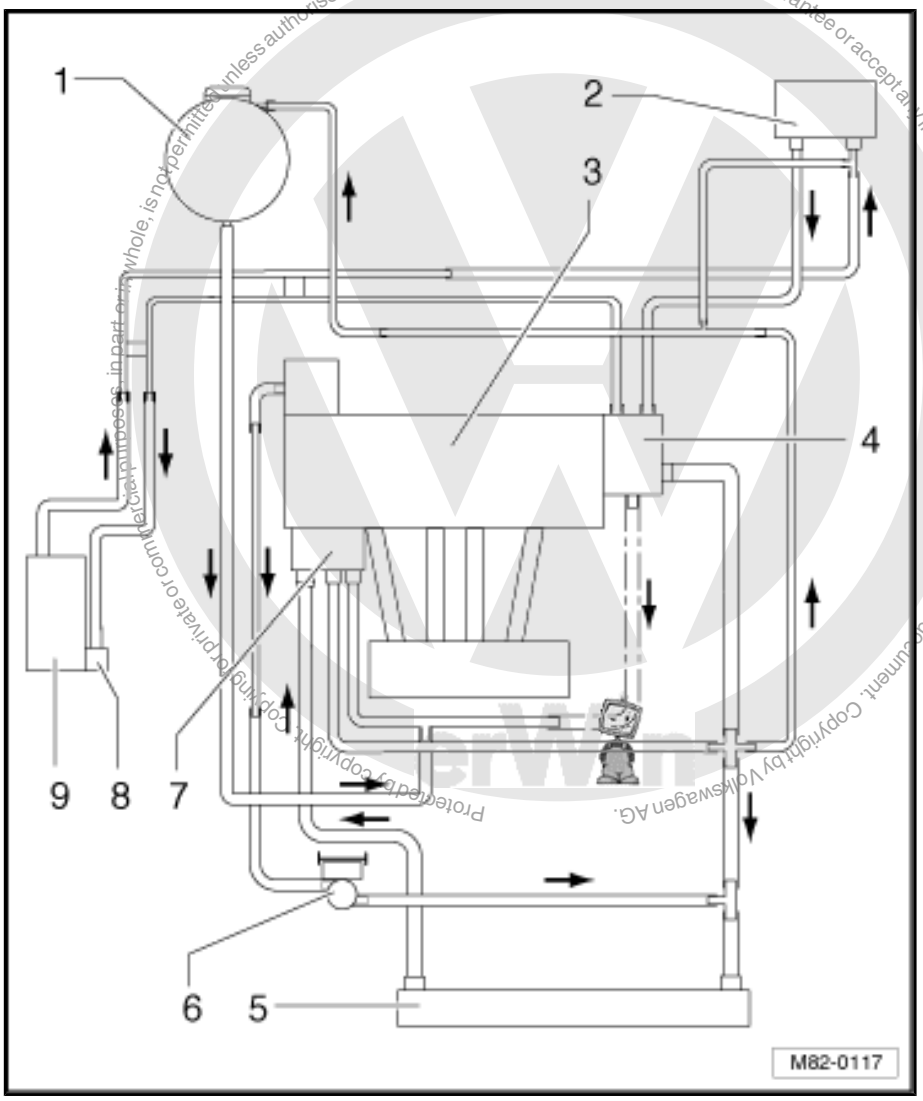
5 - Radiator

6 - Continued coolant circulation pump -V51-

7 - Thermostat housing

8 - Circulation pump -V55-

9 - Auxiliary heater Thermo Top V



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6.6 Connection diagram for coolant hoses in vehicles with auxiliary heater, engine codes BLR and BLY

1 - Coolant expansion tank

2 - Heat exchanger for heater

3 - Non-return valve

4 - Heater coolant shut-off valve -N279-

- Location: secured to engine compartment bulkhead ⇒ page 19

5 - Intake manifold

6 - Engine oil cooler

7 - Radiator

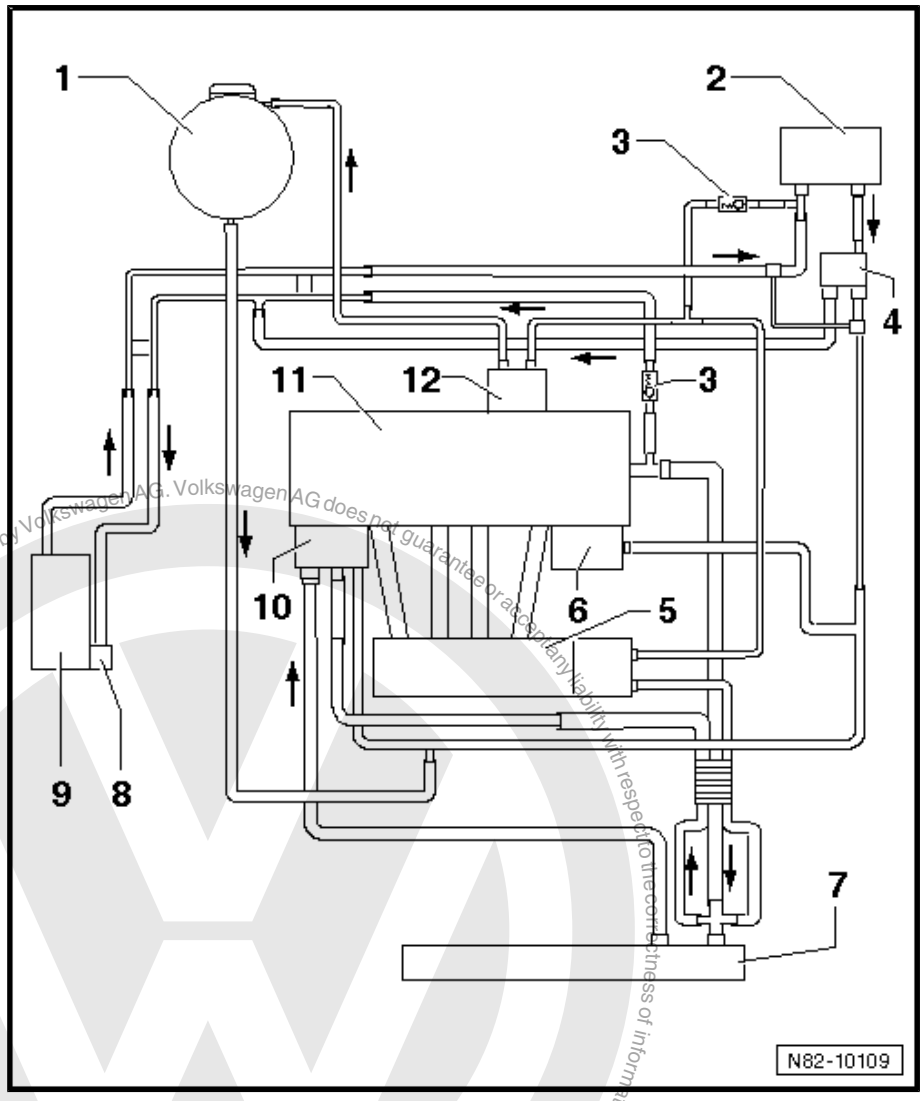
8 - Circulation pump -V55-

9 - Auxiliary heater Thermo Top V

10 - Thermostat housing

11 - Cylinder head and cylinder block

12 - Exhaust gas recirculation (water cooled)



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7 Fuel supply for auxiliary heater Thermo Top V

Before beginning repair work, perform the following steps:

– Disconnect the battery ⇒ Rep. Gr. 27 .

7.1 Rules for cleanliness

When working on the fuel supply/injection system, carefully follow the “5 rules” below:

- Thoroughly clean all connections and adjacent areas before disconnecting.
- Place parts that have been removed on a clean surface and cover. Do not use fluffy cloths!
- Carefully cover or seal opened components if the repair cannot be carried out immediately.
- Install clean parts only; remove replacement parts from their packages only immediately before installing them. Do not use any parts which have not been stored in their packaging (e.g. in a tool box).
- Fuel hoses and pipes may be shortened only with a clean sharp knife. Cutting points must not be soiled or deformed. Cutting points and surfaces must be free of burrs.

7.2 Fuel feed to Thermo Top V

Note

- *Fuel lines are secured with O-type clips. These O-type clips must always be replaced with screw-type clips.*
- *To start the auxiliary coolant heater, the following conditions are required: ambient temperature sensor -G17- is pulled off and the coolant temperature is below 50° C.*
- *If the tank was empty, there may be air in the fuel line for the auxiliary heater. To get air out of fuel line, start auxiliary coolant heater repeatedly until it does not go out by itself.*
- *Observe the rules for cleanliness when doing all work on the fuel supply system ⇒ page 27 .*

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1 - Quick-release coupling of fuel line

- ❑ For auxiliary coolant heater Thermo Top V on inner side of wing.

2 - Quick-release coupling of fuel line

- ❑ On auxiliary coolant heater.

3 - Auxiliary heater Thermo Top V

4 - Quick-release coupling of fuel line

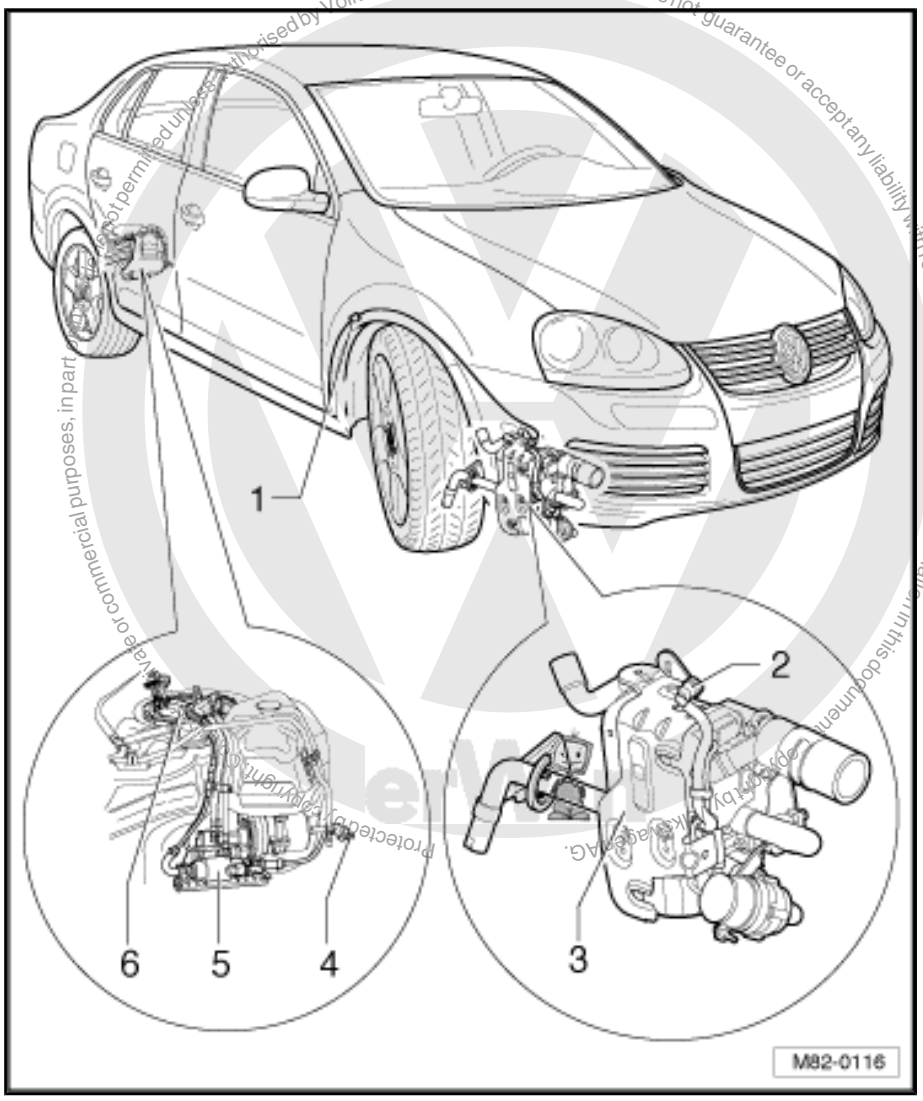
- ❑ For auxiliary coolant heating Thermo Top V on metering pump -V54- .

5 - Metering pump -V54-

- ❑ Metering pump -V54- is located on the fuel tank on the right-hand side.
- ❑ Removing and installing ⇒ page 29
- ❑ Testing quantity of fuel delivered ⇒ page 31 .

6 - Fuel gauge sender -G-

- ❑ Fuel gauge sender -G- is located on right side under bench seat.
- ❑ Removing and installing ⇒ Rep. Gr. 20



7.2.1 Fuel feed to Thermo Top V

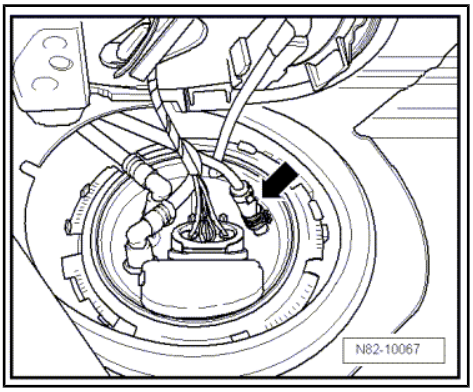
WARNING

Danger of fuel escaping.

Fuel system is under pressure.

Before opening system, wrap a cloth around the connection. Then release pressure by carefully loosening the connection.

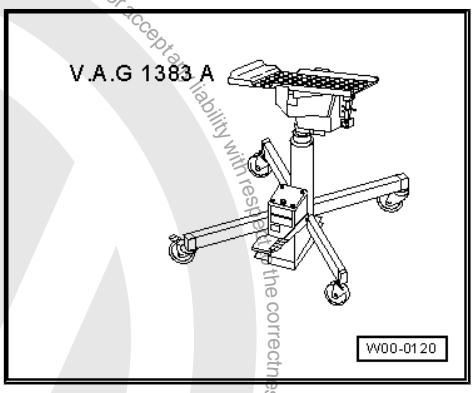
Fuel feed to auxiliary heater is achieved via connection on fuel gauge sender -G- -arrow-. Fuel gauge sender -G- is located on right side under bench seat.



7.3 Removing and installing metering pump -V54-

Special tools and workshop equipment required

- Engine and gearbox lifter -V.A.G 1383 A-



7.3.1 Removing

Note

- *Metering pump -V54- and the associated components are one spare part.*
- *To remove metering pump -V54- , the fuel tank must be lowered a little using engine and gearbox lifter -V.A.G 1383 A- . Detaching fuel tank ⇒ Rep. Gr. 20 .*

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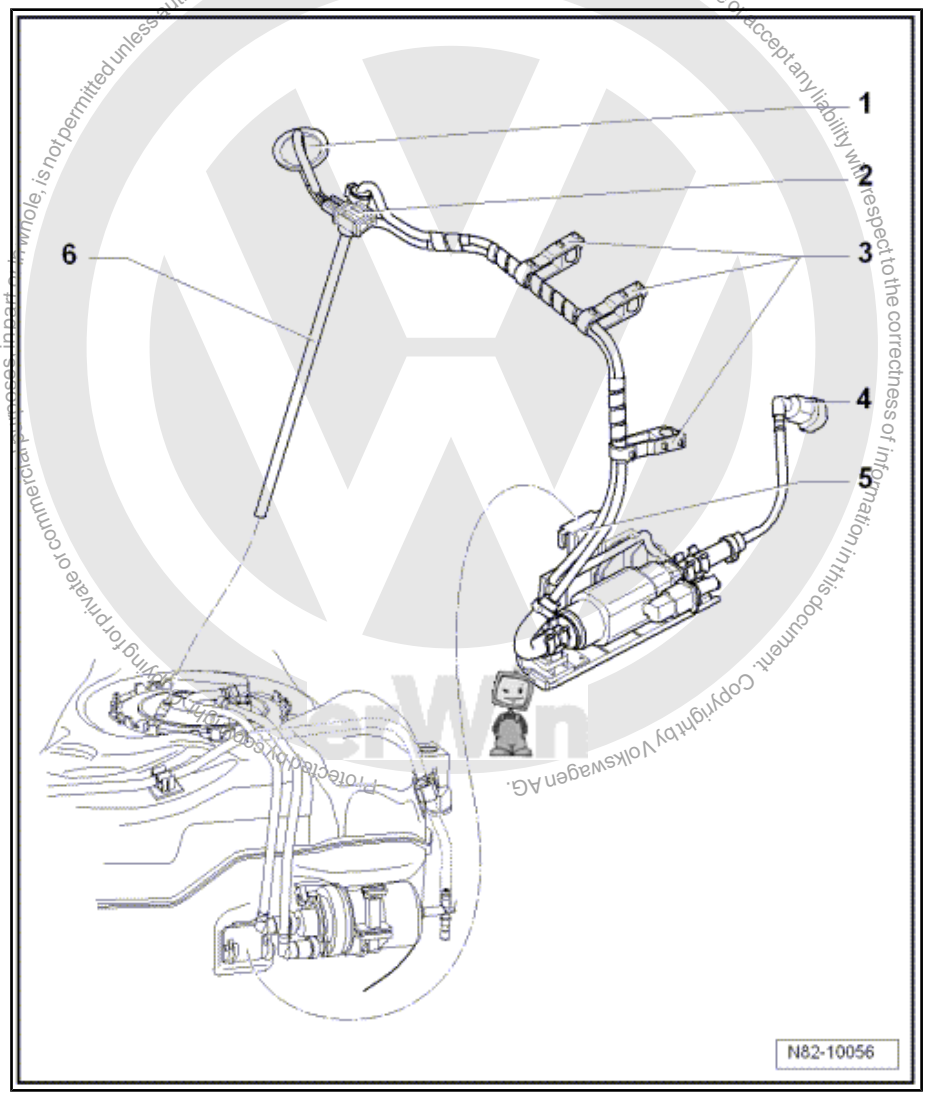

– Separate connector -2- from metering pump -V54- .

WARNING

Danger of fuel escaping.

Fuel system is under pressure.

Before opening system, wrap a cloth around the connection. Then release pressure by carefully loosening the connection.

– Separate fuel line at quick release coupling -4-.
– Remove lines from wire retainers -3-.
– Unhook bracket for metering pump -V54- on fuel tank -5-.
– Loosen lower hose clip on fuel pipe sealing sleeve -6- on fuel gauge sender -G- and pull fuel pipe out of connecting piece.

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7.3.2 Installing

Note

- *Transport caps must be removed before installation.*
- *Renew O-type clip using screw-type clip.*

Insert fuel pipe -6- in connecting piece for fuel gauge sender -G- until the sealing sleeve does not go any further over the connecting piece.

Ensure proper installation position of metering pump -V54- .

– Fit bracket for metering pump -V54- on fuel tank.

– Reconnect fuel hose at quick-release coupling -4-.

– Refit connector -2-.

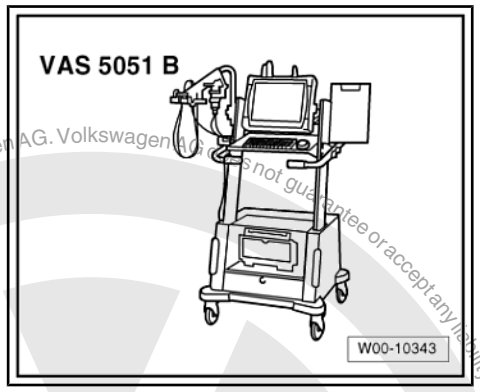
Be sure that grommet seals -1-.

– Raise and secure fuel tank ⇒ Rep. Gr. 20 .

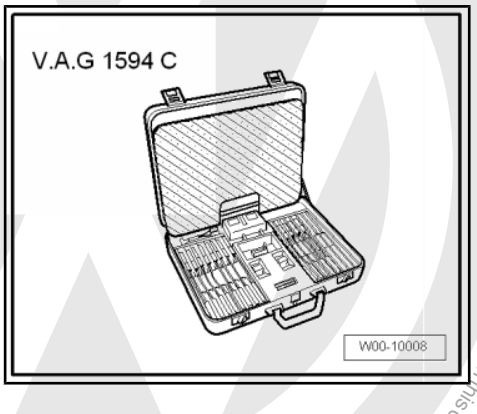
7.4 Testing quantity of fuel delivered

Special tools and workshop equipment required

- Vehicle diagnosis, testing and information system -VAS 5051B- or earlier model.



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



- Current flow diagram
- Commercially available measuring glass (0 to 50 ml)
- Fuel hose, length approx. 300 mm

7.4.1 Test prerequisites:

- Resistance of metering pump -V54- 5.2 +/- 5%Ω
- Voltage at metering pump -V54- 9.5 to 16.5 Volt.

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- No fault stored in fault memory.
- Fuel lines are not damaged or leaking.
- Ambient temperature approx. 20 °C
- Fuel tank sufficiently filled (fuel gauge on dash panel insert not in red area).

7.4.2 Checking:

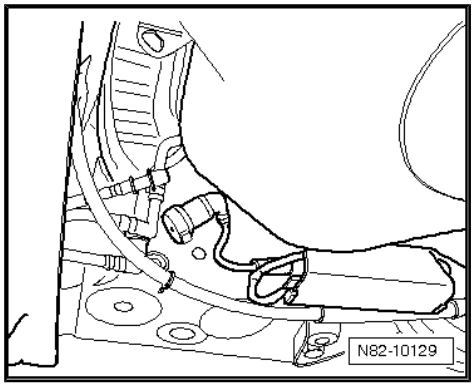
WARNING

Danger of fuel escaping.

Fuel system is under pressure.

Before opening system, wrap a cloth around the connection. Then release pressure by carefully loosening the connection.

– Disconnect connector on fuel line for metering pump -V54- and seal using suitable means.



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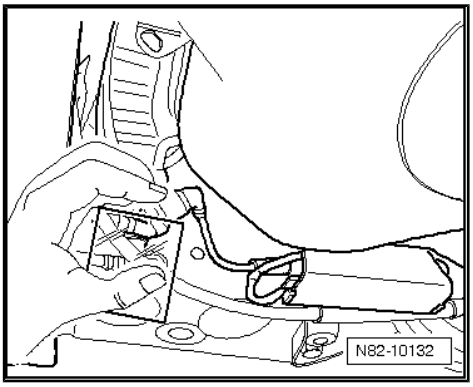

– Hold measuring glass at same height as auxiliary coolant heater.
– Using vehicle diagnosis, testing and information system -VAS 5051B- , open guided function “Check quantity of fuel delivered” (open fuel line for metering pump -V54-) and start.

After approx. 30 seconds, the fuel line is filled and bled.

– Seal fuel line.
– Empty measuring glass.
– Hold measuring glass at same height as auxiliary coolant heater.
– Using vehicle diagnosis, testing and information system -VAS 5051B- , open guided function “Check quantity of fuel delivered” (open fuel line for metering pump -V54-) and start.

Fuel delivery finishes after approx. 120 seconds.

– Connect connector to fuel line.
– Read measuring glass. Quantity delivered for petrol and diesel: 22 to 28 ml
– If quantity delivered is not within specifications, renew metering pump -V54- .

Note

- *If the ambient temperature is above 20 °C, fuel vaporisation may lead to incorrect measurements.*
- *No bubbles are to be delivered.*

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8 Regulation of auxiliary heater Thermo Top V

The auxiliary heater is intended to heat coolant.

Various operating modes can be set depending on heat required in heating circuit:

Note

One method of switching off the auxiliary heater is to press the ECON button.

8.1 Functional description of auxiliary heater Thermo Top V

Temperature at temperature sensor -G18- less than 50 °C.

Temperature at ambient temperature sensor -G17- must be below approx. +5 °C.

Turning on the switch enables operation of the auxiliary heater. The glow plug with flame monitor -Q8- , the combustion air blower -V6- and the circulation pump -V55- begin to operate. After 30 seconds, the metering pump -V54- is switched on and the combustion air blower -V6- is switched off for 3 seconds. Then the combustion air blower -V6- runs up in two stages to nearly full load within 56 seconds. After a stabilisation phase (attaining steady motor speed) of 15 seconds, the combustion air blower -V6- is again brought up to nearly full load in a 50-second stage.

After reaching full-load fuel delivery, the glow plug with flame monitoring -Q8- is switched off and the combustion air blower -V6- is brought up to full load. During the next 45 seconds as well as during normal operation, the glow plug with flame monitoring -Q8- assumes the task of flame monitoring and checks flame development. Then the automatically regulated heating operation begins. If no flame develops or the flame extinguishes, then the fuel supply is interrupted and a malfunction shut-down occurs with the combustion air blower -V6- continuing in run-on mode. If the flame is extinguished during normal operation, a new start is automatically initiated.

8.1.1 Preheating mode

Once the coolant temperature has reached 84 °C, the control unit switches to the energy-saving part load mode. If the coolant temperature continues to rise above 88° C, the control unit switches to the regulated waiting period. If the coolant temperature does not drop below 76 °C within 900 seconds during the controlled waiting period, the heating unit will start with the normal start procedure in full-load mode when the coolant temperature does drop below 76 °C.

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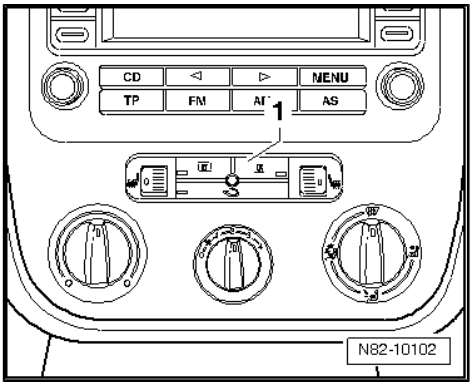
8.1.2 Auxiliary heating mode

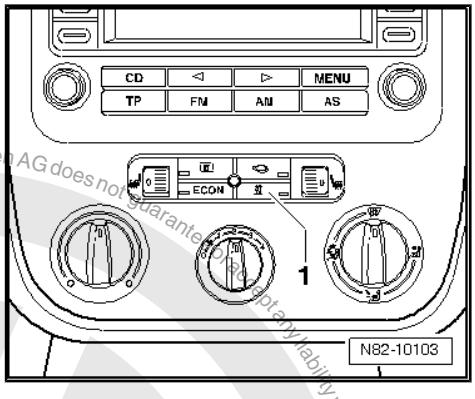
Switching on auxiliary heating mode in vehicles without an air conditioning system:

– Press immediate heating button -1-.



Switching on auxiliary heating mode in vehicles with Climatic air conditioning system:

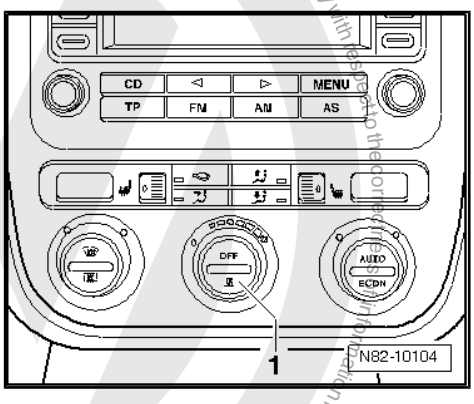
– Press immediate heating button -1-.



Switching on auxiliary heating mode in vehicles with Climatronic:

– Press immediate heating button -1-.

Once the coolant temperature has reached 82 °C, the control unit switches to the energy-saving part load mode. If the coolant temperature continues to rise above 88° C, the control unit switches to the regulated waiting period. If the coolant temperature does not drop below 70 °C within 900 seconds during the controlled waiting period, the heating unit will start with the normal start procedure in full-load mode when the coolant temperature does drop below 65 °C.



8.1.3 Switching off

When switched off manually or after a maximum operating time of 60 minutes or the coolant reaches a temperature of 84° C, combustion is ended and the post-operation mode begins. The circulation pump -V55- and the combustion air blower -V6- , however, continue to run to cool down the auxiliary heater (post-operation mode) and are switched off automatically.

Note

The post-operation period of the circulation pump -V55- and the combustion air blower -V6- depend on the operating mode in which the auxiliary heater was switched off.

The post-operation period is 175 seconds when heater is switched off during full-load operation and 110 seconds for part-load operation.

Depending on the control unit software version, slight deviations in the specified post-operation values are possible.

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8.2 Remote control operation

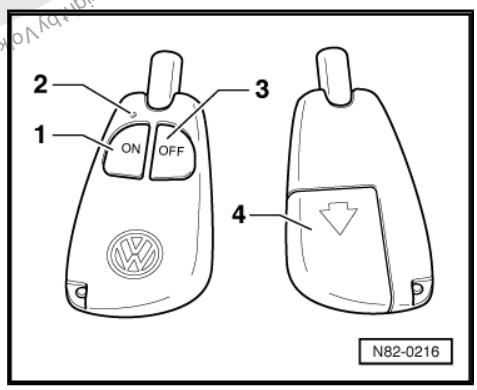
Note

- *The auxiliary coolant heater can be switched on and off from a distance of up to 600 metres (open space) using the remote control. This range is restricted in built-up areas or from buildings.*
- *The remote control should be held upright when operating the buttons (the radio signals can be received optimally by the vehicle aerial in this way and the greatest transmission range is achieved).*
- *Following disconnection of the vehicle battery, the auxiliary heater remote control does not have to be re-adapted.*
- *The basic setting should be carried out using the VAS tester if the remote control has been renewed.*

8.2.1 Switching auxiliary heater on using remote control

– Press button -1-, the warning lamp -2- must light up green.

The operating period of the auxiliary heater is determined by the remote control unit when the heater is switched on (a time component is included in the switching signal). This time component is stored permanently in the remote control and cannot be changed.



8.2.2 Switching auxiliary heater off using remote control

– Press button -3-, the warning lamp -2- must light up red.

The auxiliary heater switches to run-on and then off.

8.2.3 Renewing remote control batteries

Note

- *Note installation position of batteries.*
- *Only use batteries of the same type with a voltage of 12 volts.*
- *Allocation of the remote control to the auxiliary heater remains intact. Re-adapting is not necessary.*

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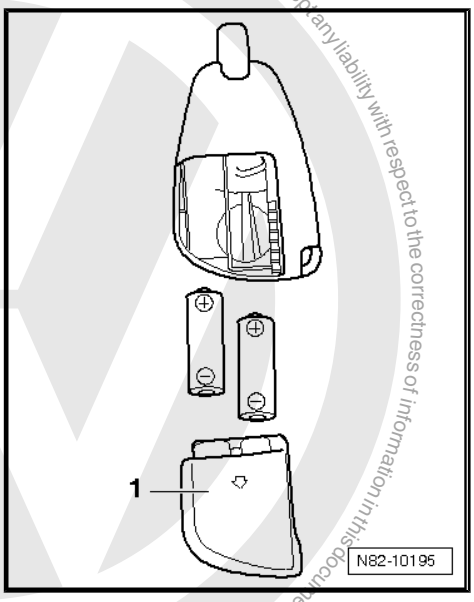
– Take off battery cover -1- and remove batteries. Insert new batteries and replace cover.



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9 Electric engine preheater, 230 V or 115 V (only Canada)

9.1 Safety measures for working on vehicles with engine preheater

WARNING

Danger of electrical shock.

Engine preheater operates with 230 V or 115 V current from the mains.

Before working on engine preheater, pull plug from mains socket.

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10 Rules for cleanliness when working on engine preheater

- Thoroughly clean all connections and adjacent areas before disconnecting.
- Place parts that have been removed on a clean surface (use sheeting or paper, but no fluffy cloths) and cover.
- Carefully cover opened components or seal if the repair cannot be carried out immediately.
- Install clean parts only:

– Remove replacement parts from their packages only immediately before installing them.

– Do not use any parts which have not been stored in their packaging (e.g. in a tool box).

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11 Removing and installing connector for mains plug

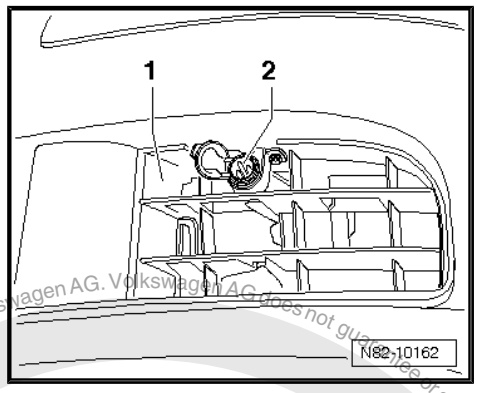
WARNING

Danger of electrical shock.

Engine preheater operates with 230 V or 115 V current from the mains.

Before working on socket for engine preheater, pull plug from mains socket.

11.1 Removing



- Pull vent grille -1- out of fasteners in front bumper cover ⇒ Rep. Gr. 63 .
- Remove bolts from connector -2- and separate earth wire from longitudinal member behind it.
- Remove noise insulation ⇒ Rep. Gr. 50 .
- Separate electrical wiring.

11.2 Installing

Note

- *When installing, ensure that cover of connector opens upwards.*
- *The electrical wiring must not come in contact with hot, turning or sharp-edged components.*

Caution

The electrical wiring can be pulled off.

The motor moves relative to the body during load changes.

Route the electrical wiring with slack between the engine and the body.

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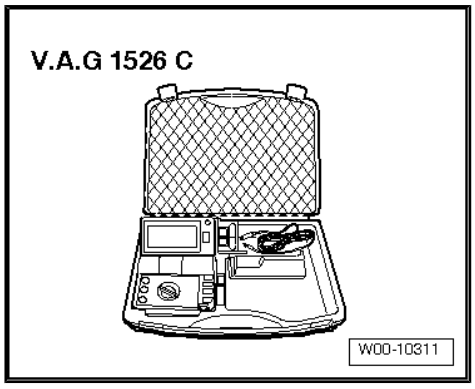
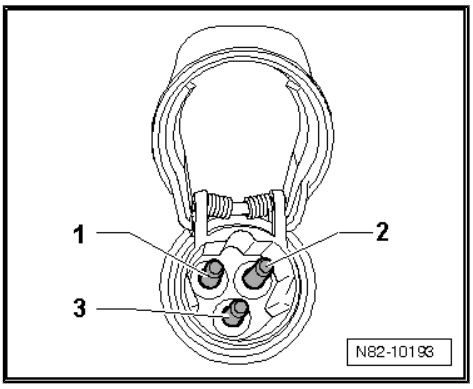
12 Checking connector

Special tools and workshop equipment required

- Hand multimeter - V.A.G 1526C-





Checking

1 - Single phase 230 V or 115 V

2 - Neutral conductor

3 - Earth conductor

– Measure between pin -1- and -3-. Specification: ∞ Ω

– Measure between pin -2- and -3-. Specification: ∞ Ω

– Measure continuity from pin -3- to negative terminal of vehicle battery (vehicle earth). Specification: 0-1 Ω

If value deviates from specification, check wiring as well as earth connection for damage. Renew defective wiring harness with a genuine part.

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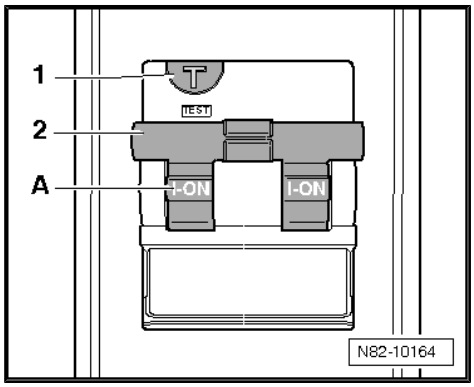
13 Testing safety switch (optional)



Checking

1 - Test button

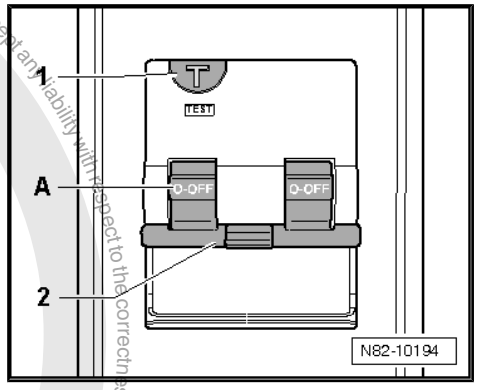
2 - Switch

A = Display “I-ON” or “0-OFF”

– Connect safety switch between adapter cable and extension cord.

– Push plug into mains socket.

After a short time, the heating element will heat up and the sound of boiling water can be heard.



– Push the Test button -1-. The switch -2- will jump back to the “0-OFF” position.

The engine preheater is switched off. The engine preheater can be switched on again by manually moving switch -2- to the “I-ON” position.

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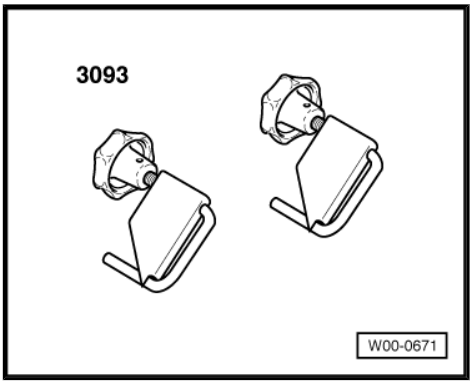
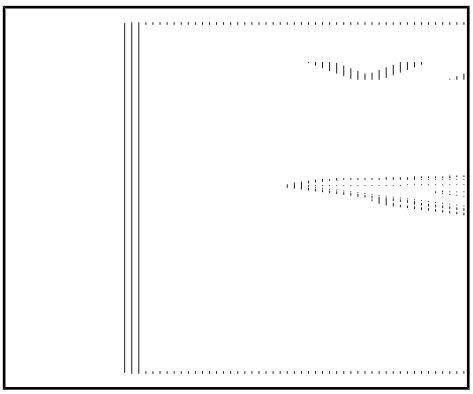
14 Removing and installing engine preheater

Special tools and workshop equipment required

- Hose clamps up to 40 mm Ø -3093-



- Drip tray for workshop hoist -VAS 6208-



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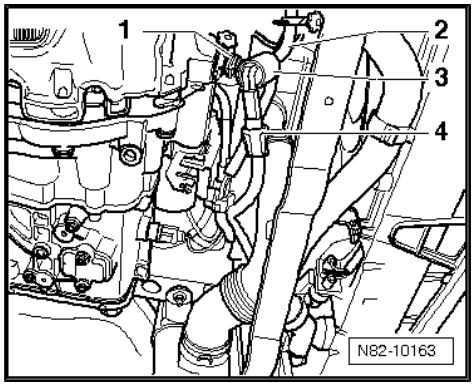
14.1 Removing

– Remove noise insulation ⇒ Rep. Gr. 50 .



WARNING

Danger of electrical shock.

Engine preheater operates with 230 V or 115 V current from the mains.

Before working on engine preheater, pull plug from mains socket.

– Remove yellow "pull-off protection" -4- from electrical connector and pull off connector. Seal connector to prevent ingress of coolant (danger of short circuit).

– Clamp off coolant hoses -1- and -2- with hose clamps up to 40 mm Ø -3093- .

– Place drip tray for workshop hoist -VAS 6208- under vehicle.

WARNING

Danger of scalding injuries.

When the engine is warm, the coolant temperature may be above 100° C. The cooling system is pressurised.

If necessary, release pressure before carrying out repairs.

– Loosen O-type or screw-type clips and pull coolant hoses off heating element -3-.

14.2 Installing

Install in reverse order.

– Ensure proper seating of yellow "pull-off protection".

Note

- *The coolant circuit must be bled after it is opened ⇒ Rep. Gr. 19 .*
- *O-type clips are to be replaced with screw-type clips.*

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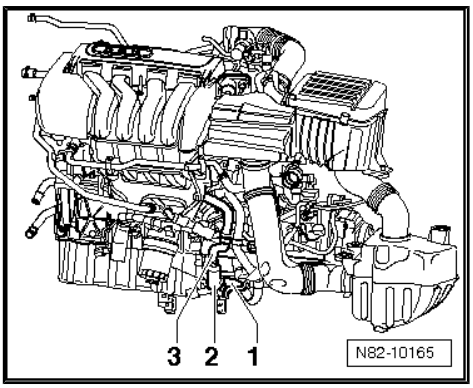
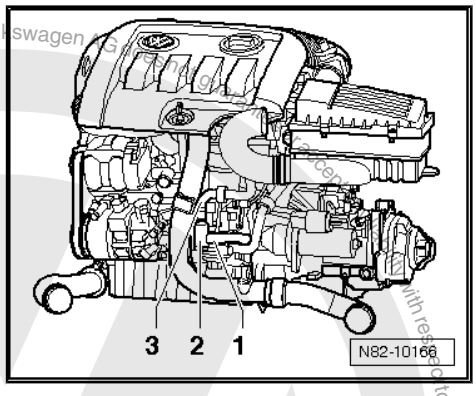
15 Connecting engine preheater into cooling circuit

15.1 2.0 l FSI



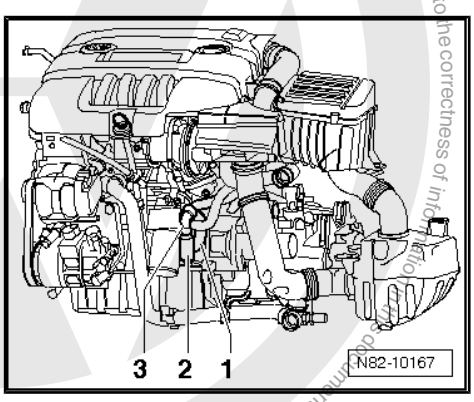
1 - Coolant return line
2 - Heating element
3 - Coolant supply line

15.2 1.9 l TDI



1 - Coolant return line
2 - Heating element
3 - Coolant supply line

15.3 1.6 l MPI



1 - Coolant return line
2 - Heating element
3 - Coolant supply line

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