



Workshop Manual Sharan 1996 ➤

Supplementary heating

Edition 06.2007



List of Workshop Manual Repair Groups

Repair Group

01 - Self-diagnosis

82 - Supplementary heating

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.



Contents

01 - Self-diagnosis	1
1 Affects vehicles from 06.2000 onwards: Instead of the "Self-diagnosis", the "Guided fault finding" function of the vehicle diagnosis, testing and information system VAS 5051A should be used for fault finding.	1
82 - Supplementary heating	2
1 Auxiliary heater -D3W- (supplementary heater), vehicles: ► 05.00	2
1.1 Repairing auxiliary heater -D3W- (supplementary heater)	2
1.2 Removing and installing exhaust system	4
1.3 Removing and installing auxiliary heater -D3W-	6
1.4 Dismantling and assembling auxiliary heater -D3W-	9
1.5 Removing heater control unit J162	10
1.6 Removing glow plug for heater Q9	11
1.7 Removing flame monitor G64	11
1.8 Connecting auxiliary heater -D3W- to coolant circuit	12
1.9 Coolant hose routing	12
1.10 Coolant hose routing on vehicles with 2nd heat exchanger	13
1.11 Auxiliary heater -D3W- fuel supply	14
1.12 Removing and installing metering pump V54	15
1.13 Regulation of auxiliary heater -D3W-	16
1.14 Start sequence	17
2 Auxiliary heater -D5W- Z (supplementary heater), vehicles 06.2000 ►	19
2.1 Repairing auxiliary heater -D5W- Z (supplementary heater)	19
2.2 Connecting auxiliary heater -D5W- Z to coolant circuit	21
2.3 Coolant hose routing on vehicles with 2nd heat exchanger	22
2.4 Regulation of auxiliary heater -D5W- Z	23
3 Auxiliary heater -B4W/ D4W-, vehicles ► 05.2000	25
3.1 Diagnosis with the diagnostic tester 5019	25
3.2 Bleeding coolant circuit	30
3.3 Road test for auxiliary heater in vehicle without Climatronic	31
3.4 Road test for auxiliary heater in vehicle with Climatronic	33
3.5 Repairing auxiliary heater -B4W- / -D4W-	35
3.6 Removing and installing heater unit -B4W- / -D4W-	37
3.7 Dismantling and assembling heater unit -B4W- (petrol)	39
3.8 Dismantling and assembling heater unit -D4W- (diesel)	42
3.9 Removing heater control unit J162	43
3.10 Renewing combustion air blower V6	44
3.11 Removing flame monitor G64	44
3.12 Removing overheating sensor G189	44
3.13 Removing coolant temperature sender for heater G241	45
3.14 Removing glow plug for heater Q9	45
3.15 Checking flame monitor G64	45
3.16 Checking overheating sensor G189	46
3.17 Checking coolant temperature sender for heater G241	46
3.18 Connecting auxiliary heater -B4W- and -D4W- to coolant circuit	47
3.19 Fuel supply to auxiliary heaters -B4W- / -D4W-	47
3.20 Removing and installing metering pump V54	50
3.21 Regulation of auxiliary heaters -B4W- and -D4W-	51
4 Auxiliary heater -B5W- S / -D5W- S, vehicles 06.2000 ►	53
4.1 Repairing auxiliary heater -B5W- S / -D5W- S	53
4.2 Removing ambient temperature switch F38	55
4.3 Removing circulation pump V55	55
4.4 Removing pre-selection clock E111	56



4.5	Removing and installing exhaust system	56
4.6	Road test for auxiliary heater in vehicle without Climatronic	58
4.7	Road test for auxiliary heater in vehicle with Climatronic	60
4.8	Removing and installing heater unit	61
4.9	Dismantling and assembling heater unit	64
4.10	Removing heat exchanger	66
4.11	Removing flame monitor G64	67
4.12	Removing glow plug for heater Q9	67
4.13	Removing heater control unit J162	68
4.14	Renewing combustion air blower V6	68
4.15	Removing overheating sensor G189	69
4.16	Removing coolant temperature sender for heater G241	69
4.17	Checking flame monitor G64	69
4.18	Checking overheating sensor G189	70
4.19	Checking coolant temperature sender for heater G241	70
4.20	Checking ambient temperature switch F38	70
4.21	Connecting auxiliary heaters -B5W- S and -D5W- S to coolant circuit	72
4.22	Connecting auxiliary heaters -B5W- S, -D5W- S and -D5Z- F to coolant circuit for engine code AYL (6 cyl.) from 05.2004	73
4.23	Coolant hose routing on vehicles with 2nd heat exchanger	75
4.24	Bleeding coolant circuit in vehicles with auxiliary heater -B5W- S, -D5W- S or -D5W- Z	76
4.25	Fuel supply to auxiliary heaters -B5W- S, -D5W- S or -D5W- Z	76
4.26	Removing and installing metering pump V54	78
4.27	Testing quantity of fuel delivered	79
4.28	Regulation of auxiliary heaters -B5W- S and -D5W- S	80
4.29	Start sequence	82
5	Auxiliary heater -D5Z- F, vehicles 05.2004 ►	83
5.1	Repairing auxiliary heater -D5Z- F	83
5.2	Removing ambient temperature switch F38	83
5.3	Removing circulation pump V55	83
5.4	Removing and installing exhaust system	83
5.5	Road test for auxiliary heater in vehicle without Climatronic	83
5.6	Road test for auxiliary heater in vehicle with Climatronic	83
5.7	Removing and installing heater unit	83
5.8	Dismantling and assembling heater unit	83
5.9	Removing heat exchanger	85
5.10	Removing and installing flame monitor G64	86
5.11	Removing glow plug for heater Q9	87
5.12	Removing heater control unit J162	87
5.13	Renewing combustion air blower V6	87
5.14	Removing overheating sensor G189	88
5.15	Removing coolant temperature sender for heater G241	88
5.16	Checking flame monitor G64	89
5.17	Checking overheating sensor G189	89
5.18	Checking coolant temperature sender for heater G241	90
5.19	Checking ambient temperature switch F38	91
5.20	Connecting auxiliary heater -D5Z- F to coolant circuit	91
5.21	Coolant hose routing on vehicles with 2nd heat exchanger	91
5.22	Bleeding coolant circuit in vehicles with auxiliary heater -D5Z- F	91
5.23	Fuel supply to auxiliary heater -D5Z- F	91
5.24	Removing and installing metering pump V54	91
5.25	Testing quantity of fuel delivered	91
5.26	Regulation of auxiliary heater -D5Z- F	91
5.27	Start sequence	92
6	Auxiliary heater -D5S- F / -B5S- F, vehicles 05.2004 ►	94
6.1	Repairing auxiliary heater -D5S- F / -B5S- F	94



6.2	Removing ambient temperature switch F38	94
6.3	Removing circulation pump V55	94
6.4	Removing pre-selection clock E111	94
6.5	Removing and installing exhaust system	94
6.6	Road test for auxiliary heater in vehicle without Climatronic	94
6.7	Road test for auxiliary heater in vehicle with Climatronic	95
6.8	Removing and installing heater unit	95
6.9	Dismantling and assembling heater unit	95
6.10	Removing heat exchanger	95
6.11	Removing and installing flame monitor G64	95
6.12	Removing glow plug for heater Q9	95
6.13	Removing heater control unit J162	95
6.14	Renewing combustion air blower V6	95
6.15	Removing overheating sensor G189	95
6.16	Removing coolant temperature sender for heater G241	95
6.17	Checking flame monitor G64	96
6.18	Checking overheating sensor G189	96
6.19	Checking coolant temperature sender for heater G241	96
6.20	Checking ambient temperature switch F38	96
6.21	Connecting auxiliary heater -D5S- F / -B5S- F to coolant circuit	96
6.22	Coolant hose routing on vehicles with 2nd heat exchanger	96
6.23	Bleeding coolant circuit in vehicles with auxiliary heater -D5S- F / -B5S- F	96
6.24	Fuel supply to auxiliary heater -D5S- F / -B5S- F	96
6.25	Removing and installing metering pump V54	96
6.26	Testing quantity of fuel delivered	97
6.27	Regulation of auxiliary heater -D5S- F / -B5S- F	97
6.28	Start sequence	97





01 – Self-diagnosis

- 1 Affects vehicles from 06.2000 onwards: Instead of the “Self-diagnosis”, the “Guided fault finding” function of the vehicle diagnosis, testing and information system -VAS 5051A- should be used for fault finding.



82 – Supplementary heating

1 Auxiliary heater -D3W- (supplementary heater), vehicles: ► 05.00

1.1 Repairing auxiliary heater -D3W- (supplementary heater)



Note

- ◆ *Before every repair, please read out the fault memory of the heater control unit -J162- using the diagnostic tester -VAS 5019- ⇒ [page 25](#) .*
- ◆ *A manufacturer's plate is fitted on the auxiliary heater unit. This plate provides information about the type of auxiliary heater installed in the vehicle ⇒ [page 3](#) .*
- ◆ *Removing and installing auxiliary heater components ⇒ [page 9](#) ; Dismantling and assembling auxiliary heater - D3W-.*
- ◆ *Check the coolant circuit after working on the coolant circuit ⇒ Rep. Gr. 19 .*



1 - Metering pump -V54-

- ☐ Fuel supply to auxiliary heater ⇒ [page 14](#) .

2 - Auxiliary heater

- ☐ With heater control unit -J162-
- ☐ Removing and installing ⇒ [page 6](#)
- ☐ Dismantling and assembling ⇒ [page 9](#)

3 - Exhaust system

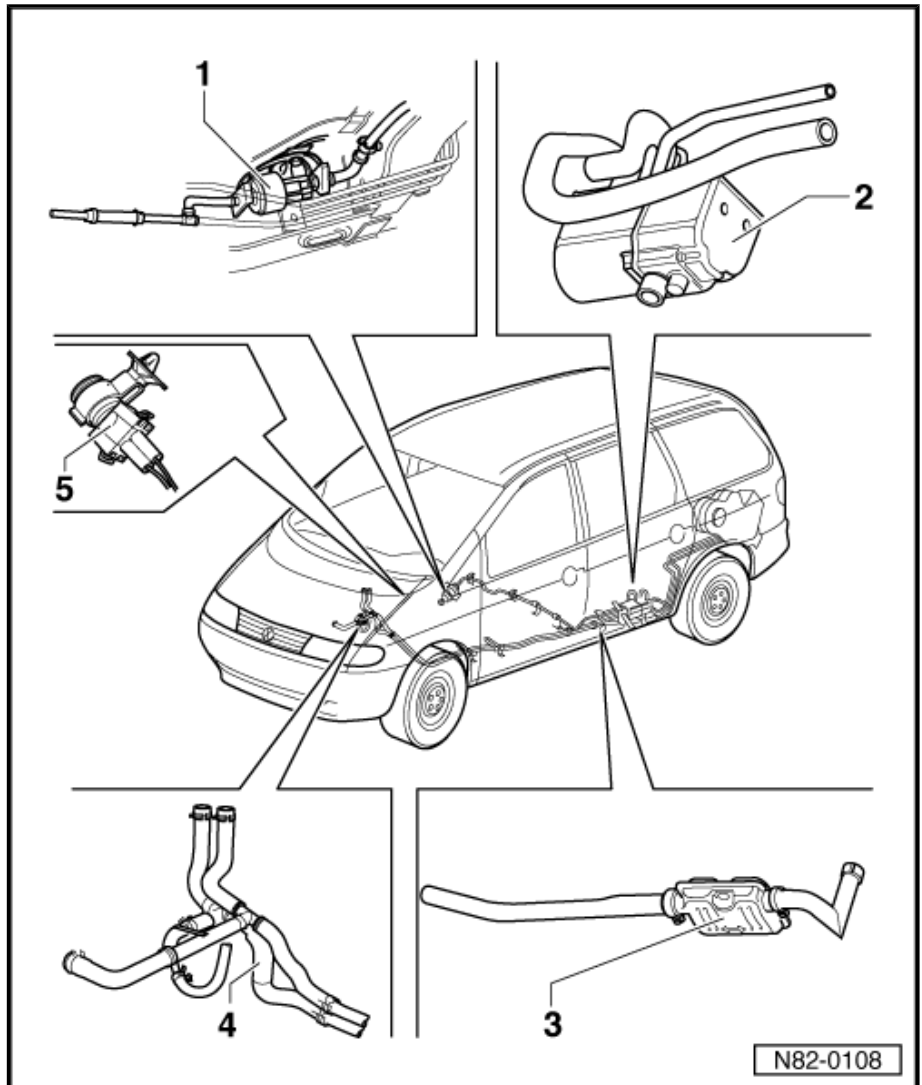
- ☐ Removing and installing ⇒ [page 4](#)
- ☐ Securing front exhaust pipe to auxiliary heater ⇒ [page 5](#) .
- ☐ Securing rear exhaust pipe to silencer ⇒ [page 6](#)

4 - Coolant hoses

- ☐ Coolant hose routing; connecting auxiliary heater to coolant circuit ⇒ [page 12](#) .

5 - Ambient temperature switch -F38-

- ☐ Switch position -On- at temperatures lower than 5 °C
- ☐ Switch position -Off- at temperatures above 5 °C
- ☐ Removing ⇒ [page 4](#)



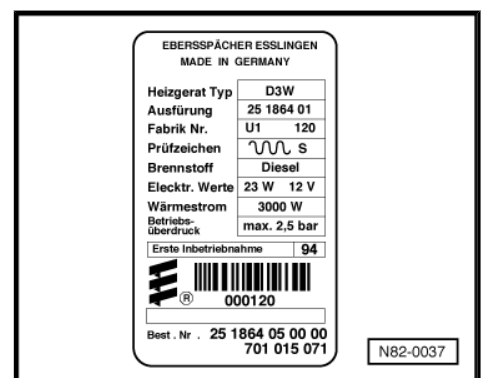
N82-0108

Manufacturer's plate



Note

- ◆ The most important technical data are shown on upper part of manufacturer's plate.
- ◆ Only the 25 1864 01 version for -D3W- is factory-fitted in the Sharan 1996 ▶.
- ◆ 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 for the auxiliary heaters does not have to be renewed after 10 years. Legislation in Germany dictates that air heaters must be renewed.



N82-0037



Removing ambient temperature switch -F38-

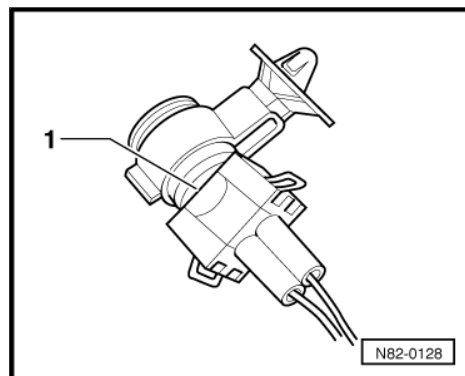
- Unclip ambient temperature switch -F38- -1- from holder.



Note

In vehicles from model year 10.1998, the wiper motor must also be replaced ⇒ Rep. Gr. 92.

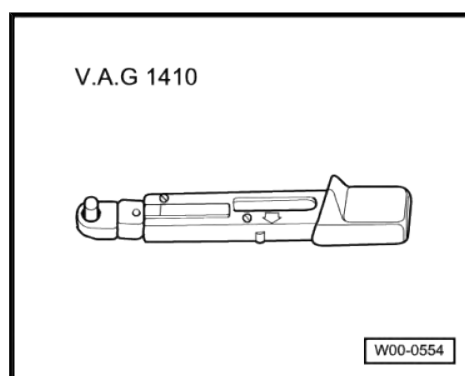
- Checking ambient temperature switch -F38- ⇒ [page 25](#)



1.2 Removing and installing exhaust system

Special tools and workshop equipment required

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



WARNING

Danger of burn injuries.

Silencer could be hot.

Before removing silencer, let it cool off.



1 - Auxiliary heater

- ☐ With heater control unit -J162-
- ☐ Dismantling and assembling ⇒ [page 9](#)

2 - Clip

3 - Front exhaust pipe

- ☐ Securing front exhaust pipe to auxiliary heater ⇒ [page 5](#)

4 - Hexagon bolt M6×16

- ☐ 6 Nm

5 - Rear exhaust pipe

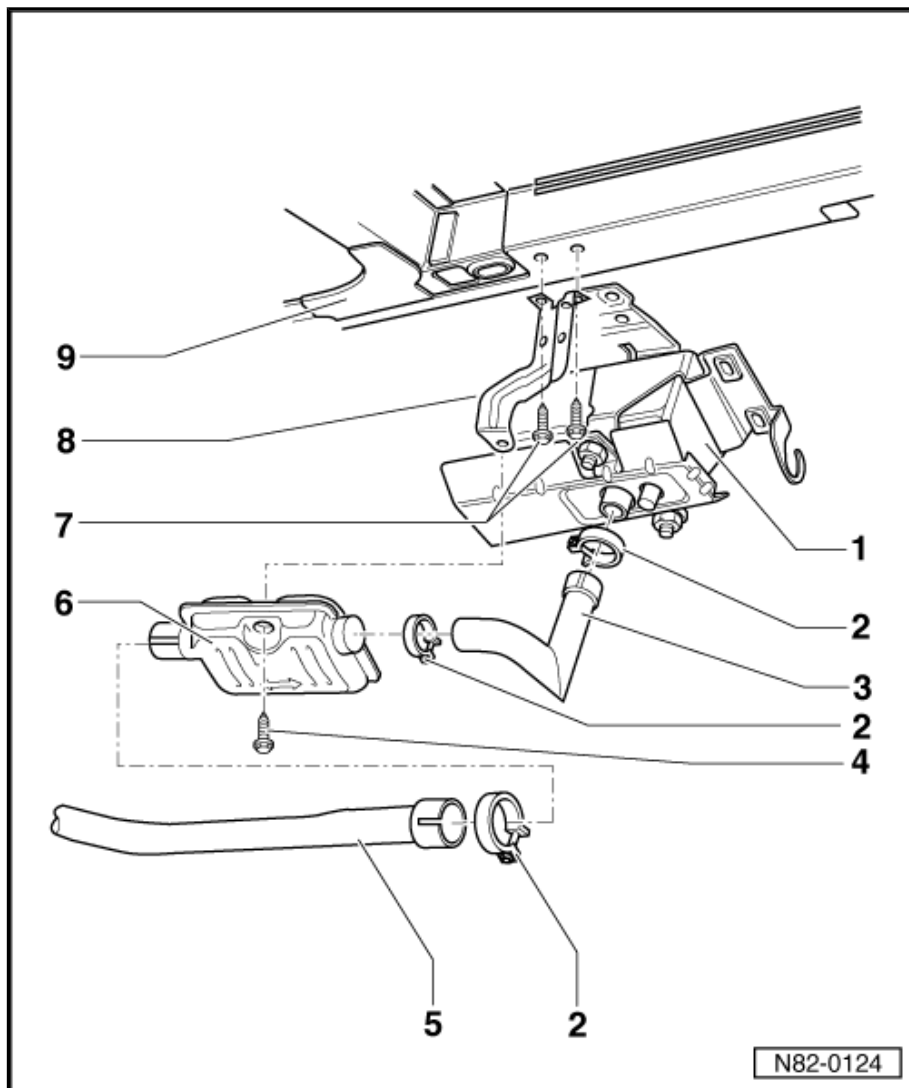
- ☐ Securing rear exhaust pipe to silencer ⇒ [page 6](#)

6 - Silencer

7 - Self-tapping screw 4.8x16

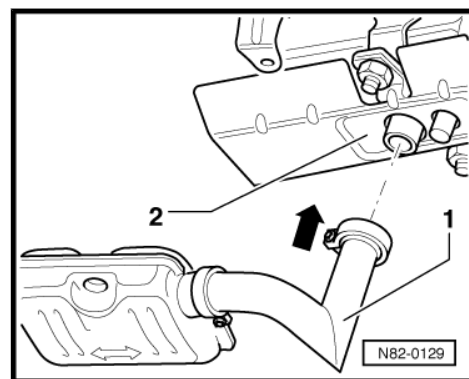
8 - Bracket

9 - Longitudinal member



Securing front exhaust pipe to auxiliary heater

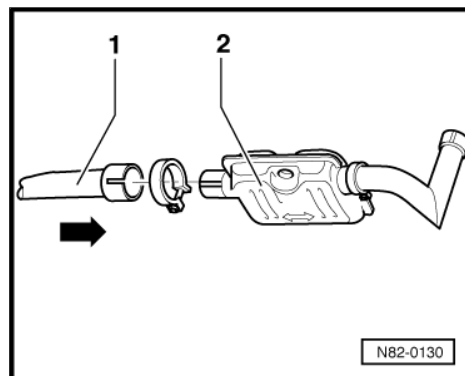
- Push exhaust pipe -1- in direction of arrow until it contacts combustion air blower housing -2-.





Securing rear exhaust pipe to silencer

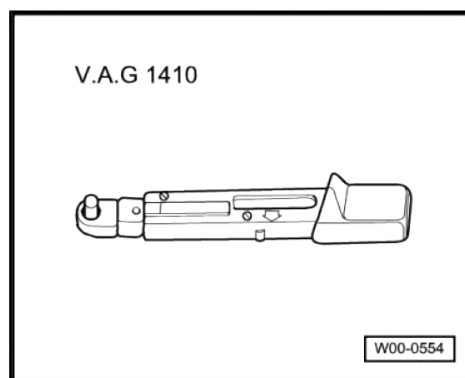
- Push exhaust pipe -1- in direction of arrow until it contacts silencer -2-.



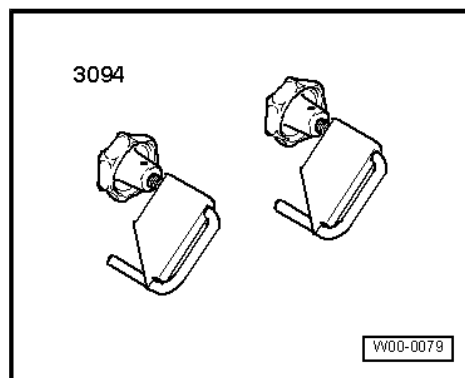
1.3 Removing and installing auxiliary heater -D3W-

Special tools and workshop equipment required

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



- ◆ Hose clamps up to 25 mm Ø -3094-



Note

- ◆ *If coolant is in the system, seal coolant hoses using hose clamps before disconnecting.*
- ◆ *Refill with coolant after installing the auxiliary heater ⇒ Rep. Gr. 19.*



1 - Longitudinal member

2 - Blind rivet nut M8

3 - Fuel line

- ❑ From metering pump - V54- to auxiliary heater.



Note

- ◆ Hose connections are secured with either screw-type or spring-type clips.
- ◆ Always replace spring-type clips with screw-type clips.

4 - Coolant hose, supply

5 - Bracket for heater unit

6 - Hexagon bolt M8×20

- ❑ 10 Nm

7 - Exhaust system

- ❑ Securing front exhaust pipe to auxiliary heater
⇒ [page 5](#)
- ❑ Securing rear exhaust pipe to silencer
⇒ [page 6](#)

8 - Hexagon bolt M6×16

- ❑ 6 Nm

9 - Hexagon nut M8

- ❑ 10 Nm

10 - Clamping plate

11 - Bracket

12 - Self-tapping screw 4.8x16

13 - Coolant hose, return

- ❑ In vehicles with a 2nd heat exchanger: supply to 2nd heat exchanger

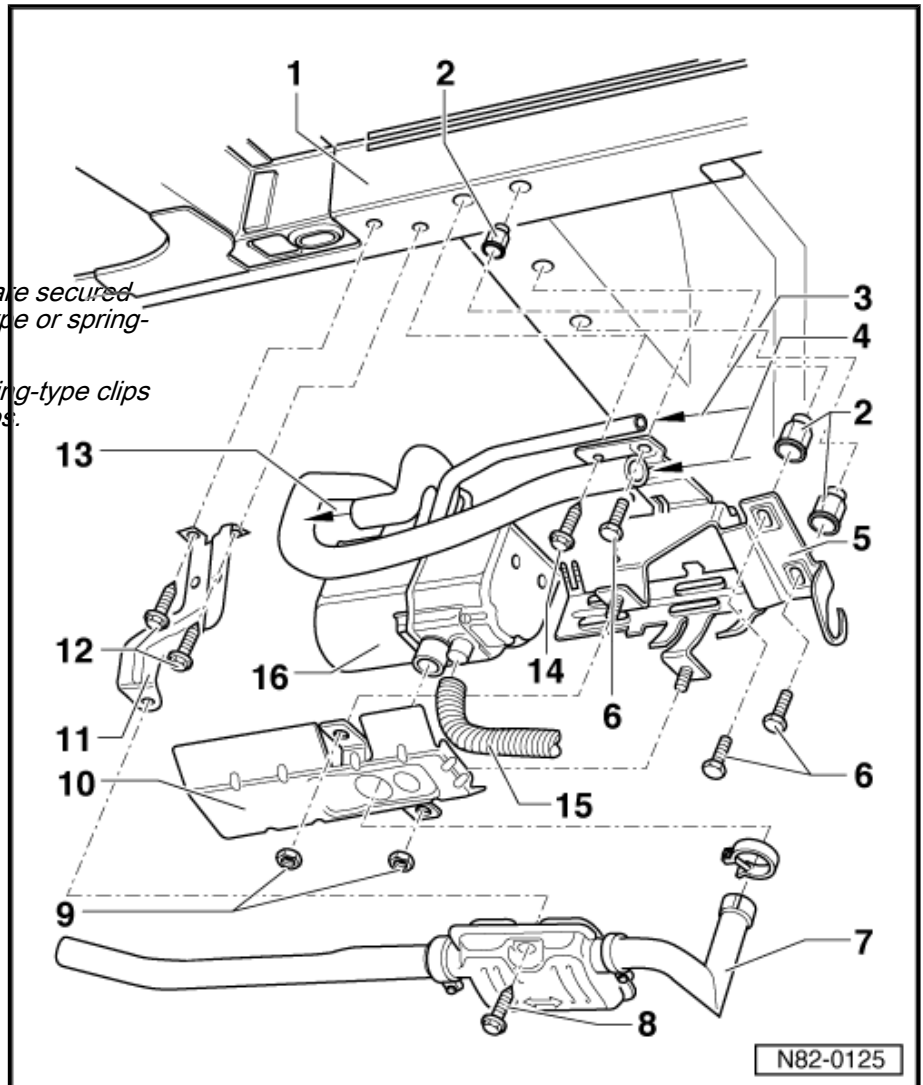
14 - Self-tapping screw 4.8x16

15 - Intake hose

- ❑ Securing ⇒ [page 9](#) .

16 - Auxiliary heater

- ❑ With heater control unit -J162-
- ❑ Dismantling and assembling ⇒ [page 9](#)



Volkswagen Technical Site: <http://vwts.ru> <http://vwts.info>



Removing:



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 and reduce temperature before carrying out repairs.

- ☐ Open the radiator cap.
- ☐ Clamp off coolant hoses to auxiliary heater with hose clamps up to Ø 25 mm -3094- and disconnect hoses.



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.

- ☐ Pull fuel line off auxiliary heater and seal it.
- ☐ Disconnect 8-pin connector (T8) from heater control unit.



WARNING

Danger of burn injuries.

Parts of the exhaust system may be hot.

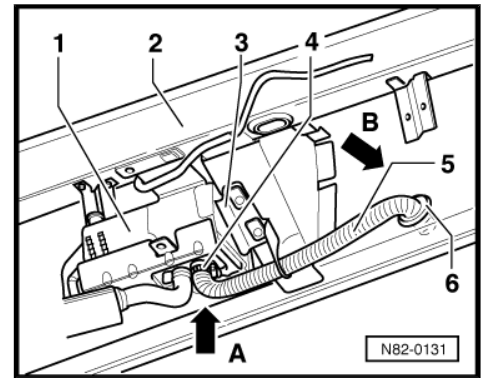
Before removing exhaust system, let it cool off.

- ☐ Unfasten silencer on bracket.
- ☐ Unscrew auxiliary heater along with its bracket.
- ☐ Secure intake hose ⇒ [page 9](#) .
- ☐ Secure front exhaust pipe to auxiliary heater ⇒ [page 5](#) .
- ☐ Secure rear exhaust pipe to silencer ⇒ [page 6](#) .



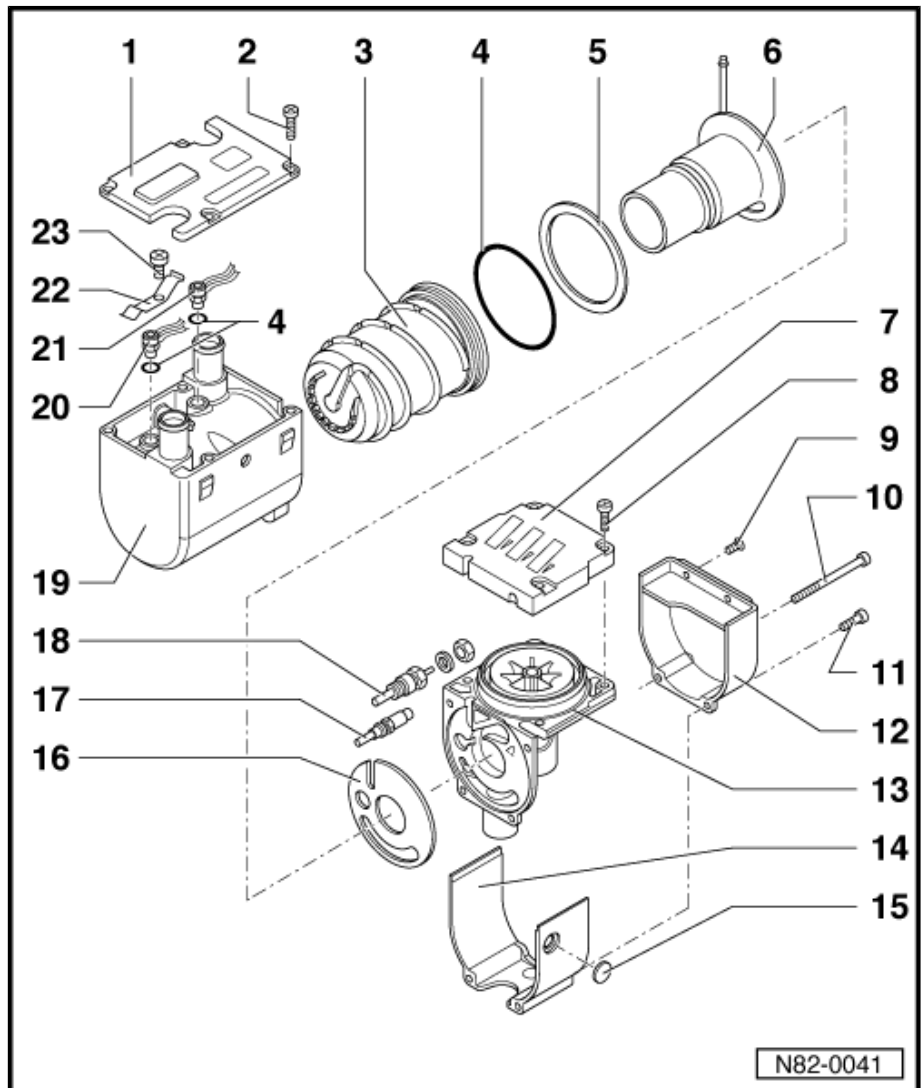
Securing intake hose

- 1 - Auxiliary heater
- 2 - Longitudinal member
- 3 - Bracket for auxiliary heater
- 4 - Screw-type clip
- 5 - Intake hose
- 6 - Sealing ring
- Push intake hose -5- in direction of -arrow A- until it makes contact with auxiliary heater housing -1-.
- Fasten screw-type clip -4-.
- Push intake hose through sealing ring -6- into bulkhead -arrow B- up to stop.
- Insert intake hose into bow of bracket for auxiliary heater -3-.



1.4 Dismantling and assembling auxiliary heater -D3W-

- 1 - Water jacket cover
- 2 - Bolt M5×12
- 3 - Heat exchanger
 - ☐ Clean inside and outside with brass wire brush (spark plug brush).
 - ☐ Note installation position ⇒ [page 10](#).
- 4 - O-ring
 - ☐ Renew
 - ☐ Lubricate when installing.
- 5 - Seal
 - ☐ Always renew after dismantling.
- 6 - Combustion chamber with flame tube
 - ☐ Clean inside and outside with brass wire brush (spark plug brush).
- 7 - Combustion air blower cover
- 8 - Bolt M5×22
- 9 - Bolt M4×10
- 10 - Socket head screw M5×65
 - ☐ 6 Nm
- 11 - Socket head screw M5×16
 - ☐ 6 Nm
- 12 - Heater control unit -J162-
 - ☐ Removing ⇒ [page 10](#)
 - ☐ Checking ⇒ [page 25](#)





13 - Combustion air blower -V6-

- ☐ Do not dismantle further
- ☐ Checking ⇒ [page 25](#)

14 - Cover

15 - Rubber grommet

16 - Seal

- ☐ Always renew after dismantling.

17 - Flame monitor -G64-

- ☐ Removing ⇒ [page 11](#)
- ☐ Checking ⇒ [page 25](#)

18 - Glow plug for heater -Q9-

- ☐ Removing ⇒ [page 11](#)
- ☐ Clean glow plug with brass wire brush (spark plug brush).
- ☐ 6 Nm
- ☐ Checking ⇒ [page 25](#)

19 - Water jacket

- ☐ Clean inside and outside with brass wire brush (spark plug brush).

20 - Overheating sensor -G189-

- ☐ Checking ⇒ [page 25](#)

21 - Temperature sensor -G18-

- ☐ Checking ⇒ [page 25](#)

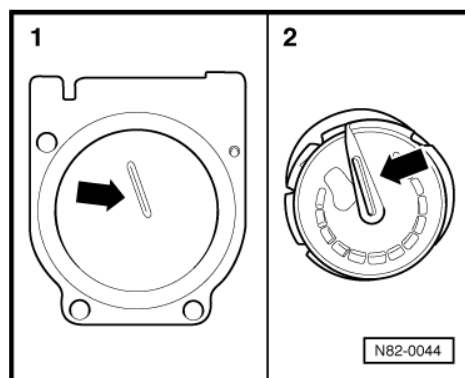
22 - Spring

- ☐ Do not bend further.
- ☐ Renew if damaged.

23 - Screw M5×16

Heat exchanger installation position

- Insert heat exchanger -2- into water jacket -1- until centering -arrows- engages.
- Push heat exchanger tightly into seating.



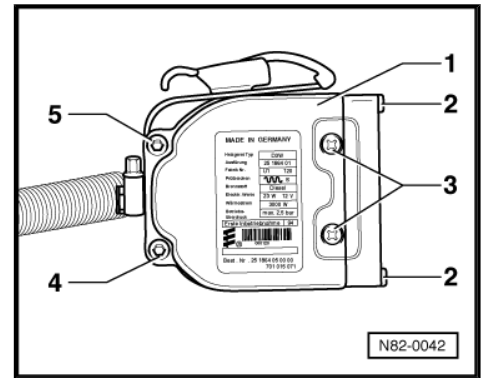
1.5 Removing heater control unit -J162-

Before beginning repair work, perform the following jobs:

- Remove auxiliary heater ⇒ [page 6](#) .



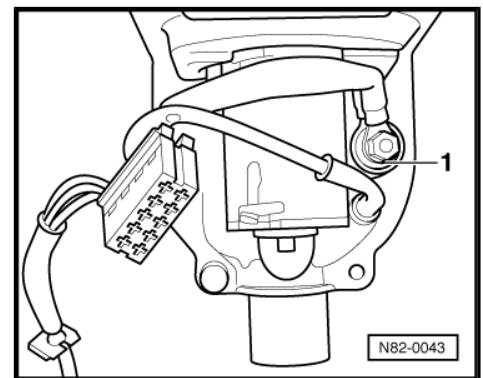
- Dismantle and assemble auxiliary heater -D3W- ➔ [page 9](#) .
- Pull 8-pin connector (T8) off.
- Loosen both cross-head screws -2- on combustion air blower cover.
- Remove cross head screws -3- and hexagon socket head bolts -4- and -5-.
- Lift up heater control unit -J162- -1-.
- Pull 10-pin connector off.



1.6 Removing glow plug for heater -Q9-

Before beginning repair work, perform the following jobs:

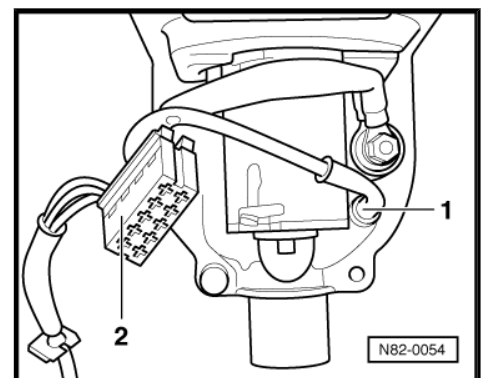
- Remove auxiliary heater ➔ [page 6](#) .
- Dismantle and assemble auxiliary heater -D3W- ➔ [page 9](#) .
- Remove cover ➔ [Item 14 \(page 10\)](#) .
- Unscrew glow plug wiring.
- Remove glow plug for heater -Q9- -1- (6 Nm).



1.7 Removing flame monitor -G64-

Before beginning repair work, perform the following jobs:

- Remove auxiliary heater ➔ [page 6](#) .
- Dismantle and assemble auxiliary heater -D3W- ➔ [page 9](#) .
- Remove cover ➔ [Item 14 \(page 10\)](#) .
- Pull flame monitor wiring out of 10-pin connector -2-.
- Unbolt flame monitor -G64- -1-.





1.8 Connecting auxiliary heater -D3W- to coolant circuit



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 and reduce temperature before carrying out repairs.

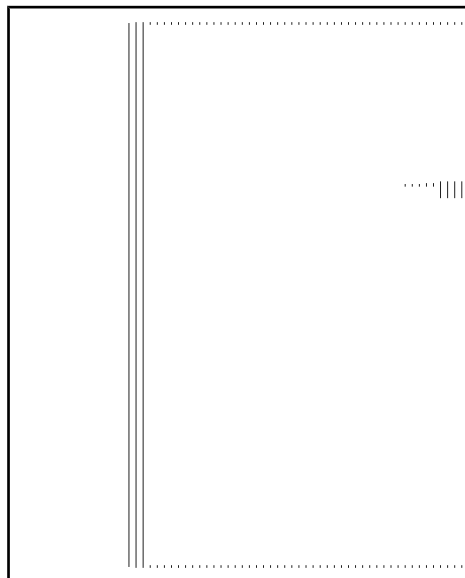


Note

Check coolant circuit after working on it ⇒ Rep. Gr. 19.

The arrows in the illustration show the coolant flow direction.

- 1 - Heat exchanger (standard)
- 2 - 2nd heat exchanger (extra equipment)
- 3 - Auxiliary heater
- 4 - Engine



1.9 Coolant hose routing

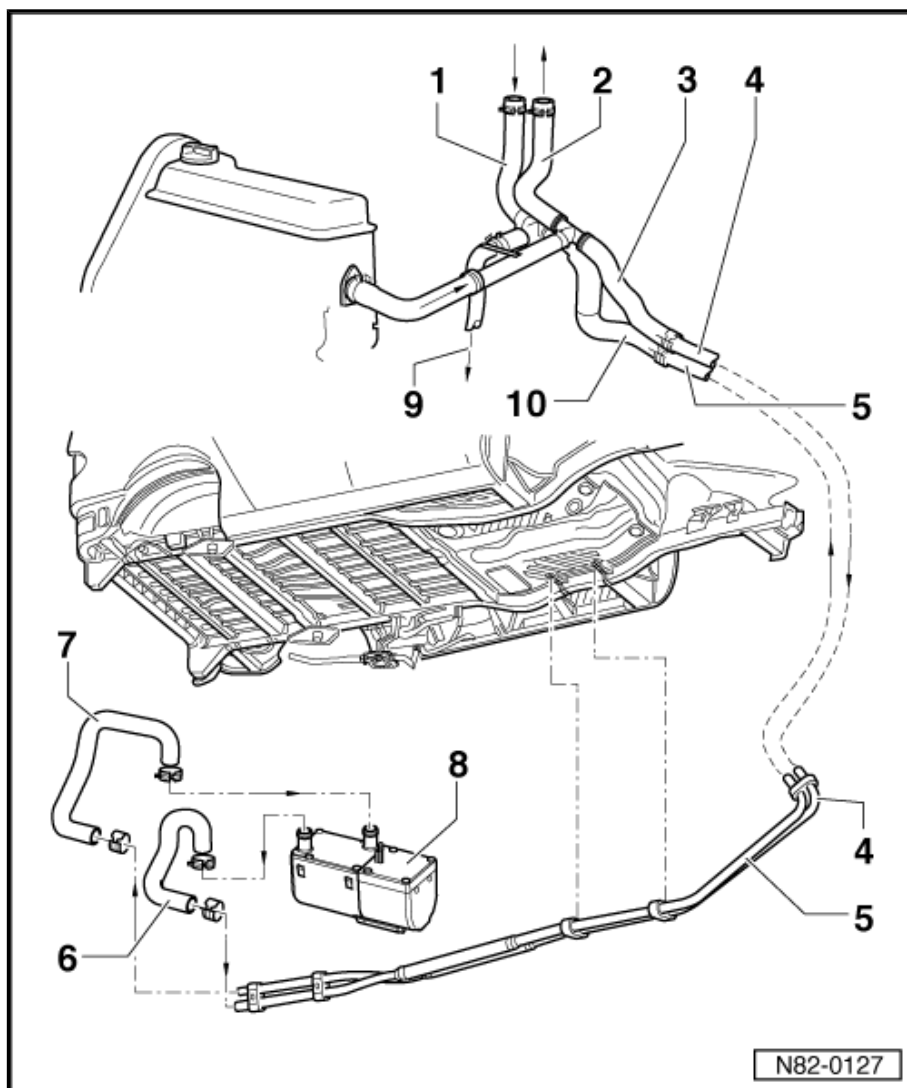


Note

The arrows in the illustration show the coolant flow direction.



- 1 - Coolant hose, return**
☐ From standard equipment heater heat exchanger
- 2 - Coolant hose, supply**
☐ To standard equipment heater heat exchanger
- 3 - Coolant hose, supply**
☐ From coolant distributor to auxiliary heater
- 4 - Coolant pipe, supply**
- 5 - Coolant pipe, return**
- 6 - Coolant hose, return**
☐ From auxiliary heater to coolant pipe
- 7 - Coolant hose, supply**
☐ From coolant pipe to auxiliary heater
- 8 - Heater unit**
- 9 - Coolant hose**
☐ To engine
- 10 - Coolant hose, return**
☐ From coolant pipe to coolant distributor



1.10 Coolant hose routing on vehicles with 2nd heat exchanger



Note

The arrows in the illustration show the coolant flow direction.



1 - Coolant hose, return

- ❑ From standard equipment heater heat exchanger

2 - Coolant hose, supply

- ❑ To standard equipment heater heat exchanger

3 - Coolant hose, supply

- ❑ From coolant distributor to heater unit

4 - Coolant pipe, supply

5 - Coolant pipe, return

6 - Heater unit

7 - Coolant hose, return

- ❑ From heater unit to coolant pipe

8 - Coolant hose, supply

- ❑ From coolant pipe to heater unit

9 - To 2nd heat exchanger

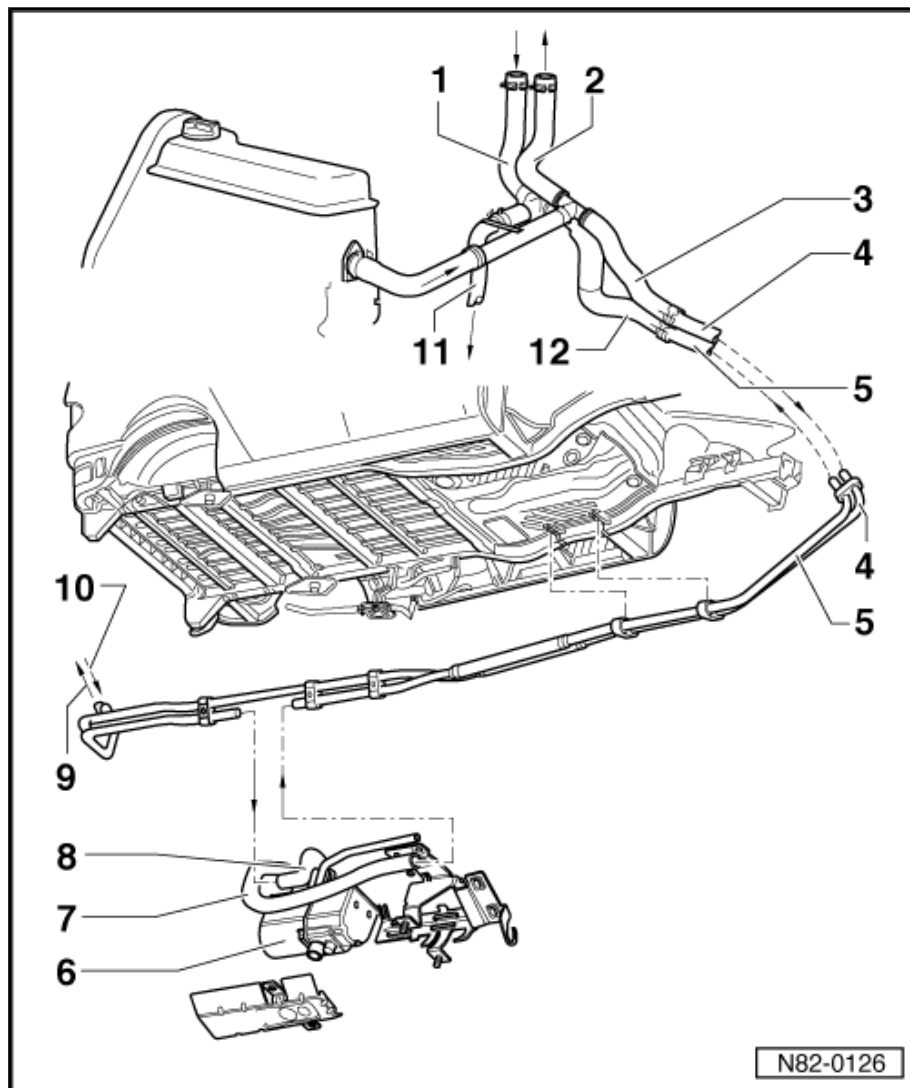
10 - From 2nd heat exchanger

11 - Coolant hose

- ❑ To engine

12 - Coolant hose, return

- ❑ From coolant pipe to coolant distributor



1.11 Auxiliary heater -D3W- fuel supply



Note

- ◆ *Hose connections are secured with either screw-type or spring-type clips.*
- ◆ *Always replace spring-type clips with screw-type clips.*



1.11.1 Fuel take-off

1 - Fuel line

- ❑ From fuel tank to metering pump -V54-

2 - Fuel return

3 - Clamping piece

4 - T-piece

5 - Fuel gauge sender -G-

6 - Heater unit

7 - Metering pump -V54-

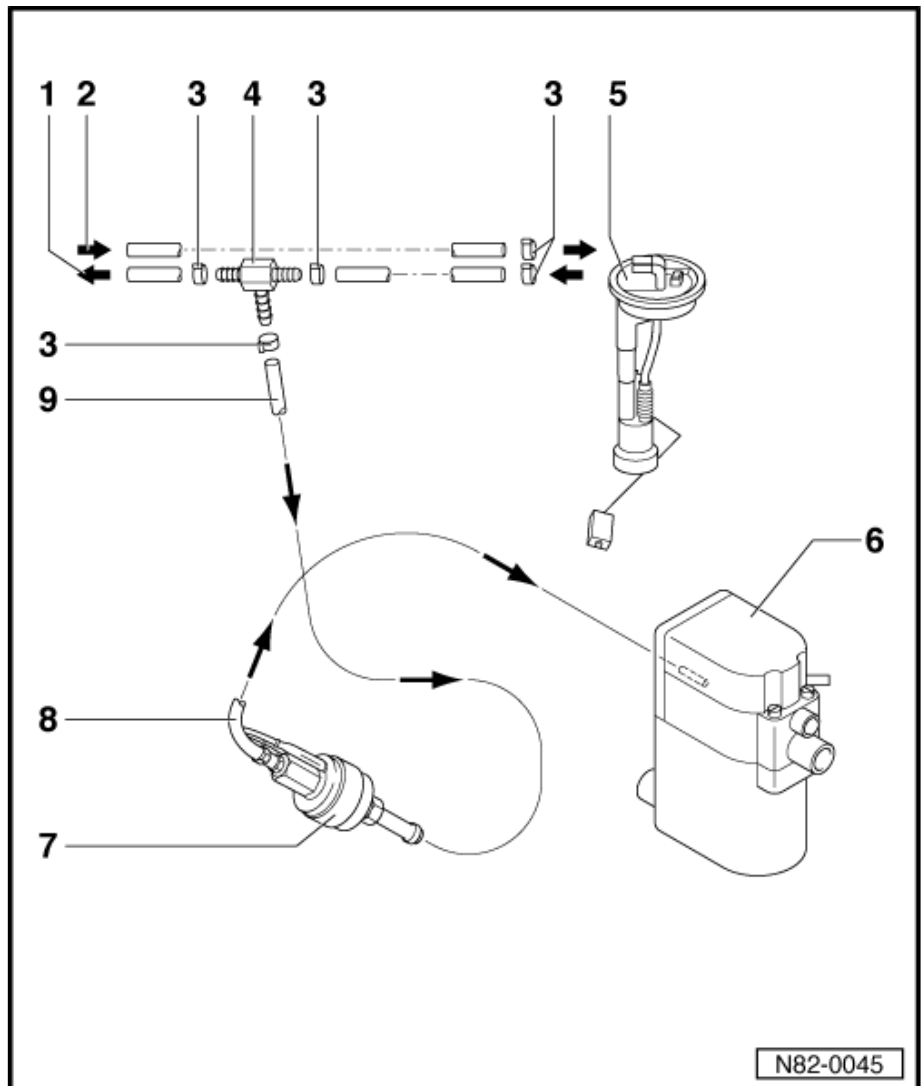
- ❑ Removing and installing
⇒ [page 15](#)
- ❑ Dismantling
⇒ [page 16](#)
- ❑ Checking installation
position ⇒ [page 16](#)

8 - Fuel line

- ❑ From metering pump to heater unit

9 - Fuel line

- ❑ From T-piece to metering pump



1.12 Removing and installing metering pump -V54-

1 - Bracket

2 - Metering pump -V54-

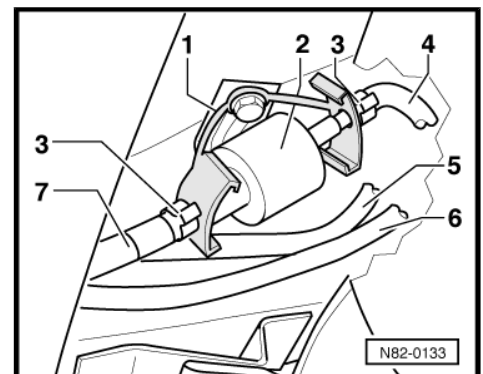
3 - Clamping piece

4 - Fuel line to heater unit

5 - Fuel line, return from engine to fuel tank

6 - Fuel line, supply from fuel tank to engine fuel pump

7 - Fuel line from T-piece connection in supply fuel line, from fuel tank to engine fuel pump



1.12.1 Removing

- Pull connector off.



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.*

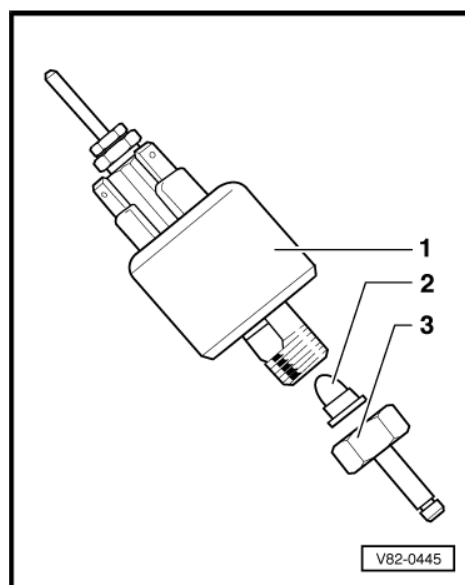
- Detach fuel hoses -4- and -7- from metering pump and seal them.
- Remove metering pump from bracket -1-.

1.12.2 Installing

- Install in reverse order; when doing this observe installation position ➔ [page 16](#)

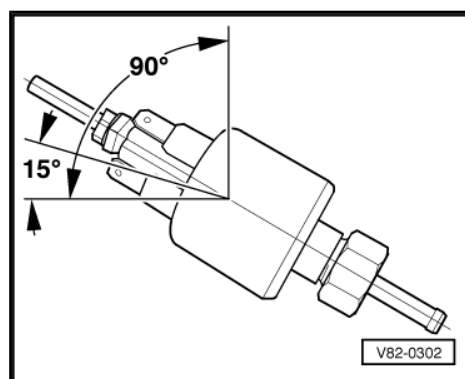
Dismantling metering pump -V54-

- 1 - Fuel pump
- 2 - Strainer
- 3 - Hose connection



Checking installation position of metering pump -V54-

- ◆ Positioned 15° to 90°



1.13 Regulation of auxiliary heater -D3W-

The auxiliary heater -D3W- is intended to heat the coolant and thereby assist the heating output of the engine.

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

After the engine is started at an ambient temperature of below 5 °C and if the coolant temperature is below 75 °C, the heater unit switches on.

If the heat required is 3000 watts (100% of heating output), then the heater unit operates in full load mode. The coolant temperature increases up to 85 °C (maximum).



If the coolant temperature reaches approx. 85 °C, then the heater unit operates in part load mode.

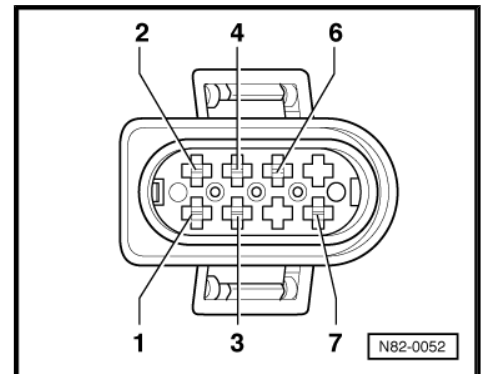
If the heat requirement is larger than 1500 watts (50% of heating output) then the coolant temperature will decrease. When the temperature reaches approx. 78 °C, the heater unit operates in full load mode again.

If, because of the low heat requirement, the coolant temperature increases further, at approx. 88 °C the heater unit goes into the run-on phase and is switched off after approx. 100 seconds.

1.14 Start sequence

1.14.1 Pin assignment for 8-pin connector -T8-on heater unit (harness end)

- 1 - Terminal 30
- 2 - Terminal 31
- 6 - Ambient temperature switch -F38-
- 7 - D+ from alternator



1.14.2 Start signals

- ◆ Terminal 30 from fuse box
- ◆ D+ from alternator; -engine running-
- ◆ Temperature at temperature sensor -G18- less than 75 °C
- ◆ Temperature at ambient temperature switch -F38- less than 5 °C



Note

If the temperature at flame monitor -G64- is greater than 70 °C it will be cooled for 4 minutes at a higher blower speed. Then the unit will start.

1.14.3 Start procedure

After each engine start the flame monitor -G64- must inform the control unit within 130 seconds after the heating has switched on, that the flame is burning normally. If this not the case, then the heater unit automatically attempts a second start. If, after the second start, the flame still does not burn normally, the heater will remain switched off until the engine is started again.

In part load mode the combustion air blower -V6- operates at reduced rpm and the metering pump -V54- delivers only approx. 50% of fuel (reduced pulse frequency).

Abortion of start procedure

The start procedure is aborted if:

- ◆ The flame monitor registers that the flame is not burning normally within 130 seconds.
- ◆ The temperature or overheating sensor detects a temperature greater than approx. 125 °C.
- ◆ The temperature difference between the temperature and overheating sensors exceeds 15 °C.



- ◆ The control unit detects a fault ⇒ [page 25](#) .



2 Auxiliary heater -D5W- Z (supplementary heater), vehicles 06.2000 ►

2.1 Repairing auxiliary heater -D5W- Z (supplementary heater)



Note

- ◆ *Before starting electrical welding work on the vehicle, disconnect the positive pole from the battery and connect it to earth in order to protect the heater control unit -J162- .*
- ◆ *A manufacturer's plate is attached to the heater unit. This plate provides information about the type of heater unit installed in the vehicle ⇒ [page 20](#) .*
- ◆ *The heater unit of the -D5W- Z has the same structure as the heater unit of the -D5W- S ⇒ [page 53](#) .*
- ◆ *Before every repair, please read out the fault memory of the control unit vehicle diagnostic, testing and information system -VAS 5051A- .*
- ◆ *Check the coolant circuit after working on it.*
- ◆ *Components identified with * are checked by the self-diagnosis function.*



1 - Metering pump -V54- *

- ❑ Installation position: in front of fuel tank on the right
- ❑ Removing and installing ⇒ [page 78](#)
- ❑ Fuel supply to auxiliary heater ⇒ [page 76](#) .

2 - Heater unit *

- ❑ With heater control unit -J162-
- ❑ Removing and installing ⇒ [page 61](#)
- ❑ Dismantling and assembling ⇒ [page 64](#)

3 - Exhaust system

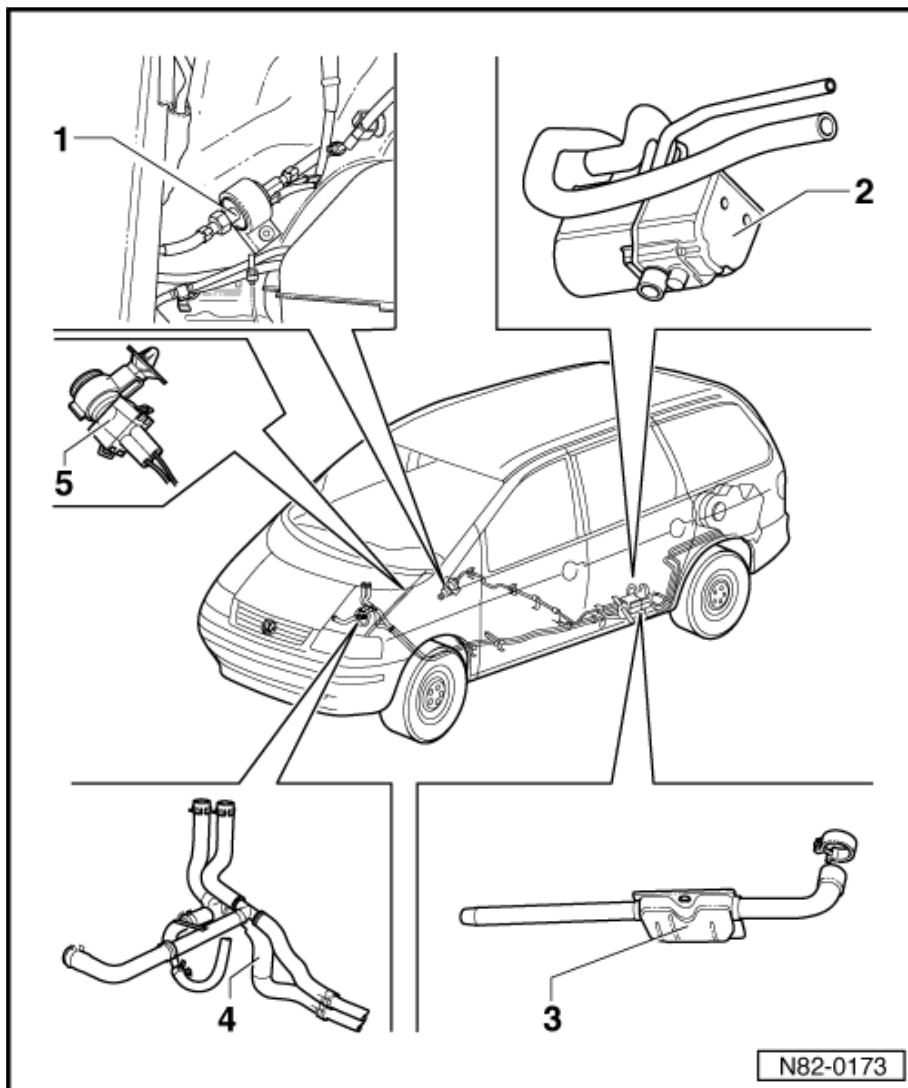
- ❑ Removing and installing ⇒ [page 56](#)
- ❑ Securing silencer to heater unit ⇒ [page 58](#)

4 - Coolant hoses

- ❑ Coolant hose routing; connecting auxiliary heater to coolant circuit ⇒ [page 21](#) .

5 - Ambient temperature switch -F38-

- ❑ Switch position -On- at temperatures lower than approx. 10 °C.
- ❑ Check switch positions with vehicle diagnostic, testing and information system -VAS 5051A- in "Guided fault finding" function
- ❑ Removing ⇒ [page 4](#)
- ❑ Checking ⇒ [page 70](#)



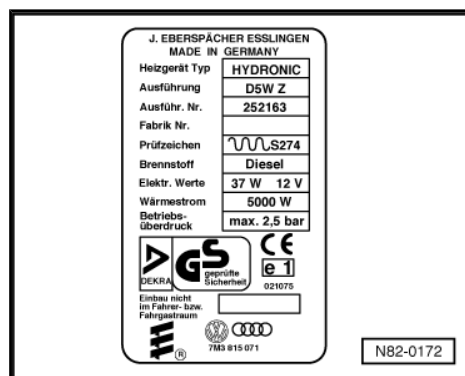
N82-0173

Manufacturer's plate



Note

- ◆ The most important technical data are shown on upper part of manufacturer's plate.
- ◆ Only the 25 2163 version for -D5W- Z is factory-fitted in the Sharan 06.2000 *.
- ◆ The heat exchanger for the auxiliary heaters does not have to be renewed after 10 years. Legislation in Germany dictates only that air heaters must be renewed.





Removing ambient temperature switch -F38-

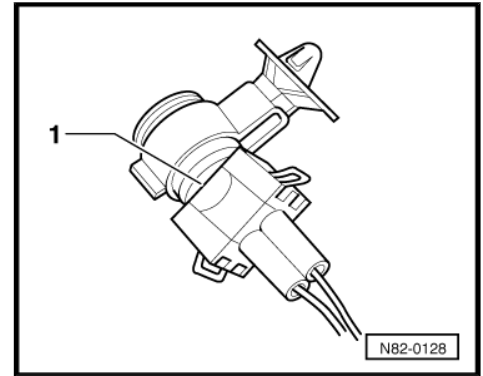
- Unclip ambient temperature switch -F38- -1- from holder on left in plenum chamber.



Note

In vehicles from model year 10.1998, the wiper motor must also be replaced ⇒ Rep. Gr. 92.

- Check ambient temperature switch -F38- ⇒ [page 70](#).



2.2 Connecting auxiliary heater -D5W- Z to coolant circuit



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 and reduce temperature before carrying out repairs.

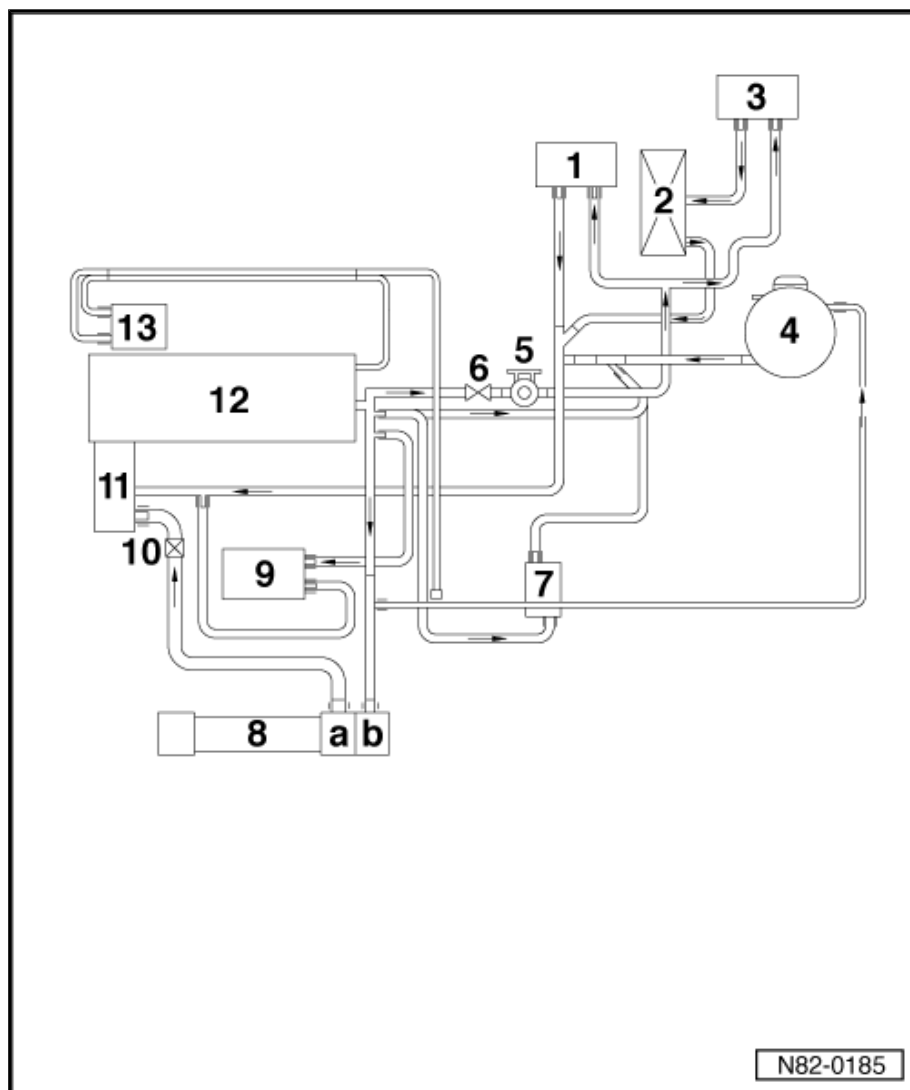


Note

- ◆ Bleed coolant circuit every time after opening it!
- ◆ Complete hose routing ⇒ Rep. Gr. 19
- ◆ The arrows in the illustration show the coolant flow direction.



- 1 - Heat exchanger for heater
- 2 - Heater unit
- 3 - Auxiliary heat exchanger
- 4 - Expansion tank
- 5 - Coolant circulation pump - V50-
- 6 - Switch-off valve for supplementary heater
- 7 - ATF cooler
- 8 - Radiator
 - ☐ a = Bottom
 - ☐ b = Top
- 9 - Oil cooler
- 10 - Thermostat
- 11 - Coolant pump
- 12 - Cylinder head
- 13 - Throttle valve preheater
 - ☐ Only 2.0 l and 2.8 l engines



2.3 Coolant hose routing on vehicles with 2nd heat exchanger

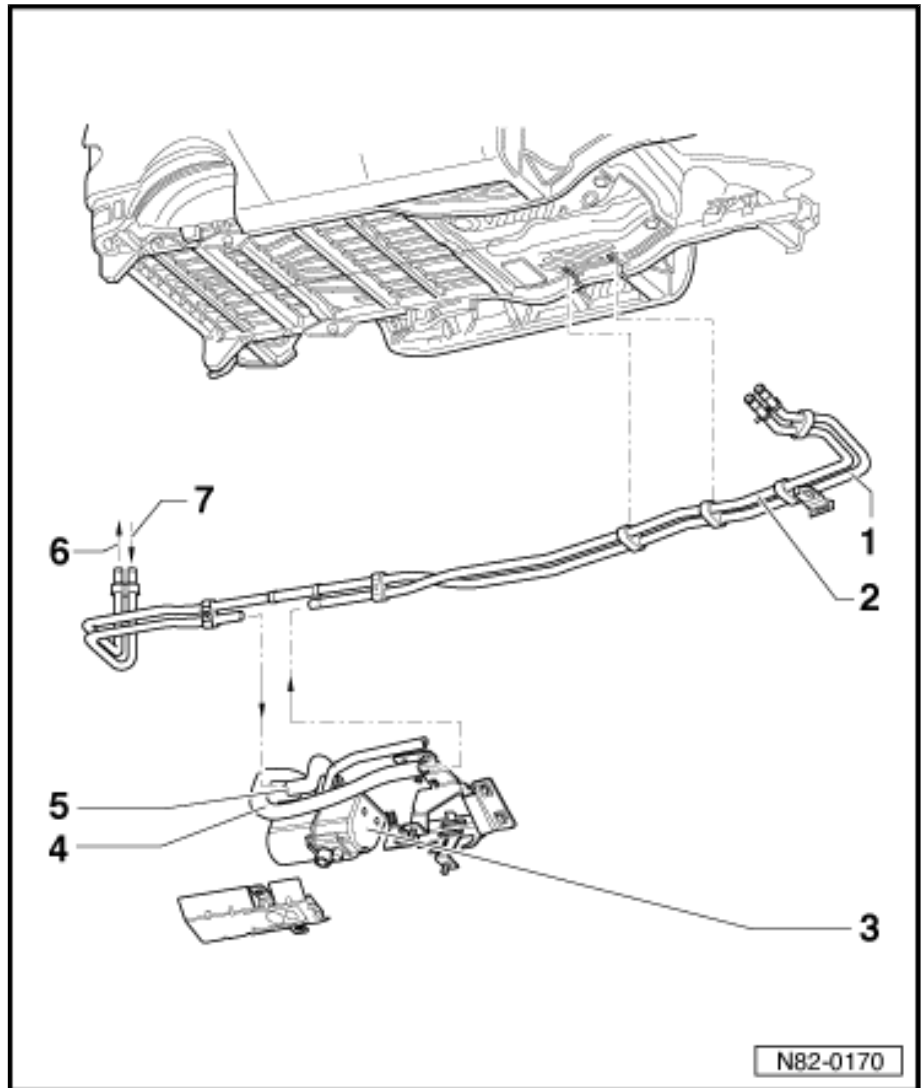


Note

The arrows in the illustration show the coolant flow direction.



- 1 - Coolant pipe, supply
- 2 - Coolant pipe, return
- 3 - Heater unit
- 4 - Coolant hose, return
 - ☐ From heater unit to coolant pipe
- 5 - Coolant hose, return
 - ☐ From coolant pipe to heater unit
- 6 - To 2nd heat exchanger
- 7 - From 2nd heat exchanger



2.4 Regulation of auxiliary heater -D5W- Z

The auxiliary heater -D5W- Z is intended to assist the heating output of the engine by heating the coolant.

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

After the engine is started at an ambient temperature of below approx. 10 °C and if the coolant temperature is below 75 °C, the heater unit switches on.

If the heat required is 5000 watts (100% of heating output), then the heater unit operates in full load mode. The coolant temperature increases up to 85 °C (maximum).

If the coolant temperature reaches approx. 85 °C, then the heater unit operates in part load mode.

If the heat requirement is larger than 2200 watts then the coolant temperature will decrease. When the temperature reaches approx. 78 °C, the heater unit operates in full load mode again.

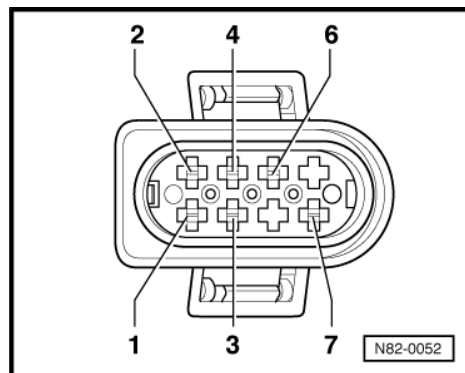
If, because of the low heat requirement, the coolant temperature increases further, at approx. 88 °C the heater unit goes into the run-on phase and is switched off after approx. 100 seconds.



2.4.1 Start sequence

2.4.2 Pin assignment for 8-pin connector -T8- on heater unit (harness end)

- 1 - Terminal 30
- 2 - Terminal 31
- 6 - Ambient temperature switch -F38-
- 7 - Terminal L from alternator



2.4.3 Start signals

- ◆ Terminal 30 from fuse box
- ◆ Terminal L from alternator; -engine running-
- ◆ Temperature at temperature sensor -G18- less than 75 °C
- ◆ Temperature at ambient temperature switch -F38- less than approx. 10 °C



Note

If the temperature at flame monitor -G64- is greater than 70 °C it will be cooled for 4 minutes at a higher blower speed. Then the unit will start.

2.4.4 Start procedure

After each engine start the flame monitor -G64- must inform the control unit within 130 seconds after the heating has switched on, that the flame is burning normally. If this not the case, then the heater unit automatically attempts a second start. If, after the second start, the flame still does not burn normally, the heater will remain switched off until the engine is started again.

In part load mode the combustion air blower -V6- operates at reduced rpm and the metering pump -V54- delivers only part of the fuel (reduced pulse frequency).

Abortion of start procedure

The start procedure is aborted if:

- ◆ The flame monitor -G64- registers that the flame is not burning normally within 130 seconds.
- ◆ The temperature or overheating sensor detects a temperature greater than 125 °C.
- ◆ The temperature difference between the temperature sensor -G18- and the overheating sensor -G189- exceeds 15 °C.
- ◆ The control unit detects a fault vehicle diagnostic, testing and information system -VAS 5051A-

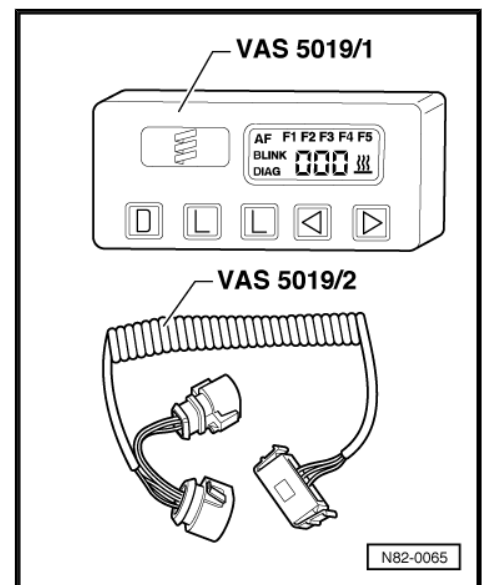


3 Auxiliary heater -B4W/ D4W-, vehicles ▶ 05.2000

3.1 Diagnosis with the diagnostic tester -5019-

Special tools and workshop equipment required

- ◆ Diagnostic tester -5019-



The heater control unit -J162- in the -B4W/- D4W- and in the -D3W- receives data from the electrical and electronic components:

- ◆ Coolant temperature sender for heater -G241-
- ◆ Flame monitor -G64-
- ◆ Overheating sensor -G189-

This data is processed by the heater control unit -J162- in the -B4W/- D4W- and -D3W-. The heater control unit -J162- then controls the combustion air blower -V6-, the glow plug for heater -Q9- and the metering pump -V54-. The heater control unit -J162- is equipped with a fault memory and recognises the fault that is currently present during the heating period. The current fault can be read as a fault code using diagnostic tester -5019-. Therefore, please connect the diagnostic tester -5019- immediately.

If fault code numbers are displayed, then the causes of the faults must be rectified according to the instructions in the fault table. The fault code numbers of the diagnostic tester must be cleared after the repair. After a road test, please use the diagnostic tester -5019- to read the heater control unit -J162- in the -B4W/- D4W- or -D3W- again.

The meanings of the fault code numbers are described in the fault table ⇒ [page 28](#).

3.1.1 Test prerequisites

- ◆ Fuses OK ⇒ Current flow diagrams, Electrical fault finding and Fitting locations
- ◆ Fuel in tank
- ◆ 12 volt voltage



- ♦ Coolant temperature is less than 75 °C. Exception: if the temperature at the flame monitor -G64- is greater than 70 °C, then the flame monitor -G64- is cooled for 4 minutes at the high blower speed of the combustion air blower -V6-. The auxiliary heater then restarts.
- ♦ The coolant expansion tank is sufficiently filled.



Note

- ♦ *The coolant circuit must be free of air for the auxiliary heater to heat properly. The diagnostic tester -5019- indicates air in the coolant circuit.*
- ♦ *Bleed coolant circuit every time after opening it!*

3.1.2 Operating diagnostic tester -5019-



Note

- ♦ *The heater control unit -J162- in the -B4W-/-D4W- or -D3W- detects one or more faults. The last fault which occurred is stored as a current fault in the fault memory of the heater control unit -J162-.*
- ♦ *The heater control unit -J162- can store up to 5 faults. It is not possible to select the fault memories F1 to F5.*
- ♦ *The current fault is stored in the last vacant memory location F1 to F5. The memory location F5 is overwritten if all memory locations are occupied.*

1 - "DIAG" display: 3-digit fault code number is displayed by the fault memory.

2 - "Flash" display: flashing code is displayed by the fault memory (not used).

3 - Display of the selected fault memory: AF - Current fault, F1 - Stored fault no. 1, F2 - Stored fault no. 2, F3 - Stored fault no. 3, F4 - Stored fault no. 4, F5 - Stored fault no. 5

4 - Display of the 3-digit fault code number.

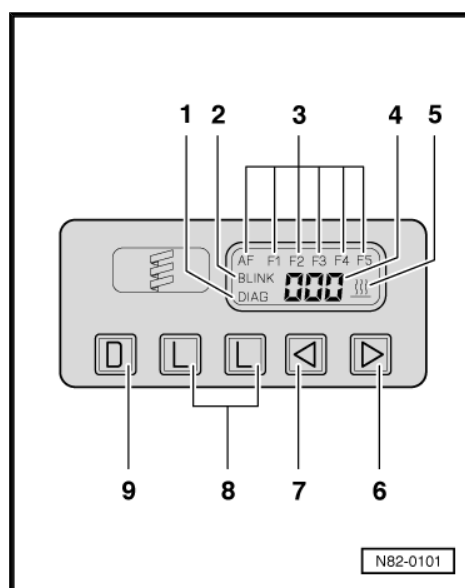
5 - Display for "Auxiliary heater on".

6 - Button ">" for scrolling up through the stored faults F1 to F5.

7 - Button "<" for scrolling down through the stored faults F1 to F5.

8 - Button "L" for deleting the stored faults. (Press both buttons for at least 2 seconds.) Continuous shut-down is revoked when the fault memory is cleared.

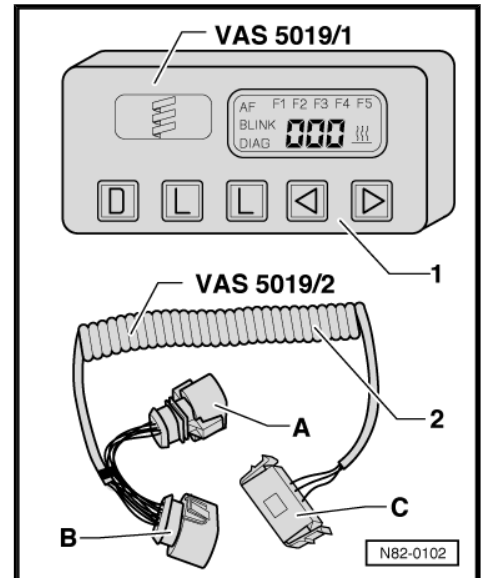
9 - Button "D" displays the 3-digit fault code of the fault memory.





3.1.3 Connecting diagnostic tester -5019-

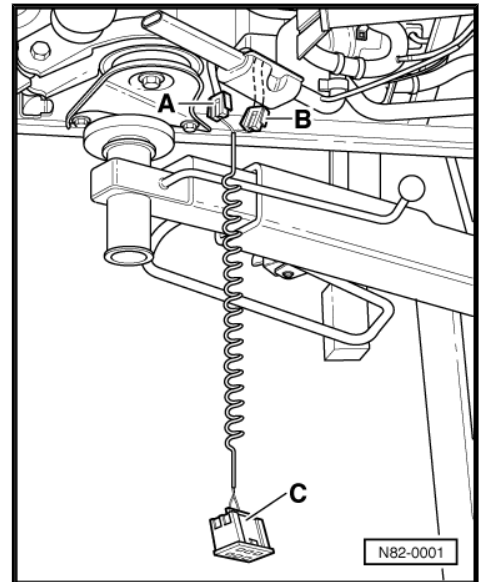
- 1 - Basic unit -5019/1-
- 2 - Diagnosis cable for auxiliary heater -5019/2-
- A - 8-pin connector housing, bypass connection
- B - 8-pin connector housing, bypass connection
- C - 8-pin connector housing, connection for basic unit -5019/1-



- Disconnect connector from auxiliary heater.
- First, only connect diagnosis cable to auxiliary heater using connector housings -A- and -B- without basic unit -5019/1-. Then connect basic unit -5019/1- to connector housing -C-.

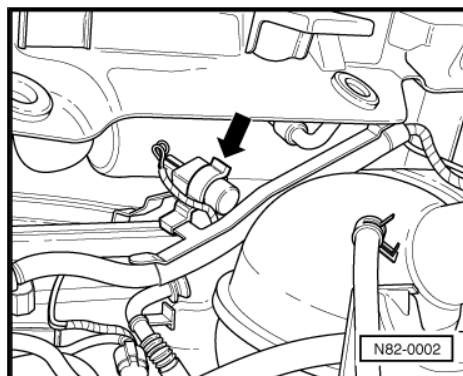
Note

- ◆ *Comply with the connection sequence, otherwise faults might be displayed that do not exist.*
- ◆ *The auxiliary heater starts without having been switched on. After 40 seconds, the combustion air blower -V6- can be heard operating.*
- ◆ *If the auxiliary heater does not start and the combustion air blower -V6- does not operate after 40 seconds, then the heater control unit -J162- has permanently switched off.*
- ◆ *If the auxiliary heater does not start in a vehicle with a diesel engine then the ambient temperature switch -F38- in the plenum chamber must be electrically bypassed.*



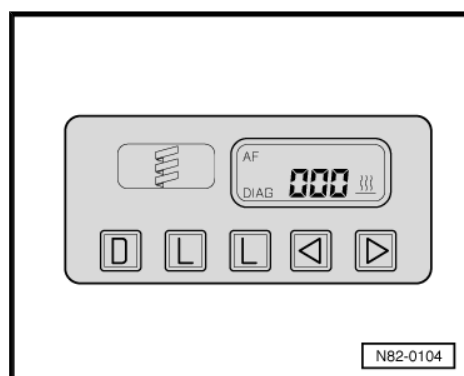


- Electrically bypass ambient temperature switch -F38- (part number: 701 959 625) in vehicles with a diesel engine. Fitting location: in plenum chamber.
- Call up fault memory.



3.1.4 Calling up fault memory of heater control unit -J162-

- Please press button “D”. The 3-digit fault code number appears.
- Please press buttons “>” and “<” to obtain all fault code numbers.
- Refer to the following fault table to determine the cause of the fault corresponding to the fault code number and the fault rectification description.



3.1.5 Fault table

Fault code number and meaning	Possible cause of fault	Fault rectification with remarks
000 No malfunction		
001 Overvoltage warning (> 16 V)	Controller	Renew
002 Undervoltage warning (< 10.2 V)	2nd. battery	Charge
010 Overvoltage shut-off (> 16 V)	2nd. battery	Voltage was present for longer than 20 seconds
011 Undervoltage shut-off (< 10.2 V)	2nd. battery	Voltages were present for longer than 20 seconds
012 Overheating	Temperature at flame monitor -G64- or overheating sensor -G189- too high (> 125 °C).	Air in coolant circuit, bleed ⇒ page 30
014 Evaluation of temperature difference between flame monitor -G64- and overheating sensor -G189-	Air in coolant circuit, flame monitor -G64- defective, overheating sensor -G189- defective	Bleed ⇒ page 30 , check flame monitor -G64- ⇒ page 45 , check overheating sensor -G189- ⇒ page 46
015 Continuous shut-down	Air in coolant circuit,	Bleed ⇒ page 30 Clear fault memory ⇒ page 26
017		



Fault code number and meaning	Possible cause of fault	Fault rectification with remarks
Overheating	Temperature too high (> 130 °C) at overheating sensor -G189- and coolant temperature sender for heater -G241-	Air in coolant circuit, bleed ⇒ page 30 Check overheating sensor -G189- ⇒ page 46 Check coolant temperature sender for heater -G241- ⇒ page 46 Clear fault memory ⇒ page 26
020 Glow plug for heater -Q9-	Defective	Renew
021 Short circuit on the glow plug for heater -Q9-	Short circuit on the connection or in the glow plug	Renew if necessary.
030 Combustion air blower -V6-	Blocked	Renew
032 Combustion air blower -V6-	Open circuit	Check the connection, replace if necessary
038 Fresh air blower -V2-	Open circuit	Check, Renew if necessary.
039 Fresh air blower -V2-	Short circuit	
041 Circulation pump -V55-	Open circuit	Check, replace if necessary and bleed coolant circuit ⇒ page 30
042 Circulation pump -V55-	Short circuit	
047 Metering pump -V54-	Short circuit	Check, Renew if necessary.
048 Metering pump -V54-	Open circuit	
050 Continuous shut-down	Unsuccessful start attempts	Erase fault memory ⇒ page 26 .
051 Time overrun	When blowing flame monitor -G64- cold with combustion air blower -V6-	Check flame monitor -G64- ⇒ page 45 .
052 Time overrun	Safety time exceeded after several start attempts	Check: exhaust pipe fuel volume, combustion air induction
053 Flame failure from the high control level	Metering pump -V54- (quantity delivered) Exhaust pipe (blocked) Combustion air (insufficient)	Check, Replace if necessary ⇒ page 48 Switch on heater once again.
054 Flame failure from medium control level	Flame monitor -G64- (values) The fault memory is cleared if the start is successful.	
056 Flame failure from low control level	Heater is permanently switched off. Clear fault memory after checking and replacing.	
060		



Fault code number and meaning	Possible cause of fault	Fault rectification with remarks
Coolant temperature sender for heater - G241-	Open circuit	Check water temperature,
061 Coolant temperature sender for heater - G241-	Short circuit	Check coolant temperature sender for heater - G241- , Replace if necessary ⇒ page 45
064 Flame monitor -G64-	Open circuit	Flame monitor -G64- Checking ⇒ page 45
065 Flame monitor -G64-	Short circuit	
071 Overheating sensor - G189-	Open circuit	Check,
072 Overheating sensor - G189-	Short circuit	Replace if necessary ⇒ page 44
090 Heater control unit - J162-	Error in microprocessor, (memory present)	Replace if necessary ⇒ page 43
091 Interference voltage	In vehicle electrical system or other voltage sources	Rectify
092 to 103 Heater control unit - J162-	Defective	Replacing ⇒ page 43 .

3.2 Bleeding coolant circuit

- Use a lifting platform to position the vehicle on a slant (raise the engine compartment by approx. 50 cm).



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 and reduce temperature before carrying out repairs.

- Top up coolant.
- Run the engine to warm it up, switch on the auxiliary heater.
- Use a lifting platform to position the vehicle on a slant (raise the engine compartment by approx. 50 cm).
- Top up coolant.



3.3 Road test for auxiliary heater in vehicle without Climatronic

Note

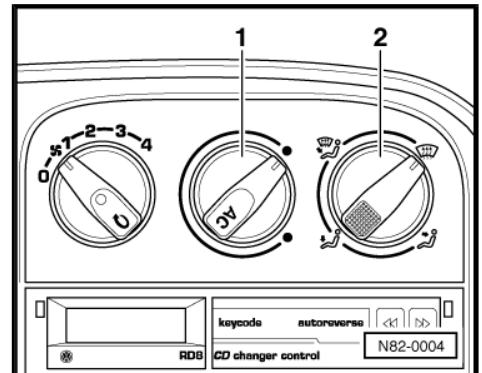
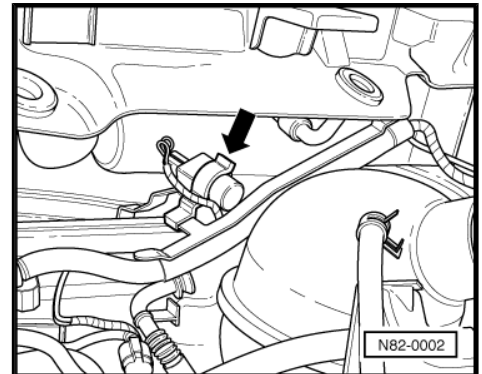
In a vehicle with a diesel engine, pull the ambient temperature switch -F38- off the connector housing and electrically bypass the contacts of the connector housing. Otherwise the auxiliary heater will not start at temperatures above 5 °C.

Ambient temperature switch -F38- with bracket -arrow- (part number 701 959 625)

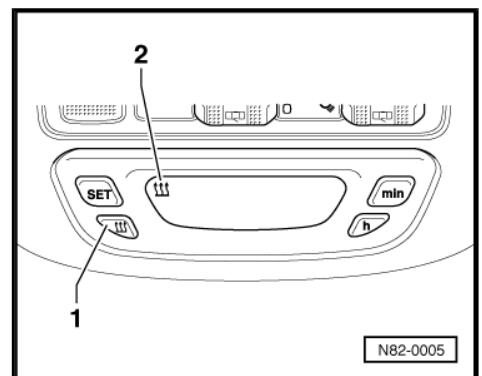
Note

In vehicles from model year 10.1998, the wiper motor must also be replaced ⇒ Rep. Gr. 92.

- Set fresh air blower switch
- Turn rotary knob for temperature flap -1- clockwise to stop.



- Turn rotary knob for flap position -2- clockwise to stop.





- Switch on auxiliary heater using pre-selection clock -E111- in moulded headliner. Press button -1- briefly. Symbol -2- for immediate heating appears.

In the engine compartment, the vacuum-controlled valve -arrow- blocks the coolant circulation through the radiator (controlled by the coolant circuit valve -N214-).



Note

- ◆ *Coolant is pumped through the auxiliary heater. The continued coolant circulation pump -V51- pumps in the vehicle with engine codes: ACV (TDI) or AES (VR6).*
- ◆ *The additionally installed circulation pump -V55- pumps in vehicles with other engines*
- ◆ *Combustion air blower -V6- and glow plug for heater -Q9- start after 6 seconds.*

Metering pump -V54- pumps 20 to 60 seconds later.

Flame monitor -G64- detects the flame. Full load operating mode starts.

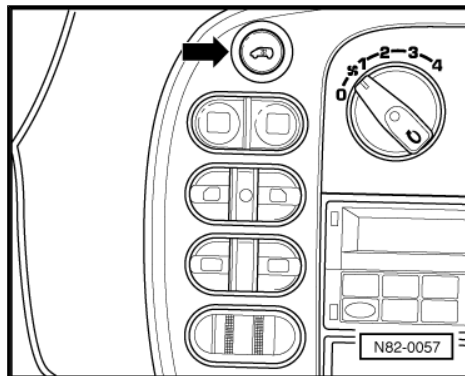
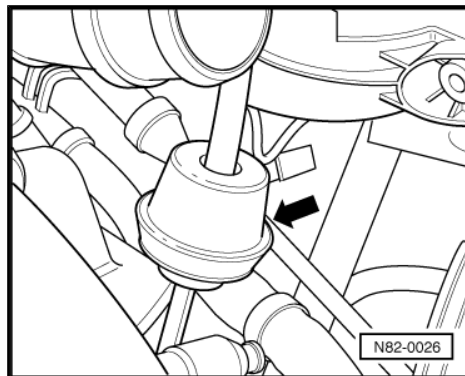
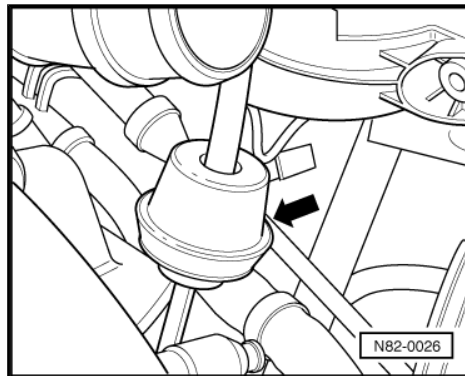


Note

- ◆ *The preheating time finishes after approx. 30 minutes. The heating enters the run-on phase.*
- ◆ *The heating continues to operate when the engine has started.*

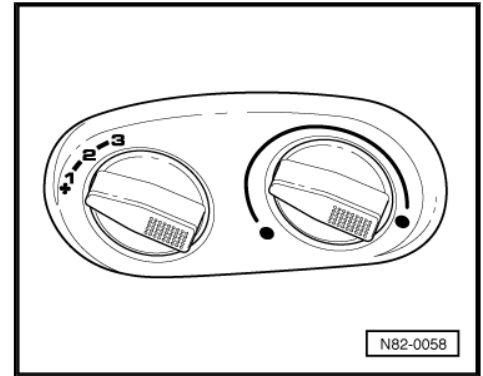
- Start engine.

- In the engine compartment, the vacuum-controlled valve -arrow- opens the coolant circulation through the radiator (controlled by the coolant circuit valve -N214-).





- Switch on the 2nd heat exchanger (briefly press the switch for heating, temperature control switch and timer -E13-).
- Switch on high temperature and blower speed on warm air blower switch -E100- .
- Run the engine to warm it up.
- Wait for several control processes to be completed.
- End the road test.
- Wait for auxiliary heater run-on phase.
- Perform diagnosis again with diagnostic tester ⇒ [page 25](#) .



i Note

The auxiliary heater is OK if no fault code appears.

- Top up coolant circuit again ⇒ [page 30](#) .
- The ambient temperature switch -F38- must be reconnected in the vehicle with a diesel engine and attached in the plenum chamber.

3.4 Road test for auxiliary heater in vehicle with Climatronic

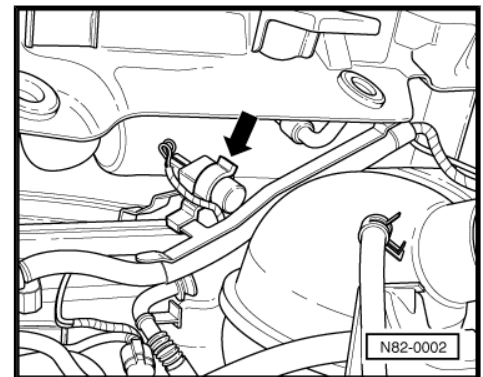
i Note

In a vehicle with a diesel engine, pull the ambient temperature switch -F38- off the connector housing and electrically bypass the contacts of the connector housing. Otherwise the auxiliary heater will not start at temperatures above 5 °C.

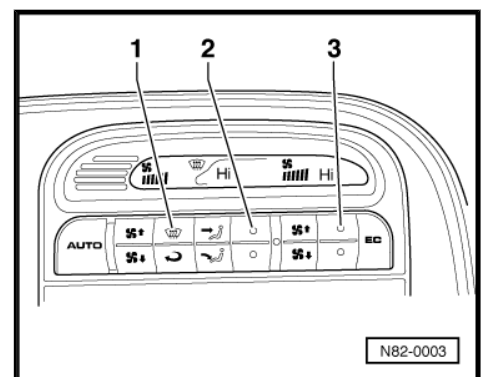
Ambient temperature switch -F38- with bracket -arrow- (part number 701 959 625)

i Note

In vehicles from model year 10.1998, the wiper motor must also be replaced ⇒ Rep. Gr. 92 .

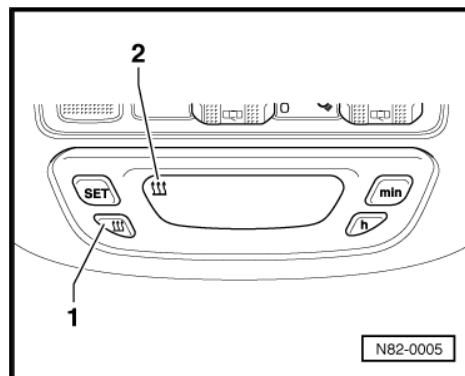


Setting operating and display unit for Climatronic air conditioning system -E87- :





- Press buttons -1-, -2- and -3- briefly.
- Switch on auxiliary heater using pre-selection clock -E111- in moulded headliner.
- Press button -1- briefly.



Symbol -2- for immediate heating appears.

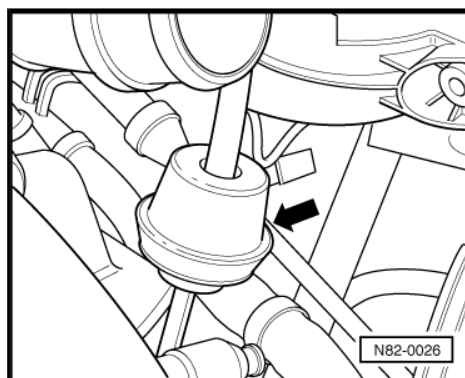
In the engine compartment, the vacuum-controlled valve -arrow- blocks the coolant circulation through the radiator (controlled by the coolant circuit valve -N214-).

Coolant is pumped through the auxiliary heater.



Note

- ◆ *The continued coolant circulation pump -V51- pumps in the vehicle with engine codes: ACV (TDI) or AES (VR6).*
- ◆ *The additionally installed circulation pump -V55- pumps in vehicles with other engines.*



Combustion air blower -V6- and glow plug for heater -Q9- start after 6 seconds.

Metering pump -V54- pumps 20 to 60 seconds later.

Flame monitor -G64- detects the flame.

Full load operating mode starts.



Note

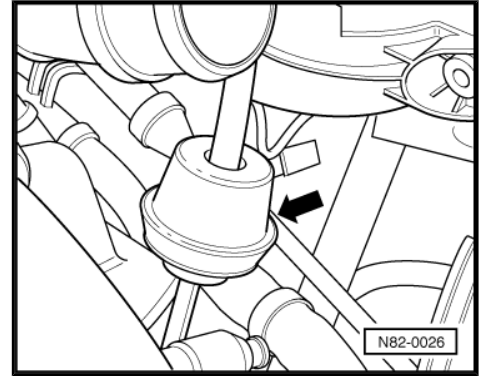
- ◆ *The preheating time finishes after approx. 30 minutes. The heating enters the run-on phase.*
- ◆ *The heating continues to operate when the engine has started.*



- Start engine.
- In the engine compartment, the vacuum-controlled valve -arrow- opens the coolant circulation through the radiator (controlled by the coolant circuit valve -N214-).
- Run the engine to warm it up.

Wait for several control processes to be completed.

- End the road test.
- Wait for auxiliary heater run-on phase.
- Perform diagnosis again with diagnostic tester ⇒ [page 25](#) .



Note

The auxiliary heater is OK if no fault code appears.

- Top up coolant circuit again ⇒ [page 30](#) .
- The ambient temperature switch -F38- must be reconnected in the vehicle with a diesel engine and attached in the plenum chamber.

3.5 Repairing auxiliary heater -B4W- / -D4W-

Before beginning repair work, perform the following steps:

- Disconnect battery ⇒ Rep. Gr. 27 .



Note

- ◆ *Before starting electrical welding work on the vehicle, disconnect the positive pole from the battery and connect it to earth in order to protect the heater control unit -J162- .*
- ◆ *A manufacturer's plate is attached to the heater unit. This plate gives details of the heater unit type installed in the vehicle ⇒ [page 37](#) .*
- ◆ *The coolant circuit must be bled before testing work and after it is opened ⇒ [page 30](#)*



1 - Metering pump -V54-

- ❑ Checking fuel supply to auxiliary heater -B4W- or -D4W- ⇒ [page 47](#) .
- ❑ In some cases, the metering pump might tick audibly but still does not deliver fuel because there is air in the intake connecting pipe. The heater control unit - J162- will then switch off permanently.
- ❑ The diagnostic tester -5019- specifies the fault code 052. Please erase the fault code and switch the heater - B4W- / -D4W- on several times.

2 - Heater unit -B4W- / -D4W-

- ❑ With heater control unit -J162-
- ❑ Removing and installing ⇒ [page 37](#)
- ❑ Dismantling and assembling ⇒ [page 39](#)

3 - Exhaust pipe

4 - Circulation pump -V55-

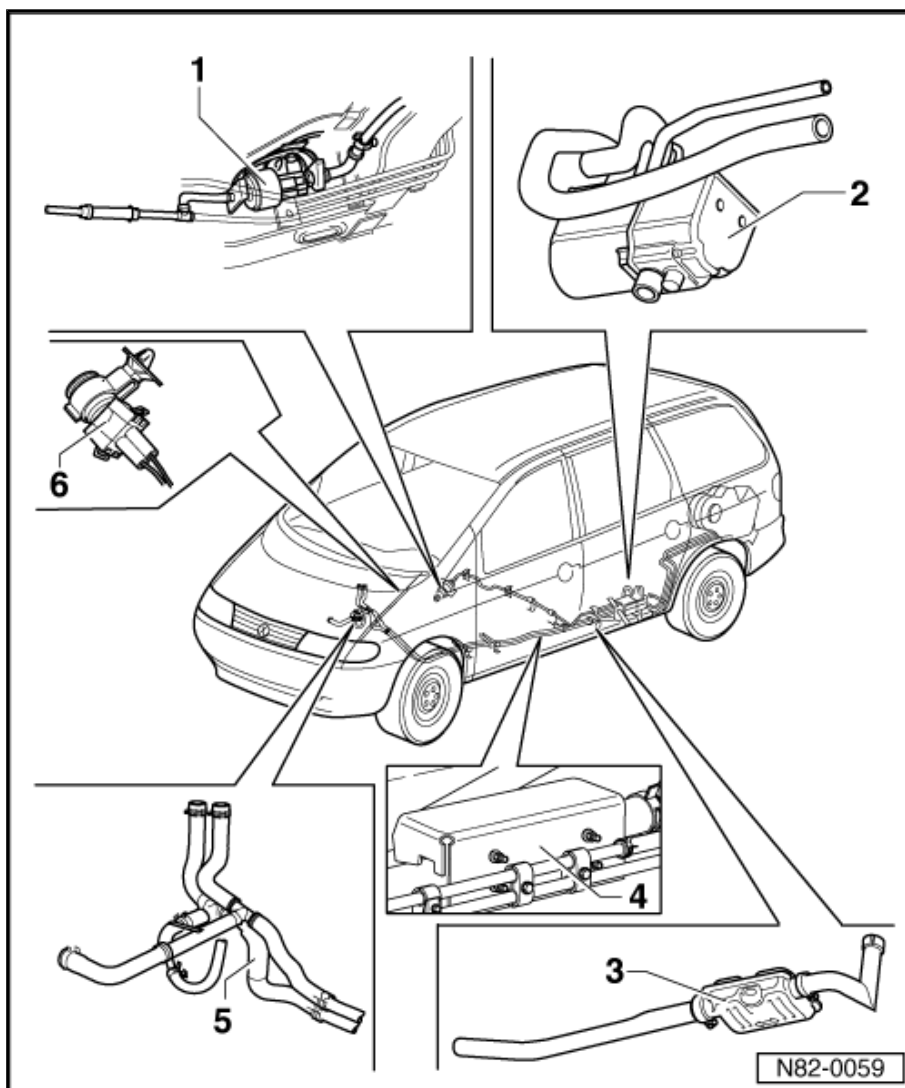
- ❑ This circulation pump - V55- is only installed if the vehicle engine does not have a continued coolant circulation pump -V51- .

5 - Coolant hoses

- ❑ Coolant hose routing; connecting auxiliary heater to coolant circuit ⇒ [page 47](#) .

6 - Ambient temperature switch -F38-

- ❑ Switch position "on" at temperatures below 5 °C
- ❑ Switch position "off" at temperatures above 5 °C
- ❑ Part number 701 959 625



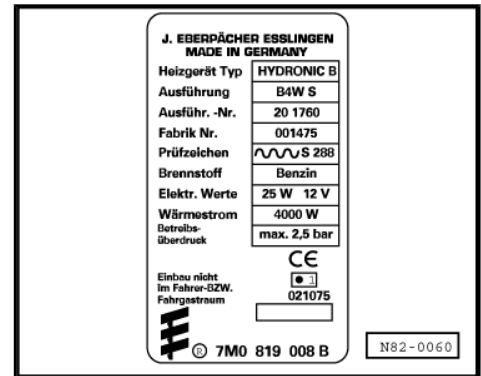


Manufacturer's plate



Note

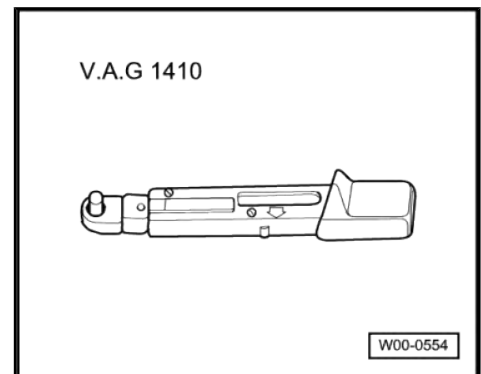
- ◆ The most important technical data are shown on upper part of manufacturer's plate.
- ◆ The date of first use is entered on the lower part of manufacturer's plate.
- ◆ Version -B4W- for petrol: 20 1760; version -D4W- for diesel: 25 1950.
- ◆ The year the unit was first put into use must be entered on the "Genuine part" manufacturer's plate. The heat exchanger for the auxiliary heaters does not have to be renewed after 10 years. Legislation in Germany dictates that air heaters must be renewed.
- ◆ The manufacturer's plate must be attached at a clearly visible location, e.g. on the lock carrier.



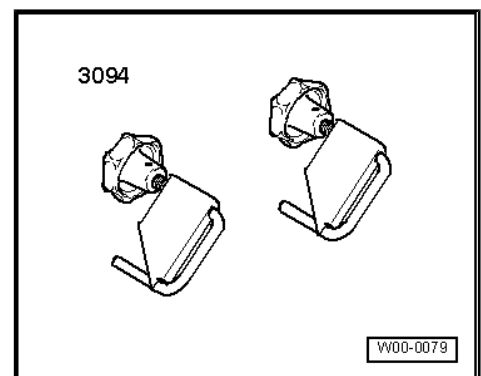
3.6 Removing and installing heater unit - B4W- / -D4W-

Special tools and workshop equipment required

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



- ◆ Hose clamps up to 25 mm Ø -3094-

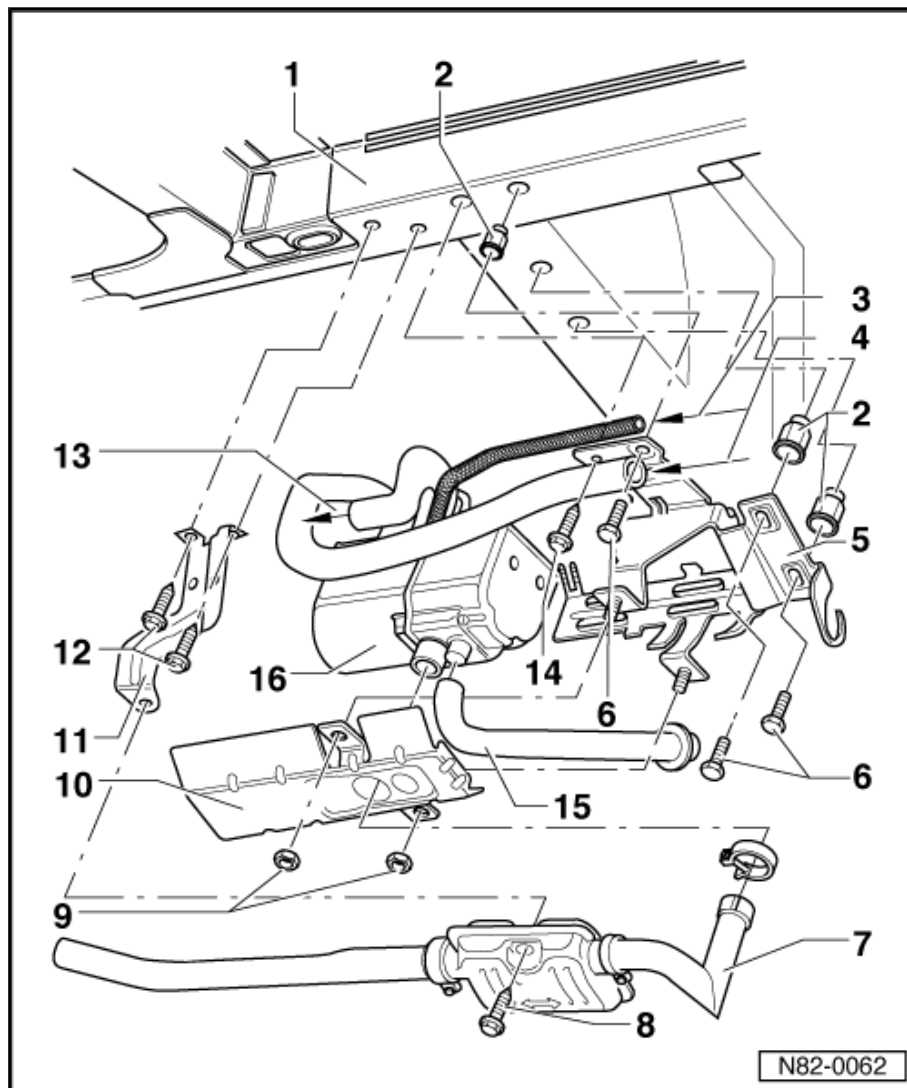


Note

Drain coolant before removing. Fill with new coolant after installing and bleed coolant circuit according to instructions
⇒ [page 30](#).



- 1 - Longitudinal member
- 2 - Blind rivet nut M8
- 3 - Fuel line
 - ☐ From metering pump to heater unit
- 4 - Coolant hose, supply
- 5 - Bracket for heater unit
- 6 - Hexagon bolt M8×20
 - ☐ 10 Nm
- 7 - Exhaust system
- 8 - Hexagon bolt M6×16
 - ☐ 6 Nm
- 9 - Hexagon nut M8
 - ☐ 10 Nm
- 10 - Clamping plate
- 11 - Bracket
- 12 - Self-tapping screw 4.8x16
- 13 - Coolant hose, return
- 14 - Self-tapping screw 4.8x16
- 15 - Intake hose
 - ☐ Securing ⇒ [page 39](#) .
- 16 - Heater unit -B4W- / -D4W-
 - ☐ With heater control unit -J162-
 - ☐ Dismantling and assembling ⇒ [page 39](#)
 - ☐ Removing



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 and reduce temperature before carrying out repairs.

- ☐ Open radiator cap.
- ☐ Clamp off coolant hoses to heater unit with hose clamps up to Ø 25 mm -3094- and unfasten hoses.

Volkswagen Technical Site: <http://vwts.ru> <http://vwts.info>



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 heater unit and seal.
- ☐ Disconnect 8-pin connector (T8) from heater control unit -J162- .



WARNING

Danger of burn injuries.

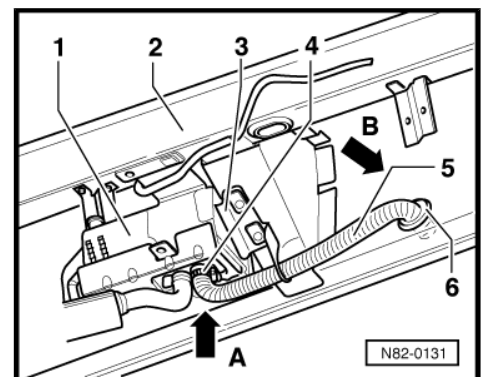
Parts of the exhaust system may be hot.

Before removing exhaust system, let it cool off.

- ☐ Unfasten silencer on bracket.
- ☐ Unscrew heater unit with bracket for heater unit.
- ☐ Secure intake hose → [page 39](#) .

Securing intake hose

- 1 - Heater unit
- 2 - Longitudinal member
- 3 - Bracket
- 4 - Screw-type clip
- 5 - Intake hose
- 6 - Sealing ring
- Push intake hose -5- in direction of -arrow A- until it makes contact with housing of heater unit -1-.
- Fasten screw-type clip -4-.
- Push intake hose through sealing ring -6- into bulkhead -arrow B- up to stop.
- Insert intake hose into bow of bracket -3-.



3.7 Dismantling and assembling heater unit -B4W- (petrol)



Note

*Dismantling and assembling heater unit -D4W- (diesel)
⇒ [page 42](#) .*



1 - Water jacket cover

2 - Bolt M5×12

3 - Heat exchanger

- ☐ Clean inside and outside with brass wire brush (spark plug brush).
- ☐ Note installation position ⇒ [page 43](#).

4 - O-ring

- ☐ Renew
- ☐ Moisten with coolant additive G12 when installing.

5 - Seal

- ☐ Always renew after dismantling.

6 - Combustion chamber with flame tube

- ☐ Clean inside and outside with brass wire brush (spark plug brush).
- ☐ Combustion chambers for petrol and diesel are different.

7 - Combustion air blower cover

8 - Glow plug for heater -Q9-

- ☐ Removing ⇒ [page 45](#)
- ☐ Rated voltage: 8 volts
- ☐ Clean glow plug with brass wire brush (spark plug brush).
- ☐ Remove glow plug connection, remove and clean strainer.
- ☐ 6 Nm
- ☐ Check under rated voltage 8 V.

9 - Bolt M4×10

10 - Socket head screw M5×65

- ☐ 6 Nm

11 - Socket head screw M5×16

- ☐ 6 Nm

12 - Heater control unit -J162-

- ☐ Removing ⇒ [page 43](#)

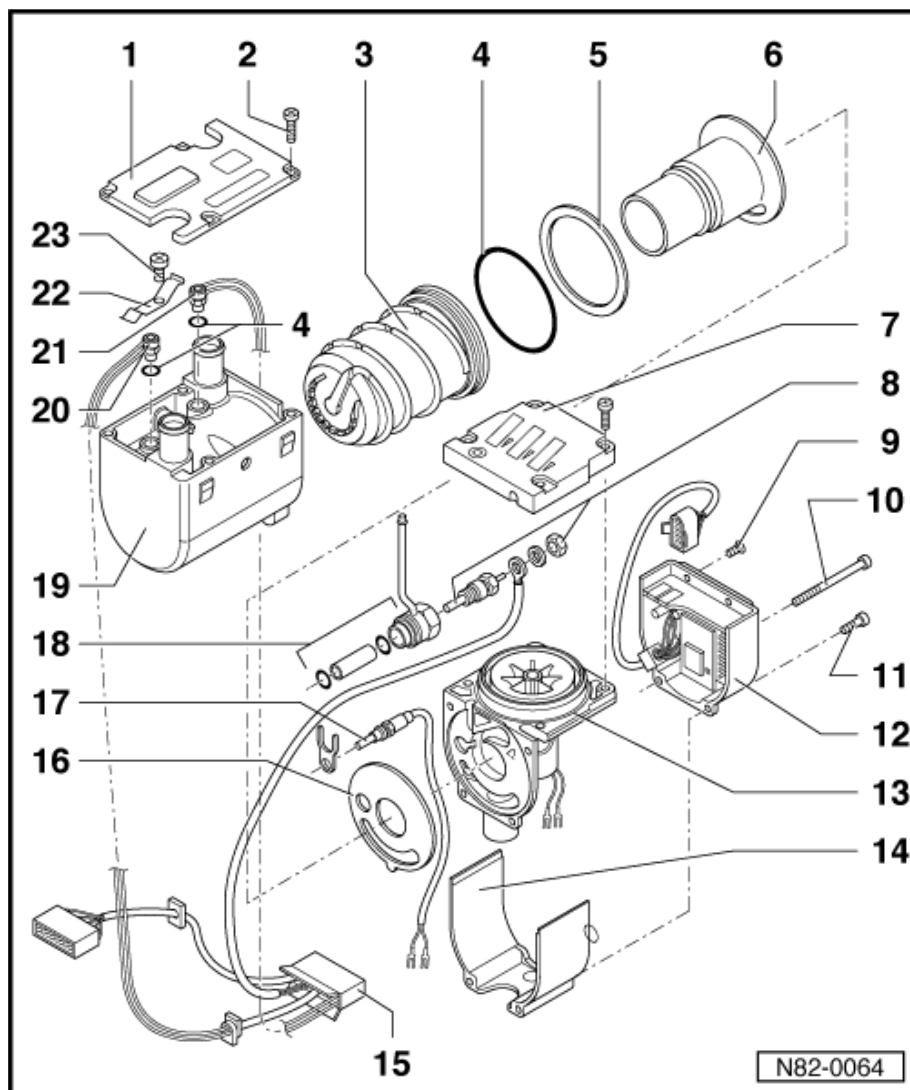
13 - Combustion air blower -V6-

- ☐ Replacing ⇒ [page 44](#).
- ☐ Do not dismantle further

14 - Cover

15 - Wiring harness

- ☐ Fold open connector housing to enable sockets to be pressed out.
- ☐ Pin assignment:





- ☐ Combustion air blower -V6- : chamber 3 - brown, chamber 4 - black.
- ☐ Flame monitor -G64- : chamber 13 - brown -, chamber 14 - blue.
- ☐ Overheating sensor -G189- : chambers 9 + 10 - red.
- ☐ Coolant temperature sender for heater -G241- : chambers 11 + 12 - blue.
- ☐ Glow plug for heater -Q9- : chamber 5 - white -, chamber 6 - brown.

16 - Seal

- ☐ Always renew after dismantling.

17 - Flame monitor -G64-

- ☐ Removing ⇒ [page 44](#)
- ☐ Checking ⇒ [page 45](#)

18 - Glow plug connection

- ☐ Clean strainer

19 - Water jacket

- ☐ Clean inside and outside with brass wire brush (spark plug brush).

20 - Overheating sensor -G189-

- ☐ Removing ⇒ [page 44](#)
- ☐ Checking ⇒ [page 46](#)

21 - Coolant temperature sender for heater -G241-

- ☐ Removing ⇒ [page 45](#)
- ☐ Checking ⇒ [page 46](#)

22 - Spring

- ☐ Do not bend further.
- ☐ Renew if damaged.

23 - Screw M5×16



3.8 Dismantling and assembling heater unit -D4W- (diesel)

1 - Water jacket cover

2 - Bolt M5×12

3 - Heat exchanger

- ☐ Clean inside and outside with brass wire brush (spark plug brush).
- ☐ Note installation position ⇒ [page 43](#).

4 - O-ring

- ☐ Renew
- ☐ Moisten with coolant additive G12 when installing.

5 - Seal

- ☐ Always renew after dismantling.

6 - Combustion chamber with flame tube

- ☐ Clean inside and outside with brass wire brush (spark plug brush).
- ☐ Combustion chambers for petrol and diesel are different.

7 - Combustion air blower cover

8 - Bolt M5×12

9 - Bolt M4×10

10 - Socket head screw M5×65

- ☐ 6 Nm

11 - Socket head screw M5×16

- ☐ 6 Nm

12 - Heater control unit -J162-

- ☐ Removing ⇒ [page 43](#)

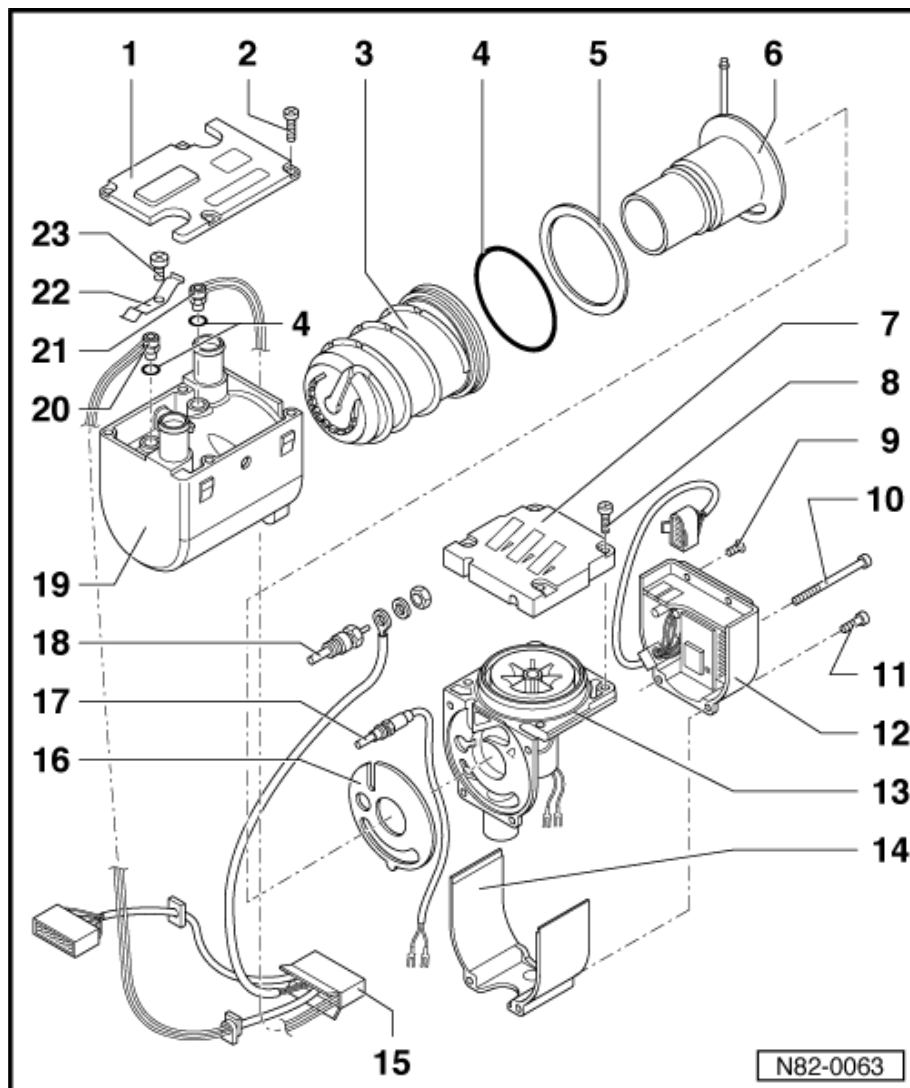
13 - Combustion air blower -V6-

- ☐ Replacing ⇒ [page 44](#).
- ☐ Do not dismantle further

14 - Cover

15 - Wiring harness

- ☐ Fold open connector housing to enable sockets to be pressed out.
- ☐ Pin assignment:
 - ☐ Combustion air blower -V6- : chamber 3 - brown, chamber 4 - black.
 - ☐ Flame monitor -G64- : chamber 13 - brown, chamber 14 - blue.
 - ☐ Overheating sensor -G189- : chambers 9 + 10 - red.
 - ☐ Coolant temperature sender for heater -G241- : chambers 11 + 12 - blue.
 - ☐ Glow plug for heater -Q9- : chamber 5 - white, chamber 6 - brown.





16 - Seal

- ☐ Always renew after dismantling.

17 - Flame monitor -G64-

- ☐ Removing ➔ [page 44](#)
- ☐ Checking ➔ [page 45](#)

18 - Glow plug for heater -Q9-

- ☐ Removing ➔ [page 45](#)
- ☐ Rated voltage: 8 volts
- ☐ Clean glow plug with brass wire brush (spark plug brush).
- ☐ 6 Nm
- ☐ Check under rated voltage 8 V.

19 - Water jacket

- ☐ Clean inside and outside with brass wire brush (spark plug brush).

20 - Overheating sensor -G189-

- ☐ Removing ➔ [page 44](#)
- ☐ Checking ➔ [page 44](#)

21 - Coolant temperature sender for heater -G241-

- ☐ Removing ➔ [page 45](#)
- ☐ Checking ➔ [page 46](#)

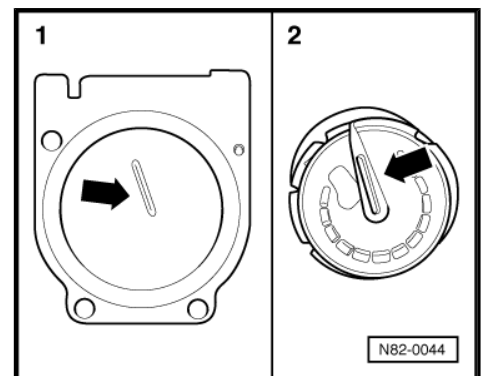
22 - Spring

- ☐ Do not bend further.
- ☐ Renew if damaged.

23 - Screw M5×16

Heat exchanger installation position

- Insert heat exchanger -2- into water jacket -1- until centring -arrows- engages.
- Push heat exchanger tightly into seating.



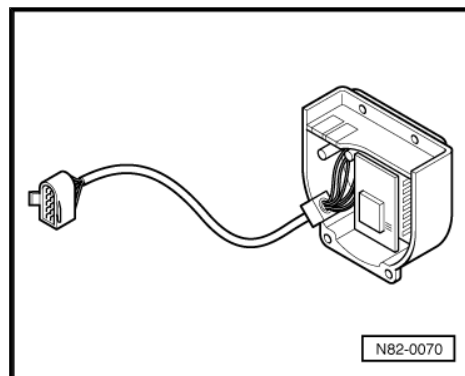
3.9 Removing heater control unit -J162-

Before beginning repair work, perform the following jobs:

- Remove heater unit ➔ [page 37](#) .



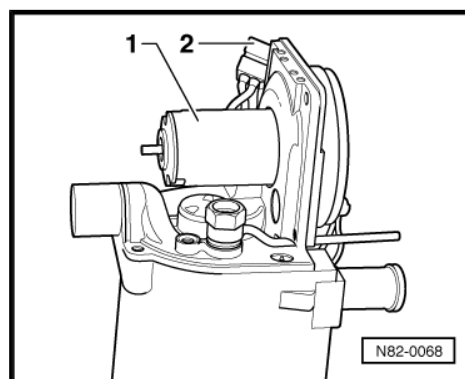
- Dismantle and assemble heater unit -B4W- or heater unit - D4W- ➔ [page 39](#) or ➔ [page 42](#)
- Pull 8-pin connector (T8) off (snapped in).



3.10 Renewing combustion air blower -V6-

Before beginning repair work, perform the following jobs:

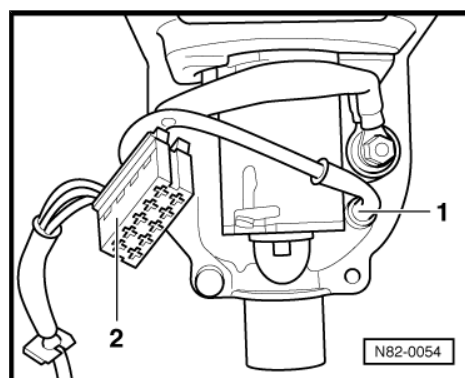
- Remove heater unit ➔ [page 37](#) .
- Dismantle and assemble heater unit -B4W- or heater unit - D4W- ➔ [page 39](#) or ➔ [page 42](#)
- Fold open connector housing -2- on both sides.
- Press out brown cable in chamber 3.
- Press out black cable in chamber 4.



3.11 Removing flame monitor -G64-

Before beginning repair work, perform the following jobs:

- Remove heater unit ➔ [page 37](#) .
- Dismantle and assemble heater unit -B4W- or heater unit - D4W- ➔ [page 39](#) or ➔ [page 42](#)
- Fold open connector housing -2- on both sides.
- Press out brown cable in chamber 13.
- Press out blue cable in chamber 14.



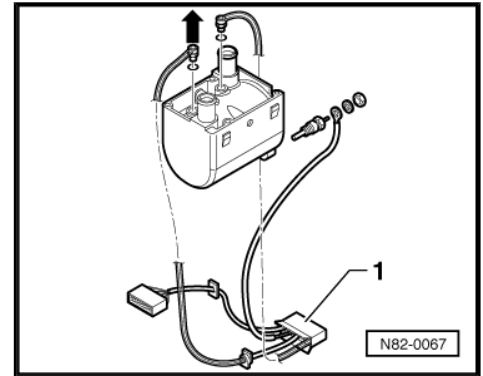
3.12 Removing overheating sensor -G189-

Before beginning repair work, perform the following jobs:

- Remove heater unit ➔ [page 37](#) .



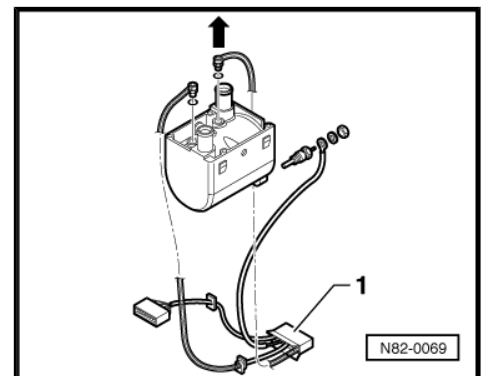
- Dismantle and assemble heater unit -B4W- or heater unit -D4W- ⇒ [page 39](#) or ⇒ [page 42](#) .
- Remove overheating sensor -G189- -arrow-.
- Fold open connector housing -1- on both sides.
- Press out red cables in chambers 9 + 10.



3.13 Removing coolant temperature sender for heater -G241-

Before beginning repair work, perform the following jobs:

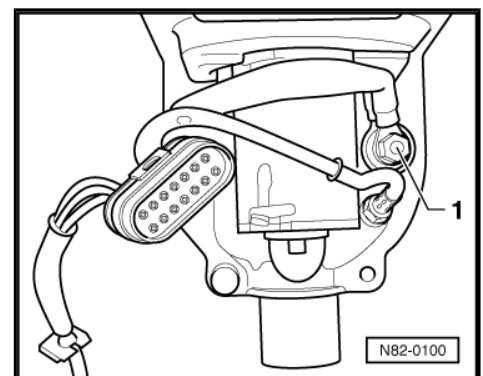
- Remove heater unit ⇒ [page 37](#) .
- Dismantle and assemble heater unit -B4W- or heater unit -D4W- ⇒ [page 39](#) or ⇒ [page 42](#) .
- Remove coolant temperature sender for heater -G241- -arrow-.
- Fold open connector housing -1- on both sides.
- Press out blue cables in chambers 11 + 12.



3.14 Removing glow plug for heater -Q9-

Before beginning repair work, perform the following jobs:

- Remove heater unit ⇒ [page 61](#) .
- Dismantling and assembling heater unit ⇒ [page 64](#)
- Unscrew glow plug wiring -1-.
- Remove glow plug for heater -Q9- (6 Nm).



3.15 Checking flame monitor -G64-

- Remove heater unit -B4W- or -D4W-.
- Remove heater control unit -J162- .
- Pull connector housing off control unit.



- Measure resistance between chamber 13 and chamber 14 at brown and blue cable:

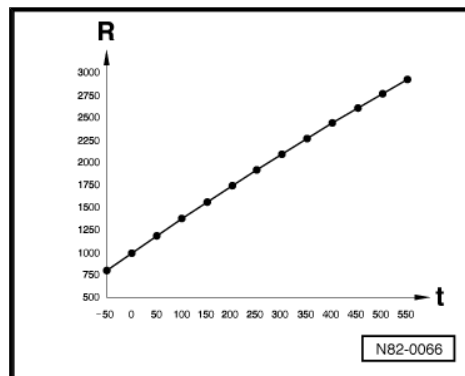
R = resistance in Ω

t = temperature in $^{\circ}\text{C}$

- Please measure resistance at prevailing temperature.

Evaluation:

- ◆ Defective > 3040 Ω = open circuit
- ◆ Defective < 780 Ω = short circuit



3.16 Checking overheating sensor -G189-

- Remove heater unit -B4W- or -D4W-.
- Remove heater control unit -J162- .
- Pull connector housing off control unit.
- Measure resistance between chamber 9 and chamber 10 at red cables.

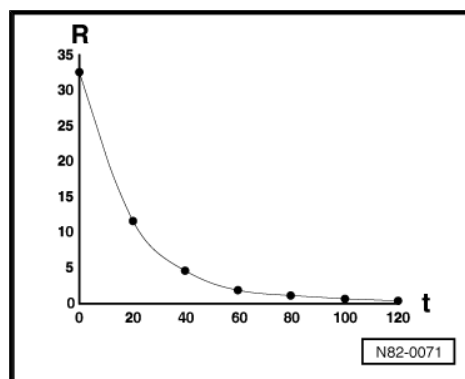
R = resistance in $\text{K}\Omega$

t = temperature in $^{\circ}\text{C}$

- Please measure resistance at prevailing temperature.

Evaluation:

- ◆ Defective > 2M Ω = open circuit
- ◆ Defective < 50 Ω = short circuit



3.17 Checking coolant temperature sender for heater -G241-

- Remove heater unit -B4W- or -D4W-.
- Remove heater control unit -J162- .
- Pull connector housing off control unit.
- Measure resistance between chamber 11 and chamber 12 at blue cables.

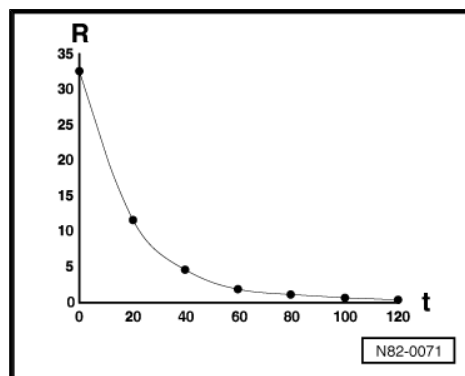
R = resistance in $\text{K}\Omega$

t = temperature in $^{\circ}\text{C}$

- Please measure resistance at prevailing temperature.

Evaluation:

- ◆ Defective > 2M Ω = open circuit
- ◆ Defective < 50 Ω = short circuit





3.18 Connecting auxiliary heater -B4W- and -D4W- 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 and reduce temperature before carrying out repairs.



Note

- ◆ *The coolant circuit must be free of air for the auxiliary heater to heat properly. The diagnostic tester -VAS 5019- indicates air in the coolant circuit.*
- ◆ *Bleed coolant circuit every time after opening it!*

The arrows in the illustration show the coolant flow direction.

1 - Auxiliary heater -B4W- or -D4W-

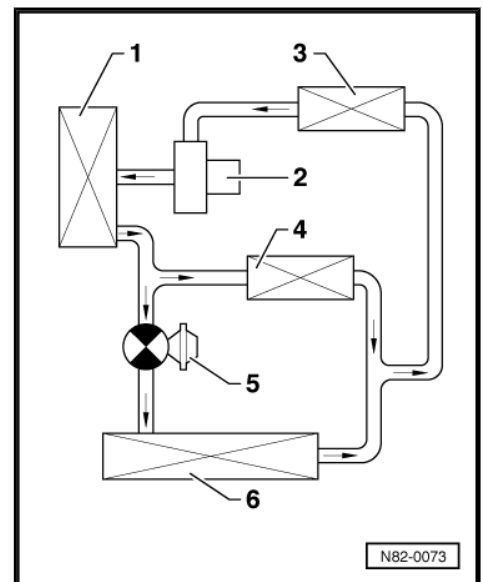
2 - Circulation pump -V55- is not installed in vehicles with engine codes ACV- (TDI) and AES- (VR6); the function is performed by continued coolant circulation pump -V51- .

3 - 2nd heat exchanger (extra equipment)

4 - Heat exchanger (standard)

5 - Coolant shut-off valve (controlled by coolant circuit valve - N214-).

6 - Engine



3.19 Fuel supply to auxiliary heaters -B4W- / -D4W-

3.19.1 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.

3.19.2 Testing quantity of fuel delivered

Special tools and workshop equipment required

- ◆ Hand multimeter -V.A.G 1526B-



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



- ◆ Current flow diagram
- ◆ Commercially available measuring glass (0 ml to 25 ml)
- ◆ Fuel hose, length approx. 200 mm



Note

A second mechanic may be required to switch on the auxiliary heater -B4W- / -D4W- as it may be necessary to raise the vehicle to check the quantity of fuel delivered.

3.19.3 Test prerequisites:

- Resistance of metering pump = 10 Ω .
- Voltage at metering pump = 11 to 13 volts.
- No fault stored in fault memory.
- Fuel lines are not damaged or leaking.
- Fuel tank sufficiently filled (fuel gauge on dash panel insert not in red area).



3.19.4 Checking:



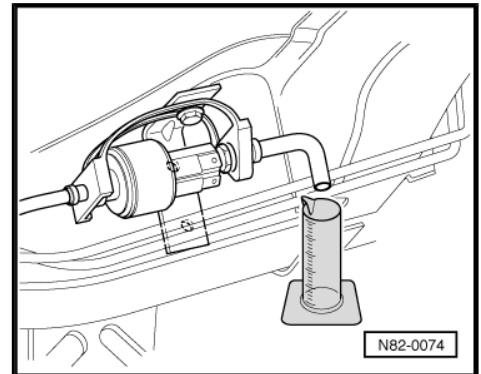
WARNING

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.*

- Remove fuel line from pressure connection of metering pump and fit a new fuel hose (length approx. 20 cm) from pressure connection to measuring glass (capacity approx. 25 ml).
- Switch auxiliary heater on (with the help of a second mechanic, if required). The metering pump will start to deliver after 40 seconds.
- Hold measuring glass at same height as heater unit.
- After approx. 40 seconds, the fuel line is filled and bled.
- Switch auxiliary heater off and empty measuring glass.
- Switch auxiliary heater on again.
- Hold measuring glass at same height as heater unit.
- The auxiliary heater switches off automatically after 90 seconds.
- Read measuring glass. Quantity delivered: petrol = 9.3 ml to 10.7 ml; diesel = 6.7 ml to 9 ml
- If quantity delivered is not within specifications, renew metering pump -V54- .



3.19.5 Fuel take-off



Note

- ◆ *Fuel lines are secured with O-type clips. These O-type clips must always be replaced with screw-type clips.*
- ◆ *Start vehicle engine if fuel tank was empty. Then start auxiliary heater several times until heater does not switch off by itself.*
- ◆ *Observe the rules for cleanliness when doing all work on the fuel supply system → [page 47](#) .*
- ◆ *The metering pumps for the auxiliary heaters -B4W- and -D4W- have different fuel delivery rates: note part number.*



1 - Fuel line

- ❑ From fuel tank to fuel pump

2 - Fuel return

3 - Hose clamp

4 - T-piece

5 - Fuel gauge sender -G-

6 - Heater unit

7 - Metering pump -V54-

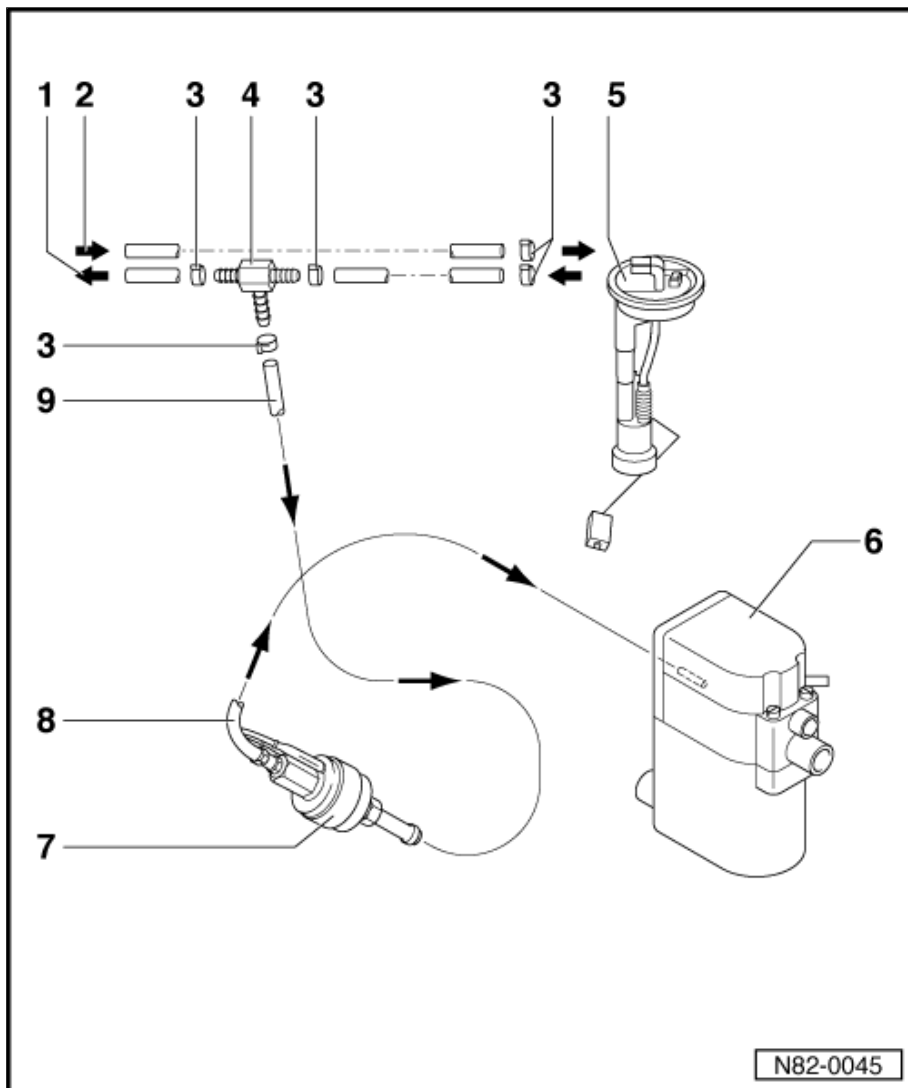
- ❑ Removing and installing
⇒ [page 50](#)
- ❑ Dismantling
⇒ [page 51](#)
- ❑ Checking installation
position ⇒ [page 51](#)
- ❑ Checking fuel quantity
delivered ⇒ [page 48](#) .

8 - Fuel line

- ❑ From fuel pump to heater unit

9 - Fuel line

- ❑ From T-piece to fuel pump



3.20 Removing and installing metering pump -V54-

1 - Bracket

2 - Metering pump -V54-

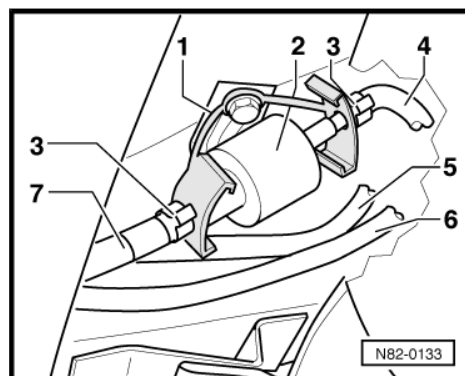
3 - Screw-type clip

4 - Fuel line to heater unit

5 - Fuel line, return from engine to fuel tank

6 - Fuel line, supply from fuel tank to engine fuel pump

7 - Fuel line from T-piece connection in supply fuel line, from fuel tank to engine fuel pump



3.20.1 Removing

- Pull connector off.



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.*

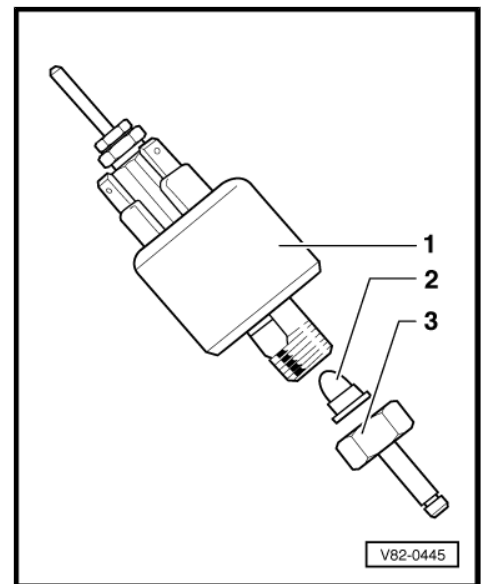
- Detach fuel hoses -4- and -7- from fuel pump and seal.
- Remove fuel pump from bracket -1-.

3.20.2 Installing

- Ensure proper fitting position ⇒ [page 51](#)

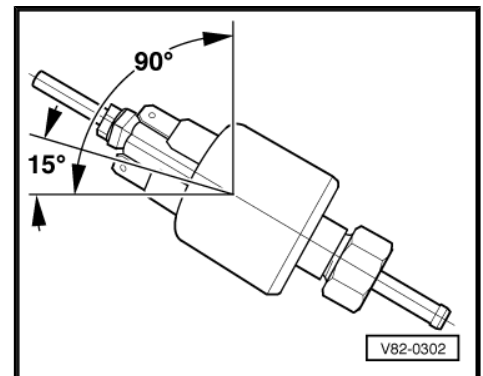
Dismantling metering pump -V54-

- 1 - Metering pump -V54-
- 2 - Strainer
- 3 - Hose connection



Checking installation position of metering pump -V54-

- ◆ Positioned 15° to 90°



3.21 Regulation of auxiliary heaters -B4W- and -D4W-

Auxiliary heater -B4W- / -D4W- is intended to heat the coolant and thereby assist the heating output of the engine. It can also be used as an auxiliary heater when the engine is switched off.

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

If the heat required is 4000 watts (100% of heating output), then the heater unit operates in full load mode. The coolant temperature increases up to 85 °C (maximum).

The auxiliary heater controls three heating levels: 4000 watts, 3300 watts and 1600 watts.



The heating levels cannot be set manually. The heater control unit -J162- controls the heat requirement.

The heater control unit -J162- calculates the heat requirement based on the temperatures measured by the coolant temperature sender for heater -G241- .

The auxiliary heater reduces its power if the coolant temperature is 85 °C. The heater interrupts control. Then the 100 second run-on phase starts. The combustion air blower -V6- runs at its highest level during the run-on phase. The circulation pump -V55- or continued coolant circulation pump -V51- continues to run until the next control start.

The control start begins at a coolant temperature of 65 °C at the highest level and the highest speed of the combustion air blower -V6- .

If the heater unit is switched off or if a malfunction shut-off occurs, the run-on phase of the combustion air blower -V6- takes place at low speed.

The flame is monitored by the flame monitor -G64- , the maximum permitted temperature is monitored by the overheating sensor -G189- . Both influence the heater control unit -J162- which switches off when there are malfunctions.

The start is repeated if the heater does not ignite within 90 seconds after fuel pumping starts. A malfunction shut-off occurs if the heater does not ignite after another 90 seconds.

A new start is performed initially if the flame goes out by itself during operation. The malfunction shut-off occurs if the heater does not ignite within 90 seconds after the fuel pumping is switched on or if the heater ignites but goes out again. The malfunction shut-off can be revoked by switching off and back on again.

The overheating sensor -G189- is triggered in the event of overheating (lack of water, air in the coolant circuit). The fuel supply is interrupted. The malfunction shut-off then occurs. Once the cause of overheating has been eliminated, the auxiliary heater can be restarted by switching off and back on again. Prerequisite: the auxiliary heater has cooled down sufficiently!

The malfunction shut-off occurs if the voltage drops below approx. 10 volts or rises above approx. 16 volts.

The auxiliary heater does not start if the glow plug for heater -Q9- is defective.

The speed-controlled combustion air blower -V6- is permanently monitored. The malfunction shut-off takes place in the event of a fault if it does not start or becomes blocked.

Check the following in case of a sooty flame: eliminate obstacles to the combustion air supply and in the exhaust gas pipe. Check the quantity delivered by the metering pump -V54- , renew it if necessary. Clean deposits off the heat exchanger for the auxiliary heater, replace if necessary.



4 Auxiliary heater -B5W- S / -D5W- S, vehicles 06.2000 ▶

4.1 Repairing auxiliary heater -B5W- S / -D5W- S

Before beginning repair work, perform the following steps:

- Disconnect battery ⇒ Rep. Gr. 27 .



Note

- ◆ *Before starting electrical welding work on the vehicle, disconnect the positive pole from the battery and connect it to earth in order to protect the heater control unit -J162- .*
- ◆ *A manufacturer's plate is attached to the heater unit. This plate provides information about the type of heater unit installed in the vehicle: petrol -B5W- S ⇒ [page 55](#) or diesel -D5W- S ⇒ [page 55](#)*
- ◆ *The coolant circuit must be bled before testing work and after it is opened ⇒ [page 76](#)*
- ◆ *Components identified with * are checked by the self-diagnosis function.*
- ◆ *Before every repair, please read out the fault memory of the control unit vehicle diagnostic, testing and information system -VAS 5051A- .*
- ◆ *Vehicles with engine code AYL (6 cyl.) are equipped with a vacuum switch for auxiliary heater -F359- . This vacuum switch for auxiliary heater -F359- switches off the auxiliary heater when there is no vacuum. The reason for this is that the two pneumatic valves in the coolant circuit (big / small coolant circuit) are controlled by vacuum to close them. If there is no vacuum, the auxiliary heater operates in the big coolant circuit. On starting the engine, the engine control unit operates with implausible temperature values and will not let the engine start. The vacuum switch for auxiliary heater -F359- is located behind the engine control unit.*



1 - Metering pump -V54-

- ☐ Installation position: in front of fuel tank on the right
- ☐ Fuel supply to auxiliary heater ➔ [page 76](#) .
- ☐ In some cases, the metering pump might tick audibly but still does not deliver fuel because there is air in the intake connecting pipe. The control unit will then switch off permanently.
- As a result, read fault memory using vehicle diagnosis, testing and information system - VAS 5051A- .
- Please clear fault memory and switch heater on several times.
- ☐ Removing and installing ➔ [page 78](#) .

2 - Heater unit *

- ☐ With heater control unit -J162-
- ☐ Removing and installing ➔ [page 61](#)
- ☐ Dismantling and assembling ➔ [page 64](#)

3 - Exhaust system

- ☐ Removing and installing ➔ [page 56](#)
- ☐ Securing exhaust pipe to heater unit ➔ [page 56](#) .

4 - Circulation pump -V55-

- ☐ Removing ➔ [page 55](#)
- ☐ Installation position: fitted in front of heater unit in driving direction.

5 - Coolant hoses

- ☐ Coolant hose routing; connecting auxiliary heater to coolant circuit ➔ [page 72](#) .

6 - Valve for coolant circuit -N214-

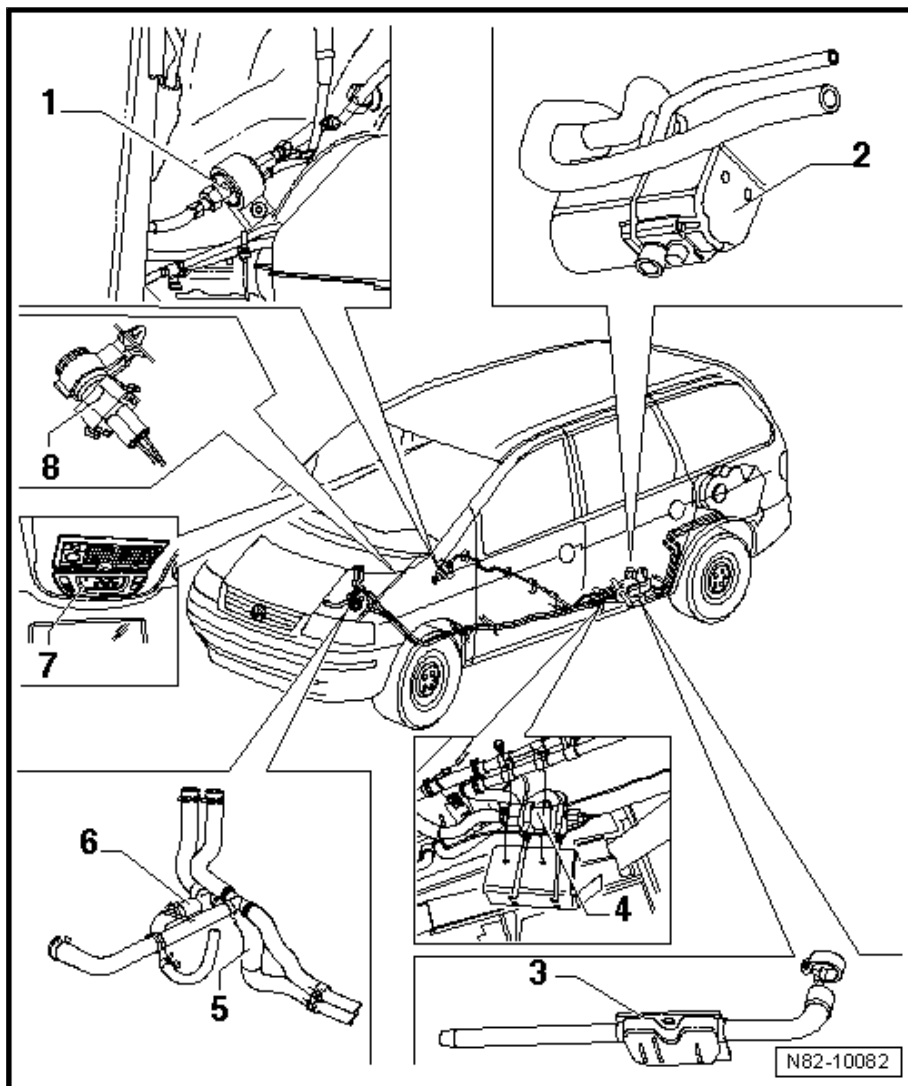
- ☐ Only in vehicles with engine codes: AYL, ASZ

7 - Pre-selection clock -E111-

- ☐ Removing ➔ [page 56](#)

8 - Ambient temperature switch -F38-

- ☐ Installation position: front left in plenum chamber
- ☐ Only in vehicles with TDI engines
- ☐ Switch position -On- at temperatures lower than approx. 10 °C.
- ☐ Check the switch positions with vehicle diagnosis, testing and information system -VAS 5051A- in "Guided fault finding" function
- ☐ Part number 701 959 625
- ☐ Removing ➔ [page 55](#)



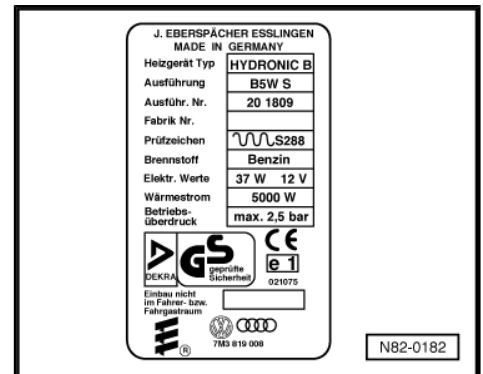


- ❑ Check with vehicle diagnosis, testing and information system -VAS 5051A- in "Guided fault finding" function

Manufacturer's plate for petrol -B5W- S

Note

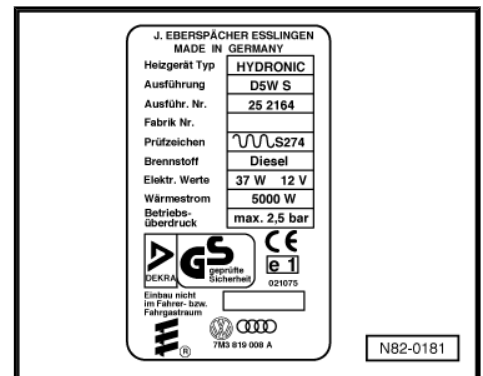
- ◆ The most important technical data are shown on upper part of manufacturer's plate.
- ◆ Only the 20 1809 version for -B5W- S is factory-fitted in the Sharan 06.2000 ➤.
- ◆ The heat exchanger for the auxiliary heaters does not have to be renewed after 10 years. Legislation in Germany dictates only that air heaters must be renewed.



Manufacturer's plate for diesel -D5W- S

Note

- ◆ The most important technical data are shown on upper part of manufacturer's plate.
- ◆ Only the 25 2164 version for -D5W- S is factory-fitted in the Sharan 06.2000 ➤.
- ◆ The heat exchanger for the auxiliary heaters does not have to be renewed after 10 years. Legislation in Germany dictates only that air heaters must be renewed.



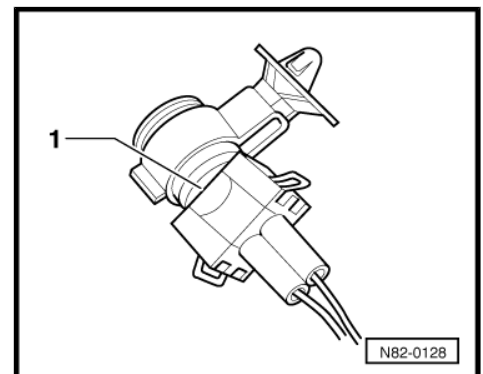
4.2 Removing ambient temperature switch - F38-

- Unclip ambient temperature switch -F38- -1- from bracket at front left in plenum chamber.

Note

In vehicles from model year 10.1998, the wiper motor must also be replaced ⇒ Rep. Gr. 92.

- Disconnect connector from ambient temperature switch -F38- and remove ambient temperature switch -F38-.

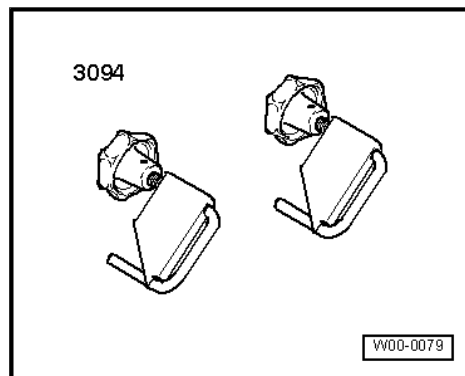


4.3 Removing circulation pump -V55-

Special tools and workshop equipment required



- ◆ Hose clamps up to 25 mm Ø -3094-



- Loosen bolts -1- for bracket.

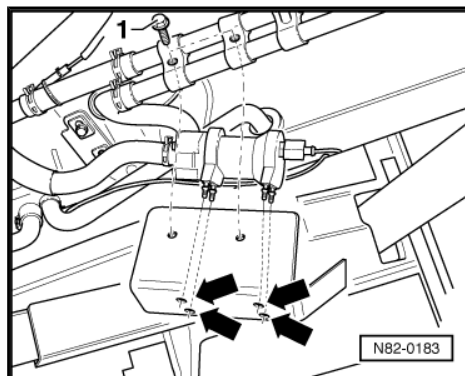


WARNING

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 and reduce temperature before carrying out repairs.



- Please disconnect coolant hoses from circulation pump with hose clamps up to Ø 25 mm -3094- .
- Disconnect connector from circulation pump -V55- .
- Pull circulation pump -V55- out of bracket -arrows-.

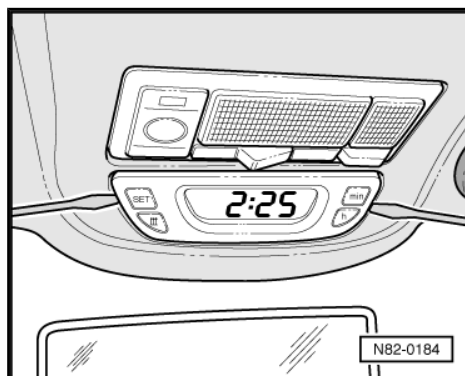


Note

- ◆ *The coolant circuit must be free of air for the auxiliary heater to heat properly.*
- ◆ *Bleed coolant circuit every time after opening it!*

4.4 Removing pre-selection clock -E111-

- Carefully lever pre-selection clock out from trim with screwdriver.
- Pull off connectors.



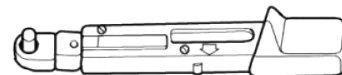
4.5 Removing and installing exhaust system

Special tools and workshop equipment required



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

V.A.G 1410



W00-0554



WARNING

Danger of burn injuries.

Silencer could be hot.

Before removing silencer, let it cool off.

1 - Heater unit

- ☐ With heater control unit
-J162-

2 - Clip

3 - Silencer

- ☐ Securing silencer to
heater unit ⇒ [page 58](#)

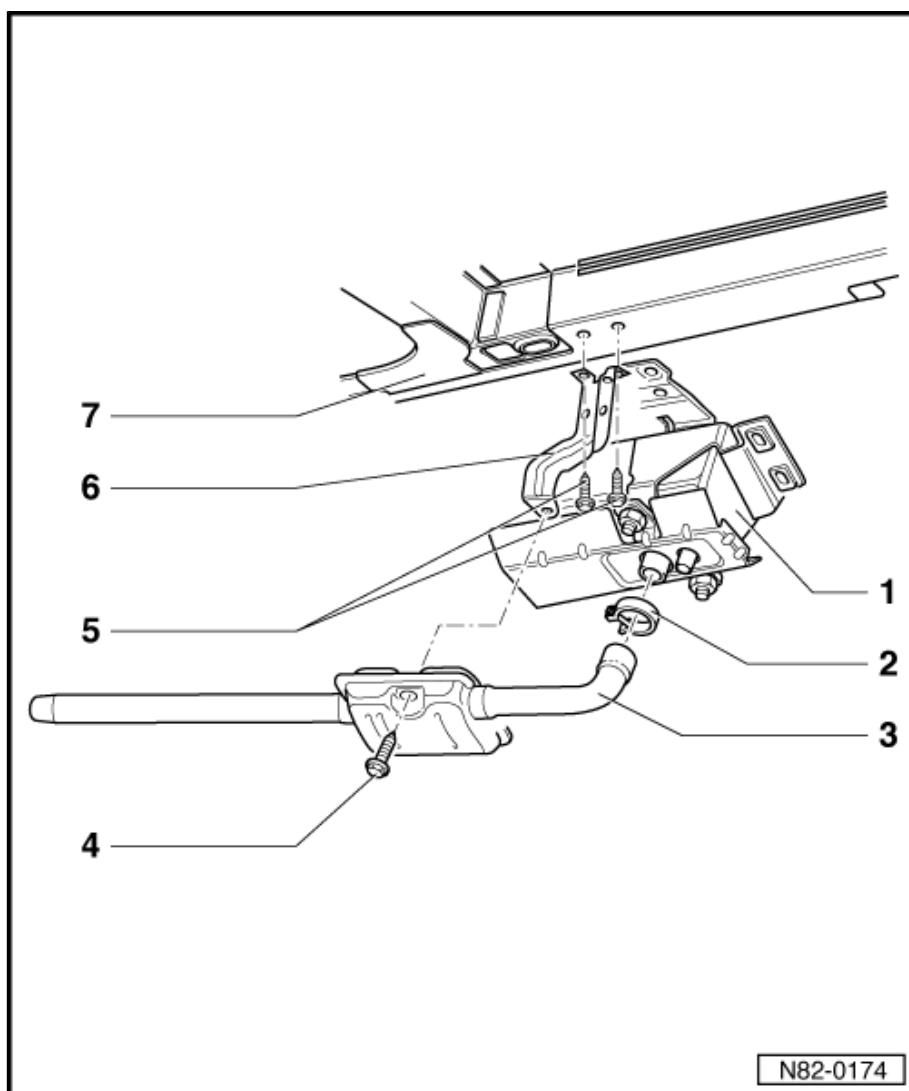
4 - Hexagon bolt M6×16

- ☐ 6 Nm

5 - Self-tapping screw 4.8x16

6 - Bracket

7 - Longitudinal member

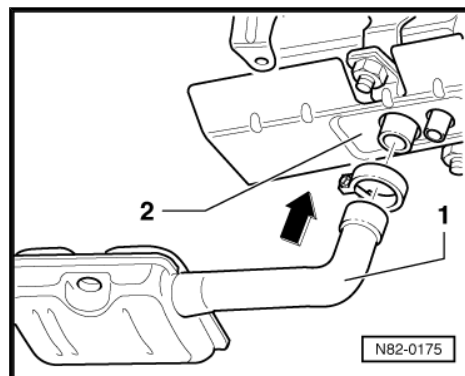


N82-0174



4.5.1 Securing silencer to heater unit

- Push silencer -1- in direction of arrow until it contacts combustion air blower housing -2-.



4.6 Road test for auxiliary heater in vehicle without Climatronic



Note

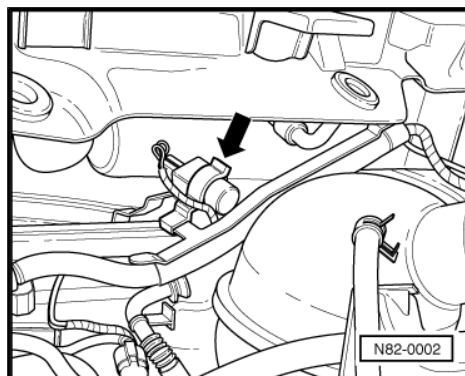
In a vehicle with a diesel engine, pull the ambient temperature switch -F38- off the connector housing and electrically bypass the contacts of the connector housing. Otherwise the auxiliary heater will not start at temperatures above approx. 10 °C.

The ambient temperature switch -F38- with bracket -arrow- is located at front left in the plenum chamber (part number 701 959 625) or, on more recent vehicles, behind the wiper motor.

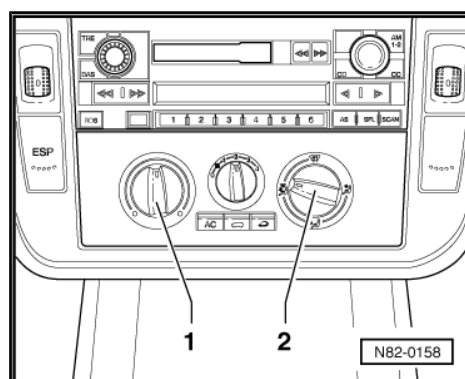


Note

In vehicles from model year 10.1998, the wiper motor must also be replaced ⇒ Rep. Gr. 92 .

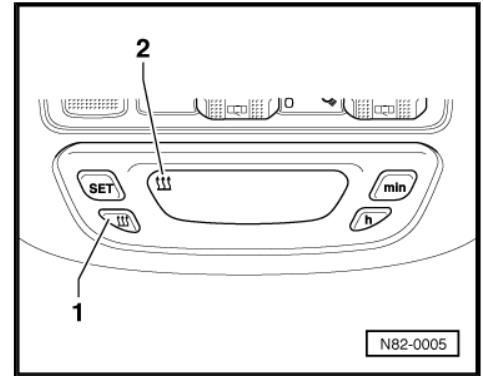


- Set fresh air blower switch
- Turn rotary knob for temperature flap -1- clockwise to stop.

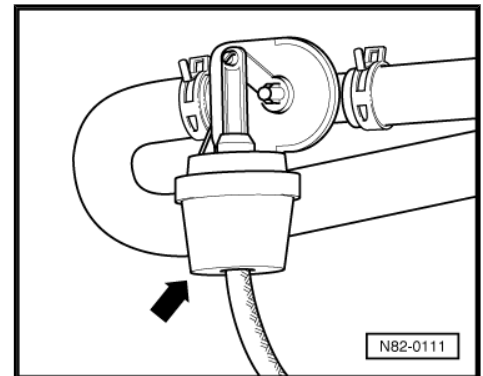




- Turn rotary knob for flap position -2- clockwise to stop.



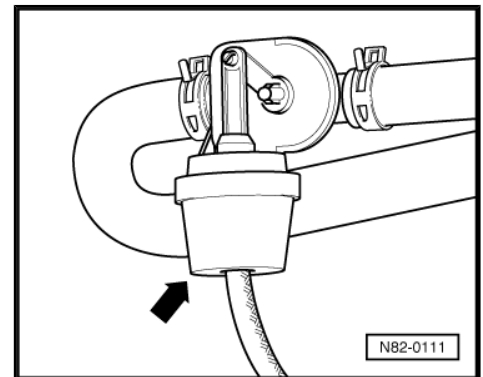
- Switch on auxiliary heater using pre-selection clock -E111- in moulded headliner. Press button -1- briefly. Symbol -2- for immediate heating appears.
- In the engine compartment, the vacuum-controlled valve -arrow- blocks the coolant circulation through the radiator (controlled by the coolant circuit valve -N214-).
- Combustion air blower -V6- and glow plug for heater -Q9- start after 6 seconds.
- Metering pump -V54- pumps 20 to 60 seconds later.
- Flame monitor -G64- detects the flame. Full load operating mode starts.



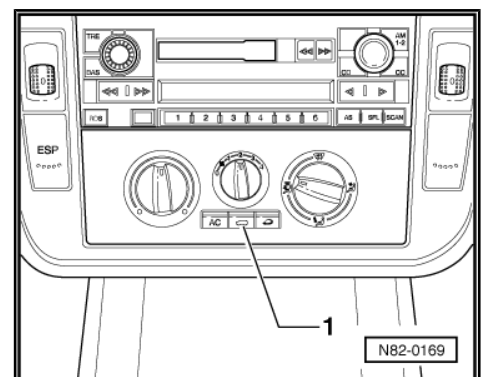
Note

- ◆ The preheating time finishes after approx. 30 minutes. The heating enters the run-on phase.
- ◆ The heating continues to operate when the engine has started.

- Start engine.

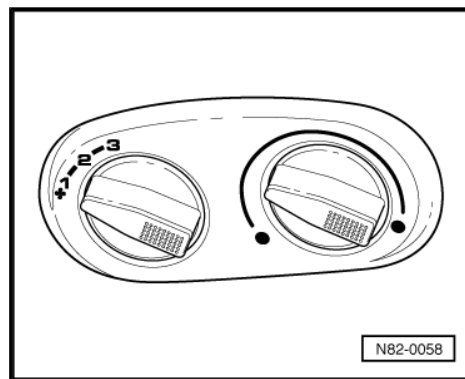


- In the engine compartment, the vacuum-controlled valve -arrow- opens the coolant circulation through the radiator (controlled by the coolant circuit valve -N214-).





- Switch on 2nd heat exchanger. Briefly press the switch for heating, temperature control switch and timer -E13- (button -1-).
- Set high temperature and blower speed on warm air blower switch -E100- .
- Run the engine to warm it up.
- Wait for several control processes to be completed.
- End the road test.
- Wait for auxiliary heater run-on phase.
- Read fault memory again using vehicle diagnosis, testing and information system -VAS 5051A- .



Note

The auxiliary heater is OK if no fault code appears.

- The ambient temperature switch -F38- must be reconnected in the vehicle with a diesel engine and attached in the plenum chamber.

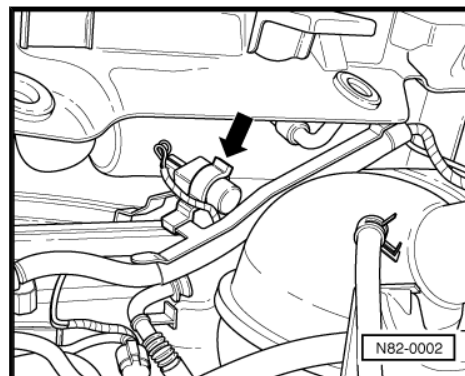
4.7 Road test for auxiliary heater in vehicle with Climatronic



Note

In a vehicle with a diesel engine, pull the ambient temperature switch -F38- off the connector housing and electrically bypass the contacts of the connector housing. Otherwise the auxiliary heater will not start at temperatures above approx. 10 °C.

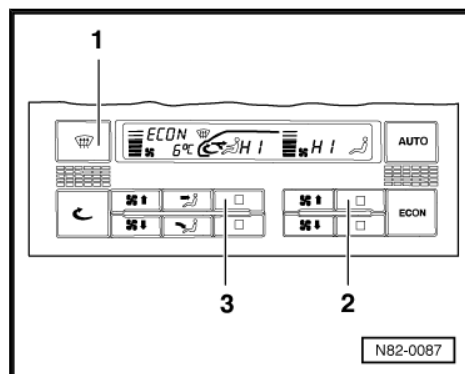
The ambient temperature switch -F38- with bracket -arrow- is located at front left in the plenum chamber (part number 701 959 625) or, on new vehicles, behind the wiper motor.



Note

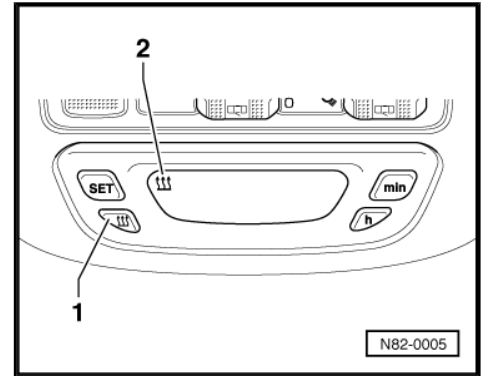
In vehicles from model year 10.1998, the wiper motor must also be replaced ⇒ Rep. Gr. 92 .

- Start engine.
- Set operating and display unit for Climatronic air conditioning system -E87- .
- Press button -1- for defrosting the windscreen.
- Use button -2-, pushbutton for “warmer” in passenger compartment, to set maximum heating power “HI”.

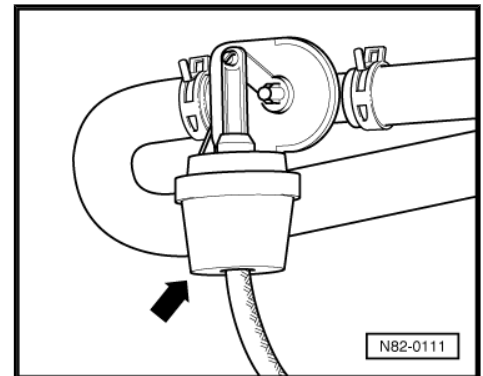




- Use button -3-, pushbutton for “warmer” in driver's area, to set maximum heating power “HI”.



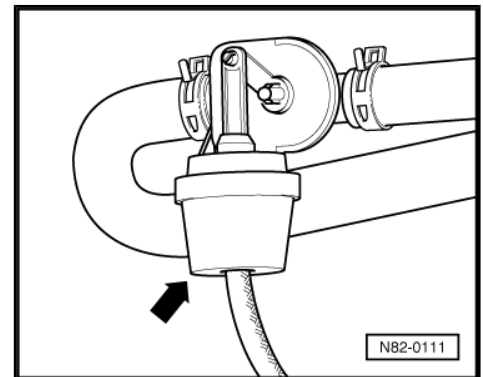
- Switch on auxiliary heater using pre-selection clock -E111- in moulded headliner. Press button -1- briefly. Symbol -2- for immediate heating appears.
- In the engine compartment, the vacuum-controlled valve -arrow- blocks the coolant circulation through the radiator (controlled by the coolant circuit valve -N214-).
- Combustion air blower -V6- and glow plug for heater -Q9- start after 6 seconds.
- Metering pump -V54- pumps 20 to 60 seconds later.
- Flame monitor -G64- detects the flame. Full load operating mode starts.



Note

- ◆ *The preheating time finishes after approx. 30 minutes. The heating enters the run-on phase.*
- ◆ *The heating continues to operate when the engine has started.*

- Start engine.
- In the engine compartment, the vacuum-controlled valve -arrow- opens the coolant circulation through the radiator (controlled by the coolant circuit valve -N214-).
- Run the engine to warm it up.
- Wait for several control processes to be completed.
- End the road test.
- Wait for auxiliary heater run-on phase.
- Read fault memory again using vehicle diagnosis, testing and information system -VAS 5051A- .



Note

The auxiliary heater is OK if no fault code appears.

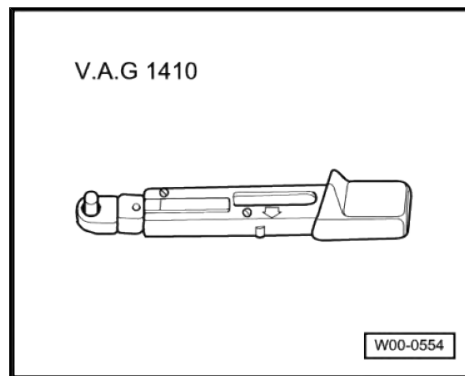
- The ambient temperature switch -F38- must be reconnected in the vehicle with a diesel engine and attached in the plenum chamber.

4.8 Removing and installing heater unit

Special tools and workshop equipment required



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



Note

- ◆ *Drain coolant before removing. Fill with new coolant after installing and bleed coolant circuit according to instructions.
⇒ [page 76](#)*
- ◆ *Cooling system is pressurized when engine is warm. If necessary, release pressure before carrying out repairs.*

1 - Longitudinal member

2 - Blind rivet nut M8

3 - Fuel line

- From metering pump - V54- to heater unit.

4 - Coolant hose, return

- In -B5W- S or -D5W- S to circulation pump - V55- .
- In -D5W- Z to coolant pipe.

5 - Bracket for heater unit

6 - Hexagon bolt M8×20

- 10 Nm

7 - Exhaust system

8 - Hexagon bolt M6×16

- 6 Nm

9 - Hexagon nut M8

- 10 Nm

10 - Clamping plate

11 - Bracket

12 - Self-tapping screw 4.8x16

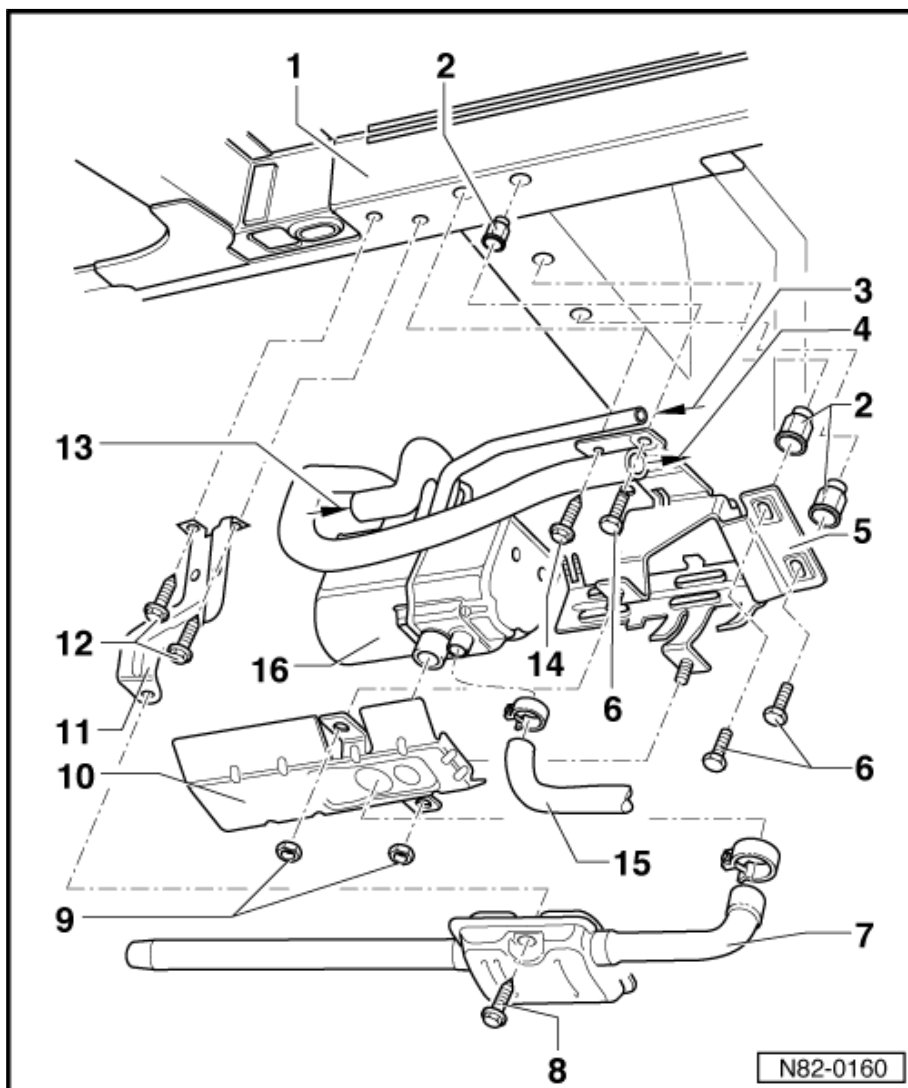
13 - Coolant hose

- From 2nd heat exchanger

14 - Self-tapping screw 4.8x16

15 - Intake pipe

- Securing intake pipe
⇒ [page 64](#)





16 - Heater unit

- ☐ With heater control unit -J162-
- ☐ Dismantling and assembling ⇒ [page 64](#)
- ☐ Removing:



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 and reduce temperature before carrying out repairs.

- ☐ Clamping off coolant hoses at heater unit and releasing them.



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 heater unit and seal.
- ☐ Disconnect T8 connector (8-pin) from heater control unit -J162- .



WARNING

Danger of burn injuries.

Silencer could be hot.

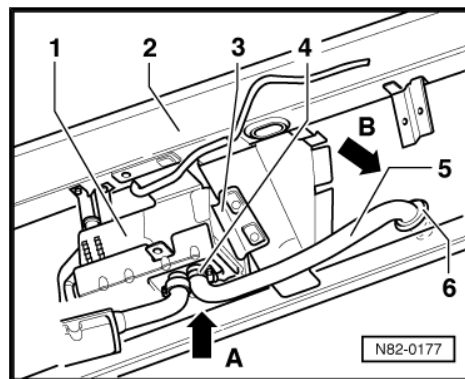
Before removing silencer, let it cool off.

- ☐ Unfasten silencer on bracket.
- ☐ Unscrew heater unit with bracket for heater unit.
- ☐ Securing intake pipe ⇒ [page 64](#)



4.8.1 Securing intake pipe

- 1 - Heater unit
- 2 - Longitudinal member
- 3 - Bracket
- 4 - Screw-type clip
- 5 - Intake pipe
- 6 - Sealing ring
- Push intake pipe -5- in direction of -arrow A- until it makes contact with housing of heater unit -1-.
- Push intake pipe through sealing ring -6- into bulkhead -arrow B- up to stop.
- Fasten screw-type clip -4-.



4.9 Dismantling and assembling heater unit



Note

*Components identified with * are checked by the self-diagnosis function.*



1 - Water jacket cover

2 - Bolt M5×12

3 - Heat exchanger

- ☐ Removing ➤ [page 66](#)
- ☐ Note installation position ➤ [page 66](#).
- ☐ Clean inside and outside with brass wire brush (spark plug brush).

4 - O-ring

- ☐ Renew
- ☐ Moisten with coolant additive G12 when installing.

5 - Seal

- ☐ Always renew after dismantling.

6 - Combustion chamber

- ☐ Clean inside and outside with brass wire brush (spark plug brush).
- ☐ Combustion chambers for petrol and diesel are different.

7 - Combustion air blower cover

8 - Glow plug for heater -Q9- *

- ☐ Removing ➤ [page 67](#)
- ☐ Rated voltage: 8 volts
- ☐ Clean glow plug with brass wire brush (spark plug brush).
- ☐ Remove glow plug connection, remove and clean strainer.
- ☐ 6 Nm
- ☐ Checking under rated voltage of 8 V

9 - Bolt M4×10

10 - Socket head screw M5×65

- ☐ 6 Nm

11 - Socket head screw M5×16

- ☐ 6 Nm

12 - Heater control unit -J162- *

- ☐ Removing ➤ [page 68](#)

13 - Combustion air blower -V6- *

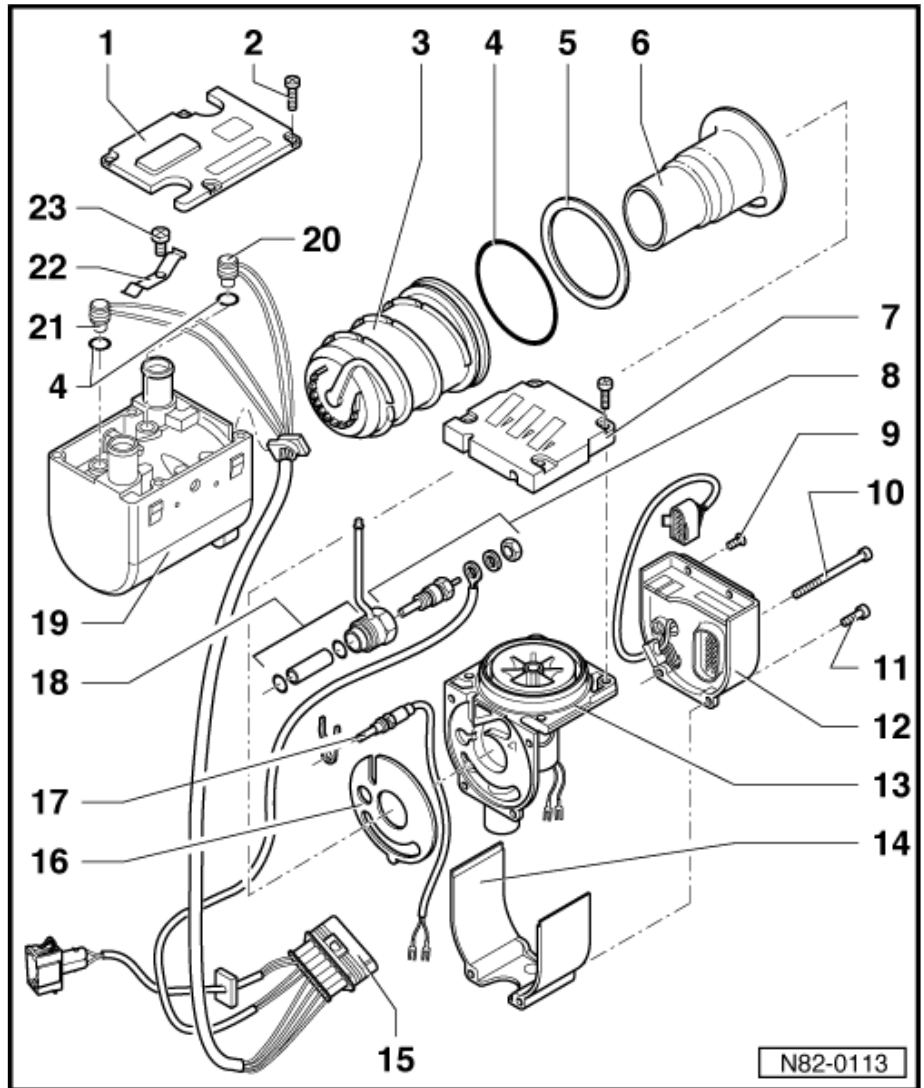
- ☐ Replacing ➤ [page 68](#).
- ☐ Do not dismantle further

14 - Cover

15 - Wiring harness

Pin assignment:

- ◆ Combustion air blower -V6- : chamber 14 - brown, chamber 13 - black.





- ◆ Flame monitor -G64- : chamber 2 - brown, chamber 1 - blue.
- ◆ Overheating sensor -G189- : chambers 5 + 6 - red.
- ◆ Coolant temperature sender for heater -G241- : chambers 3 + 4 - blue.
- ◆ Glow plug for heater -Q9- : chamber 9 - white, chamber 12 - brown.

16 - Seal

- ☐ Always renew after dismantling.

17 - Flame monitor -G64-

- ☐ Removing ⇒ [page 67](#)
- ☐ Checking ⇒ [page 69](#)

18 - Glow plug connection

- ☐ Clean strainer

19 - Water jacket

- ☐ Clean inside and outside with brass wire brush (spark plug brush).

20 - Coolant temperature sender for heater -G241-

- ☐ Removing ⇒ [page 69](#)
- ☐ Checking ⇒ [page 70](#)

21 - Overheating sensor -G189-

- ☐ Removing ⇒ [page 69](#)
- ☐ Checking ⇒ [page 70](#)

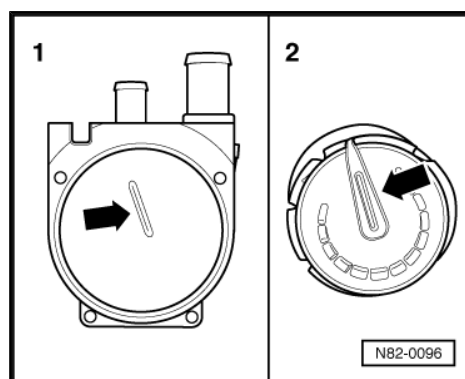
22 - Spring

- ☐ Do not bend further.
- ☐ Renew if damaged.

23 - Screw M5×16

Heat exchanger installation position

- Insert heat exchanger -2- into water jacket -1- until centring -arrows- engages.
- Push heat exchanger tightly into seating.



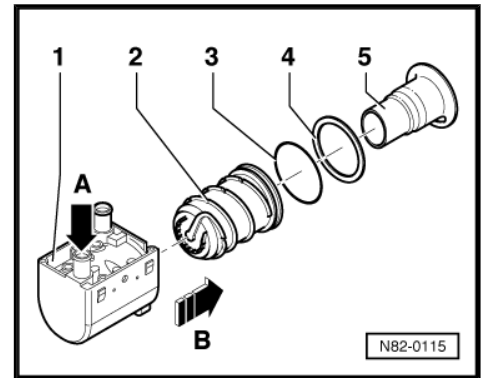
4.10 Removing heat exchanger

Before beginning repair work, perform the following jobs:

- Remove heater unit ⇒ [page 61](#) .



- Dismantling and assembling heater unit ⇒ [page 64](#)
- Pull combustion chamber -5- out of heat exchanger -2-.
- Use suitable screwdriver carefully to press heat exchanger -2- through rear water connection (water inlet) -arrow A- out of water jacket -1- in direction of -arrow B-.
- Before assembling, always replace O-ring -3- and seal -4-, and observe installation position of heat exchanger ⇒ [page 66](#)



4.11 Removing flame monitor -G64-

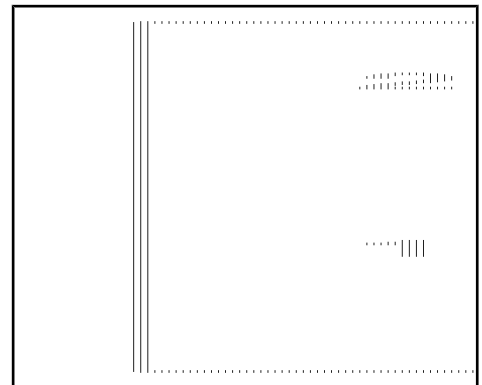
Before beginning repair work, perform the following jobs:

- Remove heater unit ⇒ [page 61](#) .
- Dismantling and assembling heater unit ⇒ [page 64](#)
- Press brown cable out of chamber 2 of connector housing -2-.
- Press blue cable out of chamber 1 of connector housing -2-.
- Unbolt flame monitor -1-.



Note

For installation, route glow plug wiring under combustion air blower -V6- -arrow-.



4.12 Removing glow plug for heater -Q9-

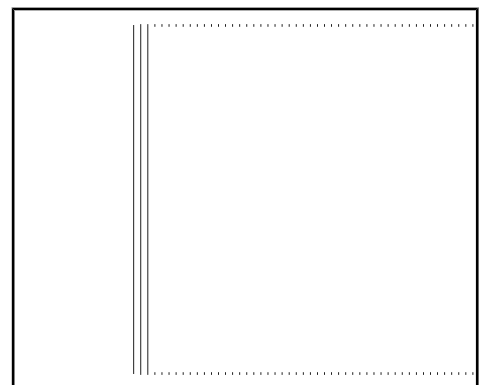
Before beginning repair work, perform the following jobs:

- Remove heater unit ⇒ [page 61](#) .
- Dismantling and assembling heater unit ⇒ [page 64](#)
- Unscrew glow plug wiring -1-.
- Remove glow plug for heater -Q9- .



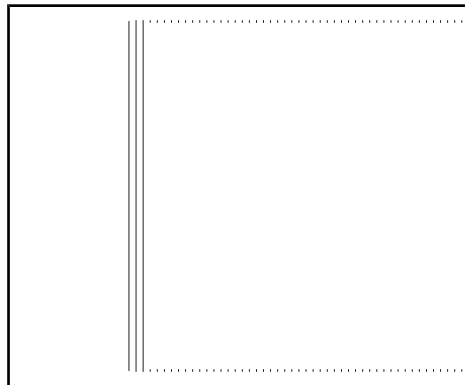
Note

- ◆ *The glow plug for heater -Q9- has been modified as a spare part for the diesel-fuelled heater -D5W- in current production.*
- ◆ *This means the removal and installation procedures have changed.*

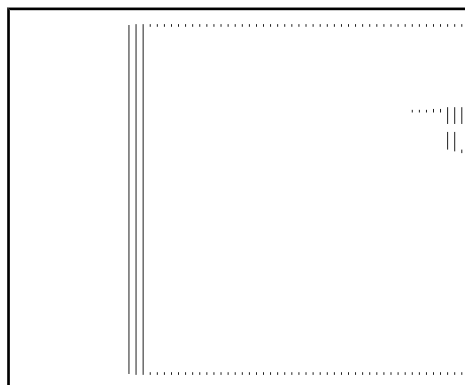




- Press glow plug wiring -1- and -2- out of chambers T14c / 9 (white) and T14c / 12 (brown) using ejection tool -VAS 1978/4- .



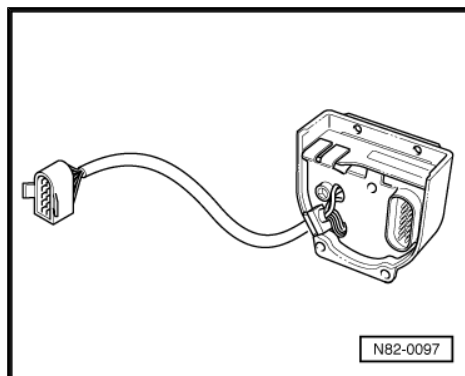
- Screw new glow plug for heater -Q9- into housing (6 Nm).
- Route glow plug wiring under combustion air blower -V6 - -arrows-.
- Clip white cable into chamber T14c / 9 and black cable into chamber T14c / 12 of connector housing -1-.



4.13 Removing heater control unit -J162-

Before beginning repair work, perform the following jobs:

- Remove heater unit ➔ [page 61](#) .
- Dismantling and assembling heater unit ➔ [page 64](#)
- Remove bolts from control unit.
- Disconnect 14-pin connector (T14 in control unit).
- Carefully remove control unit.



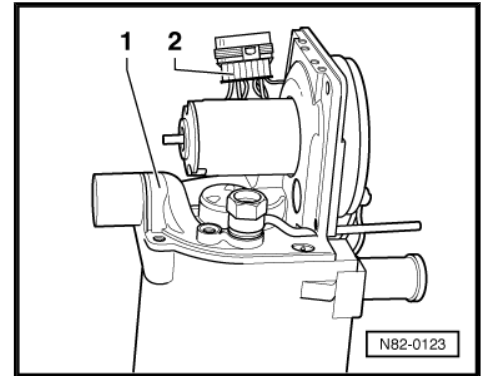
4.14 Renewing combustion air blower -V6-

Before beginning repair work, perform the following jobs:

- Remove heater unit ➔ [page 61](#) .



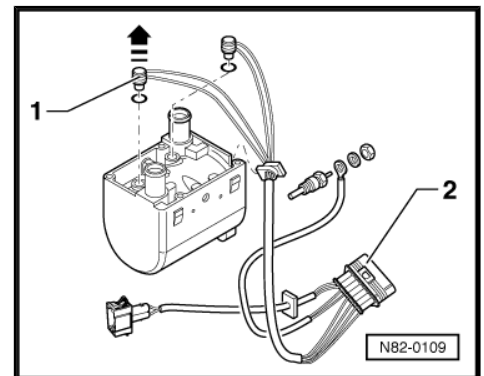
- Dismantling and assembling heater unit ⇒ [page 64](#)
- Press brown cable out of chamber 14 of connector housing -2-.
- Press black cable out of chamber 13 of connector housing -2-.
- Remove flame monitor -G64- ⇒ [page 67](#) .
- Remove glow plug for heater -Q9- ⇒ [page 67](#) .
- Remove cross head screws from combustion air blower.
- Remove combustion air blower -V6- together with bracket -1-.



4.15 Removing overheating sensor -G189-

Before beginning repair work, perform the following jobs:

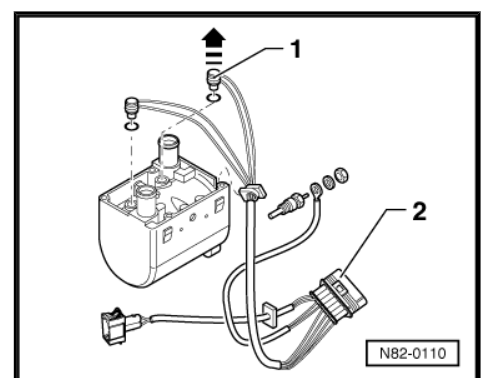
- Remove heater unit ⇒ [page 61](#) .
- Dismantling and assembling heater unit ⇒ [page 64](#)
- Remove water jacket cover ⇒ [Item 1 \(page 65\)](#) .
- Remove spring ⇒ [Item 22 \(page 66\)](#) .
- Press red cables out of chambers 5 and 6 of connector housing -2-.
- Unscrew overheating sensor -G189- -1- in direction of arrow.



4.16 Removing coolant temperature sender for heater -G241-

Before beginning repair work, perform the following jobs:

- Remove heater unit ⇒ [page 61](#) .
- Dismantling and assembling heater unit ⇒ [page 64](#)
- Remove water jacket cover ⇒ [Item 1 \(page 65\)](#) .
- Remove spring ⇒ [Item 22 \(page 66\)](#) .
- Press blue cables out of chambers 3 and 4 of connector housing -2-.
- Pull off coolant temperature sender for heater -G241- -1- in direction of arrow.



4.17 Checking flame monitor -G64-

Before beginning repair work, perform the following jobs:

- Remove heater unit ⇒ [page 61](#) .
- Remove heater control unit -J162- ⇒ [page 68](#) .
- Pull connector housing off control unit.



- Measure resistance between chamber 2 and chamber 1 at brown and blue cable.

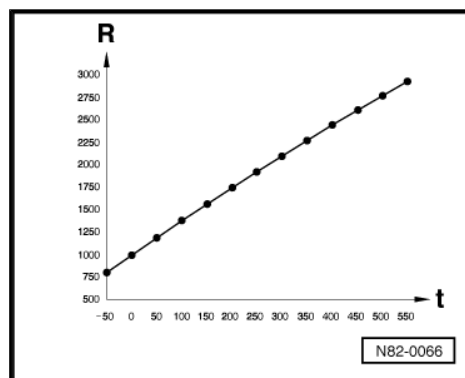
R = resistance in Ω

t = temperature in $^{\circ}\text{C}$

- Please measure resistance at prevailing temperature.

Evaluation:

- ◆ Defective > 3040 Ω = open circuit
- ◆ Defective < 780 Ω = short circuit



4.18 Checking overheating sensor -G189-

Before beginning repair work, perform the following jobs:

- Remove heater unit ➔ [page 61](#) .
- Remove heater control unit -J162- ➔ [page 68](#) .
- Pull connector housing off control unit.
- Measure resistance between chamber 5 and chamber 6 at red cables.

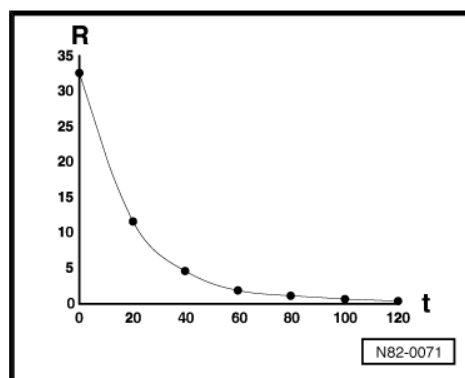
R = resistance in $\text{k}\Omega$

t = temperature in $^{\circ}\text{C}$

- Please measure resistance at prevailing temperature.

Evaluation:

- ◆ Defective > 2M Ω = open circuit
- ◆ Defective < 50 Ω = short circuit



4.19 Checking coolant temperature sender for heater -G241-

Before beginning repair work, perform the following jobs:

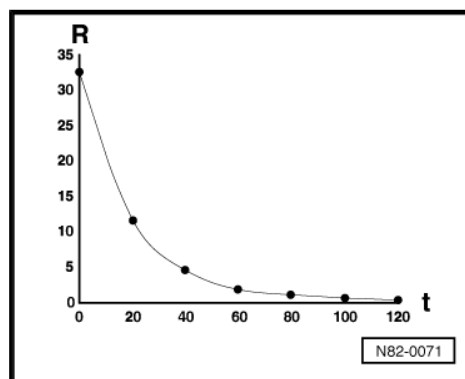
- Remove heater unit ➔ [page 61](#) .
- Remove heater control unit -J162- ➔ [page 68](#) .
- Pull connector housing off control unit.
- Measure resistance between chamber 3 and chamber 4 at blue cables.

R = resistance in $\text{k}\Omega$

t = temperature in $^{\circ}\text{C}$

- Please measure resistance at prevailing temperature.

Evaluation: defective > approx. 2 M Ω = open circuit; defective < 50 Ω = short circuit

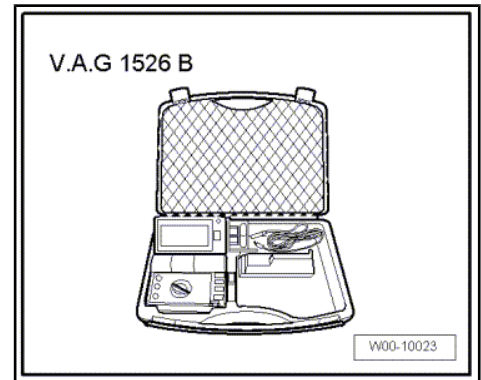


4.20 Checking ambient temperature switch - F38-

Special tools and workshop equipment required



- ◆ Hand multimeter -V.A.G 1526B-



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



- ◆ Current flow diagram
- ◆ Cold spray (commercially available)



Note

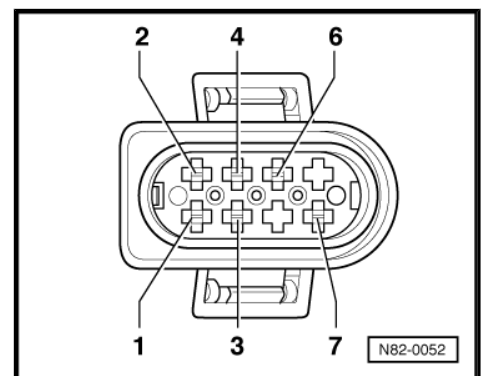
The ambient temperature switch -F38- is only installed in vehicles with TDI diesel engines.

4.20.1 Test procedure

- Disconnect 8-pin connector (T8) from heater unit.
- Set measuring range selector switch on hand multimeter - V.A.G 1526B- to DC voltage measurement, measuring range 20 V.
- Connect hand multimeter -V.A.G 1526B- to chamber -T8/2- and chamber -T8/6- of disconnected 8-pin connector using cables from auxiliary measuring set -V.A.G 1594C- .
- Switch on ignition and start engine.

Display on the hand multimeter -V.A.G 1526B- :

- ◆ At ambient temperatures below approx. 10 °C: approx. 12 V





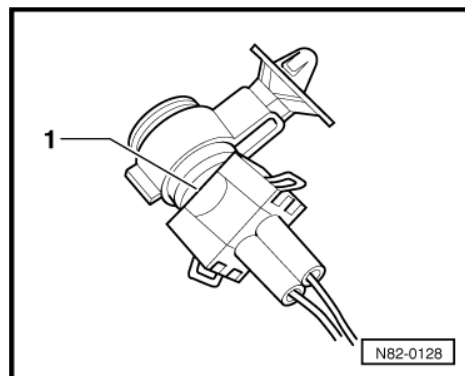
- Unclip ambient temperature switch -1- from bracket at front left in plenum chamber. Depending on vehicle equipment, the ambient temperature switch -1- may be located on the wiper motor wiring harness or behind the wiper motor.
- Spray ambient temperature switch with cold spray, if necessary, and observe display on hand multimeter -V.A.G 1526B-.

If values do not change when ambient temperature switch -F38- is sprayed, or if specified rated values are not achieved:

- Check cables and/or connectors to ambient temperature switch -F38- according to current flow diagram.

If cables and/or connectors to ambient temperature switch -F38- are OK according to current flow diagram:

- Please replace ambient temperature switch -F38-.



Note

The ambient temperature switch -F38- switches on the auxiliary heater only if the engine is running and the coolant temperature is below approx. 77 °C. The ambient temperature must not exceed approx. 10 °C.

4.21 Connecting auxiliary heaters -B5W- S and -D5W- S to coolant circuit



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 and reduce temperature before carrying out repairs.

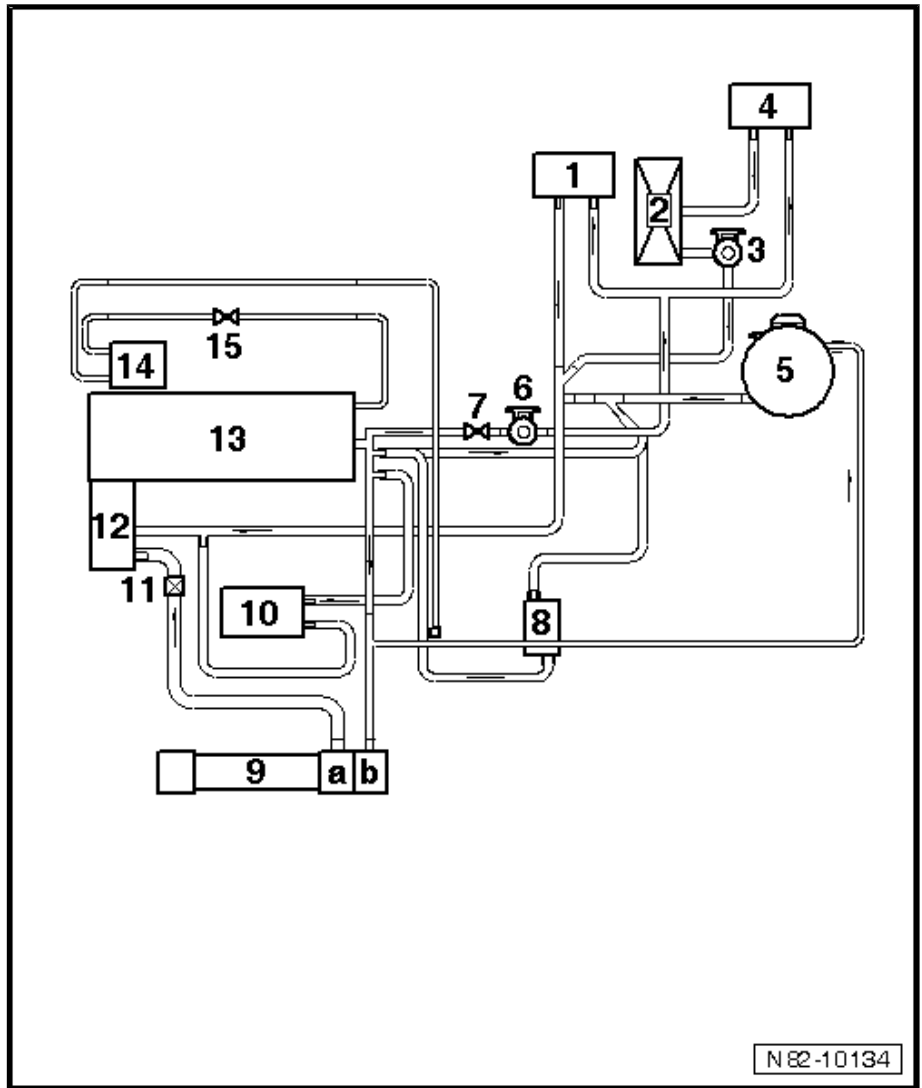


Note

- ◆ *The coolant circuit must be free of air for the auxiliary heater to heat properly.*
- ◆ *Bleed coolant circuit every time after opening it!*
- ◆ *Complete hose routing ⇒ Rep. Gr. 19*
- ◆ *The arrows in the illustration show the coolant flow direction.*



- 1 - Heat exchanger for heater
- 2 - Heater unit
- 3 - Circulation pump -V55-
- 4 - Auxiliary heat exchanger
- 5 - Expansion tank
- 6 - Coolant circulation pump - V50-
- 7 - Switch-off valve for supplementary heater
 - ☐ Pneumatically controlled by coolant circuit valve -N214-
 - ☐ Only for 66 kW engine with unit injectors
- 8 - ATF cooler
 - ☐ Only vehicles with automatic transmission
- 9 - Radiator
 - ☐ a = Bottom
 - ☐ b = Top
- 10 - Oil cooler
- 11 - Thermostat
- 12 - Coolant pump
- 13 - Cylinder head
- 14 - Throttle valve preheater
 - ☐ Only 2.0 l and 2.8 l engines
- 15 - Switch-off valve for supplementary heater
 - ☐ Pneumatically controlled by coolant circuit valve -N214-
 - ☐ Only for 85 kW engine with unit injectors



4.22 Connecting auxiliary heaters -B5W- S, -D5W- S and -D5Z- F to coolant circuit for engine code AYL (6 cyl.) from 05.2004



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 and reduce temperature before carrying out repairs.



Note

- ◆ The coolant circuit must be free of air for the auxiliary heater to heat properly.
- ◆ Bleed coolant circuit every time after opening it!
- ◆ Complete hose routing ⇒ Rep. Gr. 19
- ◆ The arrows in the illustration show the coolant flow direction.

1 - Heat exchanger for heater

2 - Heater unit

3 - Auxiliary heat exchanger

4 - Circulation pump -V55-

5 - Coolant circulation pump - V50-

6 - Expansion tank

7 - Switch-off valve for supplementary heater

- ☐ Pneumatically controlled by coolant circuit valve -N214-

8 - ATF cooler

- ☐ Only vehicles with automatic transmission

9 - Radiator

10 - Oil cooler

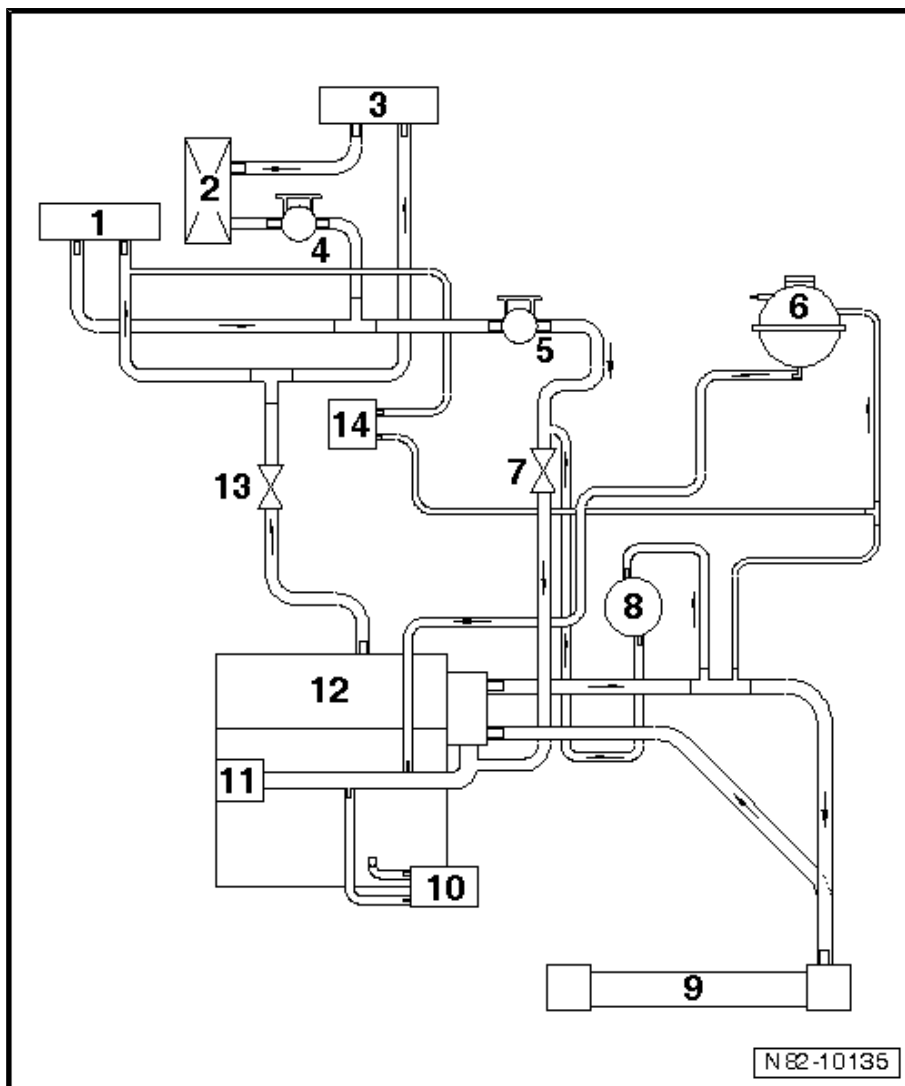
11 - Coolant pump

12 - Cylinder head

13 - Switch-off valve for supplementary heater

- ☐ Pneumatically controlled by coolant circuit valve -N214-

14 - Throttle valve preheater



Volkswagen Technical Site: <http://vwts.ru> <http://vwts.info>



4.23 Coolant hose routing on vehicles with 2nd heat exchanger



WARNING

Danger of scalding injuries.

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

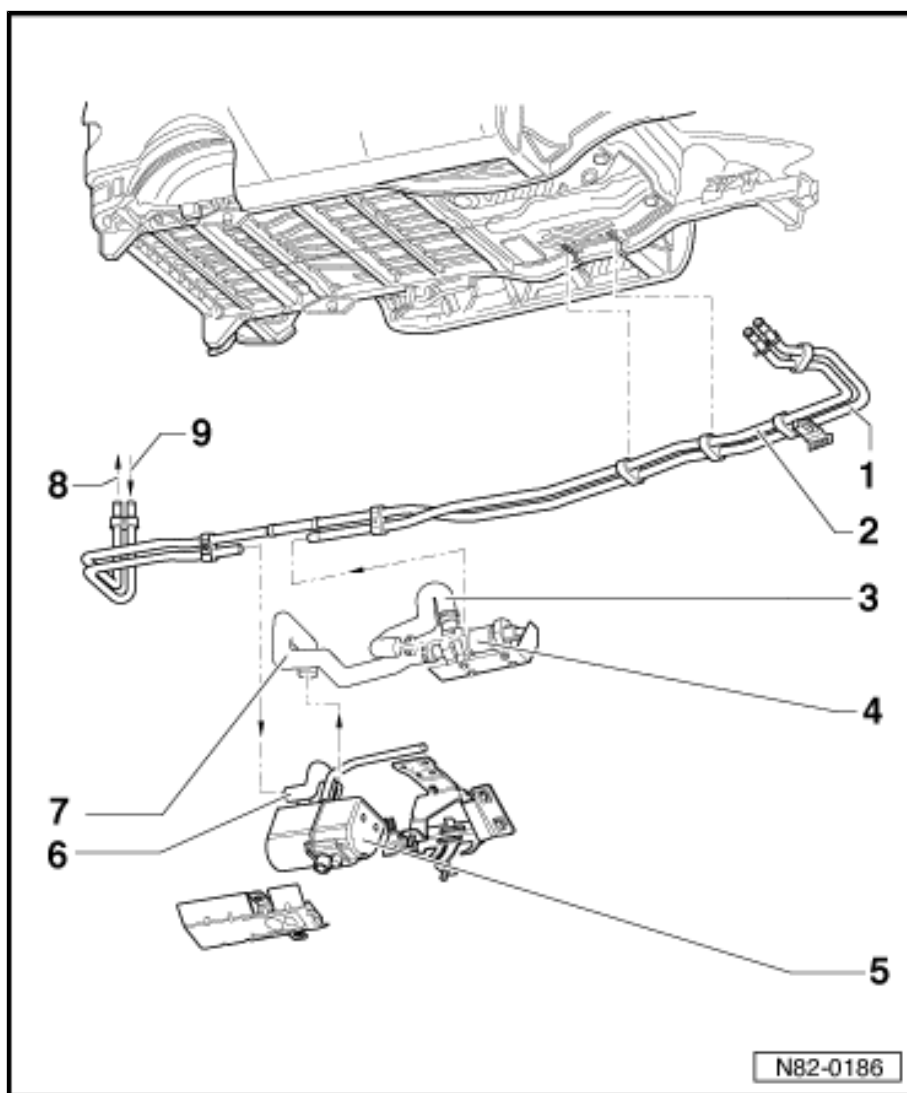
If necessary, release pressure and reduce temperature before carrying out repairs.



Note

The arrows in the illustration show the coolant flow direction.

- 1 - Coolant pipe, supply
- 2 - Coolant pipe, return
- 3 - Coolant hose, return
 - From circulation pump -V55- to the coolant pipe.
- 4 - Circulation pump -V55-
- 5 - Heater unit
- 6 - Coolant hose, return
 - From coolant pipe to heater unit.
- 7 - Coolant hose, return
 - From heater unit to circulation pump -V55- .
- 8 - To 2nd heat exchanger
- 9 - From 2nd heat exchanger





4.24 Bleeding coolant circuit in vehicles with auxiliary heater -B5W- S, -D5W- S or -D5W- Z



Note

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

- Raise front of vehicle approx. 50 cm using lifting platform.



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 and reduce temperature before carrying out repairs.

- Top up coolant.
- Lower vehicle again and perform road test until engine reaches operating temperature (with auxiliary heater switched on).
- Raise front of vehicle approx. 50 cm using lifting platform.
- Top up coolant.



Note

Repeat procedure until there are no more air bubbles in coolant circuit.

4.25 Fuel supply to auxiliary heaters -B5W- S, -D5W- S or -D5W- Z

4.25.1 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.



4.25.2 Fuel take-off -B5W- S, -D5W- S or -D5W- Z



Note

- ◆ Fuel lines are secured with O-type clips. These O-type clips must always be replaced with screw-type clips.
- ◆ Start vehicle engine if fuel tank was empty. Then start auxiliary heater several times until heater does not switch off by itself.
- ◆ The arrows in the illustration indicate the fuel flow direction.
- ◆ Observe the rules for cleanliness when doing all work on the fuel supply system ⇒ [page 47](#).

1 - Fuel return

2 - Fuel supply

3 - Quick release coupling

4 - Fuel gauge sender -G-

5 - Heater unit

6 - Metering pump -V54-

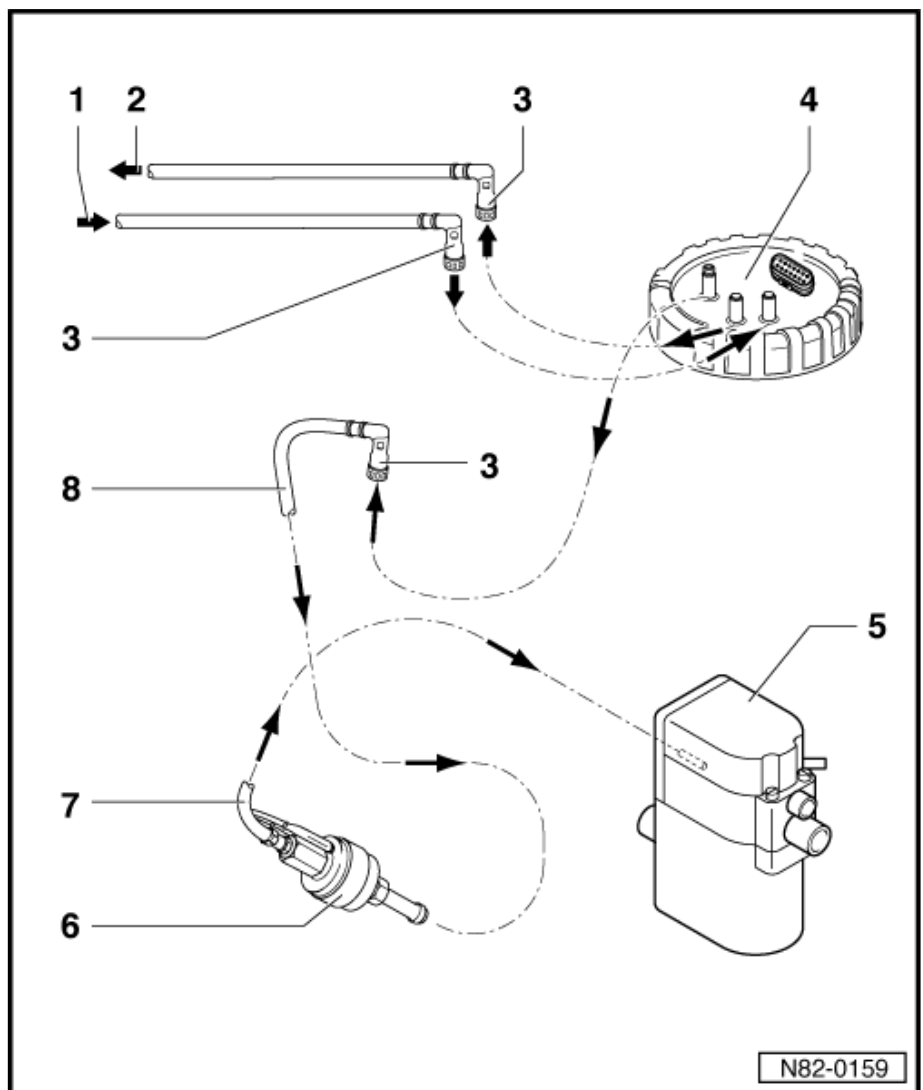
- ☐ Removing and installing ⇒ [page 78](#)
- ☐ Dismantling ⇒ [page 78](#)
- ☐ Checking installation position ⇒ [page 79](#)
- ☐ Testing quantity of fuel delivered ⇒ [page 79](#)

7 - Fuel line

- ☐ From metering pump - V54- to heater unit.

8 - Fuel line

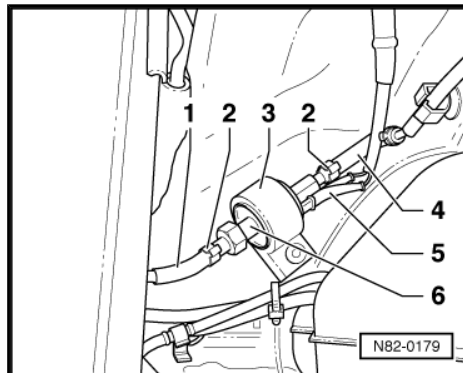
- ☐ From fuel gauge sender -G- to metering pump - V54-.





4.26 Removing and installing metering pump -V54-

- 1 - Fuel line from fuel tank
- 2 - Clamping piece
- 3 - Bracket
- 4 - Fuel line to heater unit
- 5 - Connector
- 6 - Metering pump -V54-



4.26.1 Removing

- Separate connector -5-.

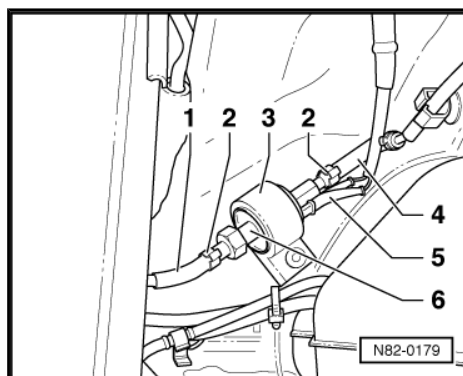


WARNING

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.*



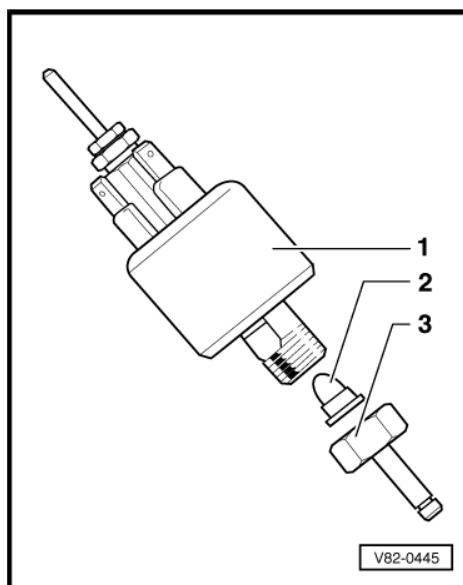
- Detach fuel hoses -1- and -4- from metering pump and seal them.
- Remove metering pump from bracket -3-.

4.26.2 Installing

- Ensure proper fitting position ⇒ [page 79](#)

Dismantling metering pump -V54-

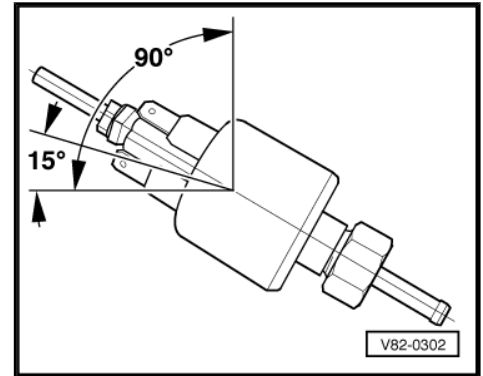
- 1 - Metering pump -V54-
- 2 - Strainer
- 3 - Hose connection





Installation position of metering pump -V54-

- ◆ Positioned 15° to 90°



4.27 Testing quantity of fuel delivered

Special tools and workshop equipment required

- ◆ Hand multimeter -V.A.G 1526B-



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



- ◆ Current flow diagram
- ◆ Commercially available measuring glass (0 ml to 25 ml)
- ◆ Fuel hose, length approx. 200 mm



Note

A second mechanic may be required to switch on the auxiliary heater as it may be necessary to raise the vehicle to check the quantity of fuel delivered.

4.27.1 Test prerequisites:

- Resistance of metering pump -V54- = 10Ω.
- Voltage at metering pump -V54- = 11 to 13 volts.
- No fault stored in fault memory



- Fuel lines are not damaged or leaking.
- Ambient temperature approx. 20 °C
- Fuel tank filled sufficiently (fuel gauge on dash panel not in red area)

4.27.2 Checking:



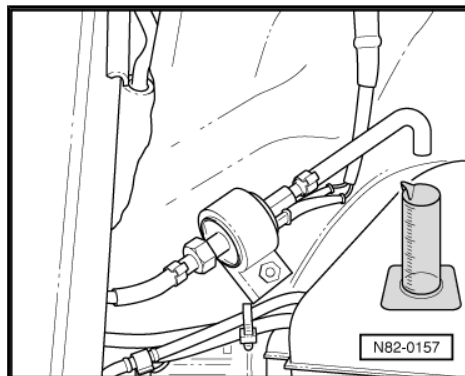
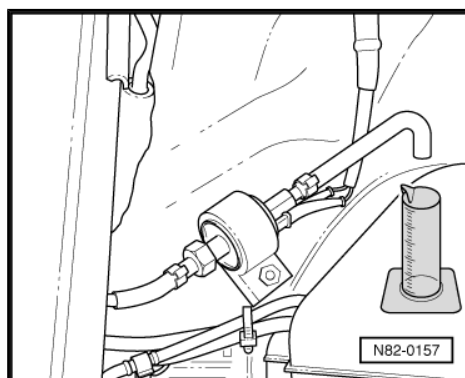
WARNING

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.*

- Remove fuel line from pressure connection of metering pump and fit a new fuel hose (length approx. 200 mm) from pressure connection to measuring glass (capacity approx. 25 ml).
- Switch auxiliary heater on (with the help of a second mechanic, if required). The metering pump will start to deliver after 45 seconds.
- Hold measuring glass at same height as heater unit.
- After approx. 40 seconds, the fuel line is filled and bled.
- Switch auxiliary heater off and empty measuring glass.
- Switch auxiliary heater on again.
- Hold measuring glass at same height as heater unit.
- The auxiliary heater switches off automatically after 90 seconds.
- Read measuring glass. Quantity delivered: petrol = 10.9 ml to 12.1 ml; diesel = 7.5 ml to 8.5 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.

4.28 Regulation of auxiliary heaters -B5W- S and -D5W- S

The auxiliary heater -B5W- S / -D5W- S is intended to heat the coolant and thereby assist the heating output of the engine. It can also be used as an auxiliary heater when the engine is switched off.

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

After the engine is started at an ambient temperature of below approx. 10 °C and if the coolant temperature is below approx. 77 °C, the auxiliary heater in vehicles with TDI engines is automatically switched on via the ambient temperature switch -F38- .



If the heat required is 5000 watts (100% of heating output), then the heater unit operates in full load mode. The coolant temperature increases up to 85 °C (maximum).

The auxiliary heater controls two heating levels: -B5W- S = 5000 watts or 1500 watts; D5W- S = 5000 watts or 2200 watts.

The heating levels cannot be set manually. The control unit -J162- controls the heat requirement.

The heater control unit -J162- calculates the heat requirement based on the temperatures measured by the coolant temperature sender for heater -G241- .

The auxiliary heater reduces its power if the coolant temperature is 85 °C. The heater interrupts control. Then the 130 second run-on phase starts. The combustion air blower -V6- runs at its highest level during the run-on phase. The circulation pump -V55- continues running until the next control start.

The control start begins at a coolant temperature of 65 °C at the highest level and the highest speed of the combustion air blower -V6- .

If the heater unit is switched off or if a malfunction shut-off occurs, the run-on phase of the combustion air blower -V6- takes place at low speed.

The flame is monitored by the flame monitor -G64- , the maximum permitted temperature is monitored by the overheating sensor -G189- . Both influence the heater control unit -J162- which switches off when there are malfunctions.

The start is repeated if the heater does not ignite within 90 seconds after fuel pumping starts. A malfunction shut-off occurs if the heater does not ignite after another 90 seconds.

A new start is performed initially if the flame goes out by itself during operation. The malfunction shut-off occurs if the heater does not ignite within 90 seconds after the fuel pumping is switched on or if the heater ignites but goes out again. The malfunction shut-off can be revoked by switching off and back on again.

The overheating sensor -G189- is triggered in the event of overheating (lack of water, air in the coolant circuit). The fuel supply is interrupted. The malfunction shut-off then occurs. Once the cause of overheating has been eliminated, the auxiliary heater can be restarted by switching off and back on again. Prerequisite: the auxiliary heater has cooled down sufficiently!

The malfunction shut-off occurs if the voltage drops below approx. 10.2 volts or rises above approx. 16 volts.

The auxiliary heater does not start if the glow plug for heater -Q9- is defective.

The speed-controlled combustion air blower -V6- is permanently monitored. The malfunction shut-off takes place in the event of a fault if it does not start or becomes blocked.

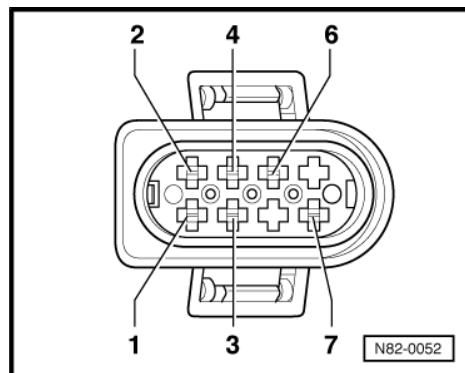
Check the following in case of a sooty flame: eliminate obstacles to the combustion air supply and in the exhaust gas pipe. Check the quantity delivered by the metering pump -V54- , renew it if necessary. Clean deposits off the heat exchanger for the auxiliary heater, replace if necessary.



4.29 Start sequence

4.29.1 Pin assignment for 8-pin connector (T8i) on heater unit (harness end)

- 1 - Terminal 30
- 2 - Terminal 31
- 6 - Ambient temperature switch -F38- (TDI only)
- 7 - Pre-selection clock -E111-



4.29.2 Start signals

- ◆ Terminal 30 from 2nd battery
- ◆ "Heater on" signal from pre-selection clock -E111-
- ◆ Temperature at coolant temperature sender for heater -G241- below approx. 77 °C
- ◆ Temperature at ambient temperature switch -F38- below approx. 10 °C (TDI only)



Note

If the temperature at the flame monitor -G64- is greater than 70 °C, it will be cooled for 4 minutes at a higher blower speed. Then the unit will start.

4.29.3 Start procedure

After each engine start the flame monitor -G64- must inform the heater control unit -J162- within 130 seconds after the heating has switched on, that the flame is burning normally. If this not the case then the heater unit will automatically attempt a second start. If, after the second start, the flame still does not burn normally, the heater will remain switched off until the auxiliary heater is switched on again.

In part load mode the combustion air blower -V6- operates at reduced rpm and the metering pump -V54- delivers only approx. 50% of fuel (reduced pulse frequency).

Abortion of start procedure

The start procedure is aborted if:

- ◆ The flame monitor -G64- registers that the flame is not burning normally within 130 seconds.
- ◆ The coolant temperature sender for heater -G241- or the overheating sensor -G189- detects a temperature above 125 °C.
- ◆ There is a temperature difference of more than 15 °C between the coolant temperature sender for heater -G241- and the overheating sensor -G189- .
- ◆ The heater control unit -J162- detects a fault; read out the fault memory using the vehicle diagnosis, testing and information system -VAS 5051A- .



5 Auxiliary heater -D5Z- F, vehicles 05.2004 ►

5.1 Repairing auxiliary heater -D5Z- F

The external components, sensors and actuators are identical with the auxiliary heaters -B5W- S / -D5W- S.

- Repairing auxiliary heater -D5Z- F ⇒ [page 53](#)

5.2 Removing ambient temperature switch - F38-

The external components, sensors and actuators are identical with the auxiliary heaters -B5W- S / -D5W- S.

Removing ambient temperature switch -F38- ⇒ [page 55](#)

5.3 Removing circulation pump -V55-

The external components, sensors and actuators are identical with the auxiliary heaters -B5W- S / -D5W- S.

Removing circulation pump -V55- ⇒ [page 55](#)

5.4 Removing and installing exhaust system

The external components, sensors and actuators are identical with the auxiliary heaters -B5W- S / -D5W- S.

- Removing and installing exhaust system ⇒ [page 56](#) .

5.5 Road test for auxiliary heater in vehicle without Climatronic

The external components, sensors and actuators are identical with the auxiliary heaters -B5W- S / -D5W- S.

- Road test for auxiliary heater in vehicle without Climatronic
⇒ [page 58](#)

5.6 Road test for auxiliary heater in vehicle with Climatronic

The external components, sensors and actuators are identical with the auxiliary heaters -B5W- S / -D5W- S.

- Road test for auxiliary heater in vehicle with Climatronic
⇒ [page 60](#)

5.7 Removing and installing heater unit

The external components, sensors and actuators are identical with the auxiliary heaters -B5W- S / -D5W- S.

- Removing and installing heater unit ⇒ [page 61](#)

5.8 Dismantling and assembling heater unit



1 - Bolt M5×80

- ☐ Qty. 4
- ☐ 4.5 Nm

2 - Cover for combustion air blower -V6-

3 - Bolt M4×16

- ☐ Qty. 4
- ☐ 2 Nm

4 - Top cover for combustion air blower -V6-

5 - Combustion air blower -V6-

- ☐ Replacing ⇒ [page 87](#) .
- ☐ Do not dismantle further

6 - Glow plug for heater -Q9-

- ☐ Removing ⇒ [page 87](#)
- ☐ Rated voltage: 8 volts
- ☐ Clean glow plug with brass wire brush (spark plug brush).
- ☐ Checking under rated voltage of 8 V

7 - Combustion chamber

- ☐ Clean inside and outside with brass wire brush (spark plug brush).
- ☐ Combustion chambers for petrol and diesel are different.

8 - Heater control unit -J162-

- ☐ Removing ⇒ [page 87](#)

9 - Wiring harness

Pin assignment:

- ◆ Combustion air blower -V6- : chamber 14 - brown, chamber 13 - black.
- ◆ Flame monitor -G64- : chamber 2 - brown, chamber 1 - brown.
- ◆ Overheating sensor -G189- : chamber 10 - black, chamber 11 - black.
- ◆ Coolant temperature sender for heater -G241- : chamber 7 - white, chamber 8 - white.
- ◆ Glow plug for heater -Q9- : chamber 3 - brown, chamber 6 - white.

10 - Bolt M4×16

- ☐ Qty. 4
- ☐ 2 Nm

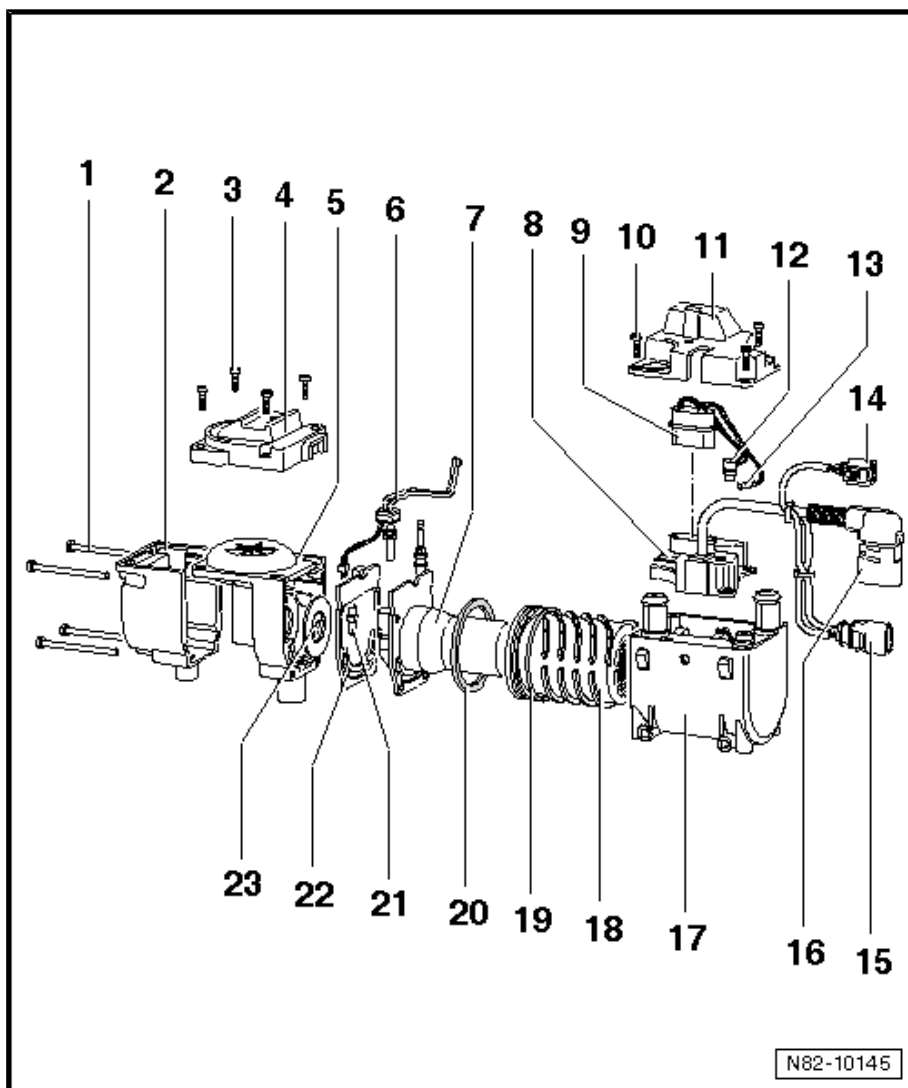
11 - Cover for heater control unit -J162- .

12 - Overheating sensor -G189-

- ☐ Removing ⇒ [page 88](#)
- ☐ Checking ⇒ [page 89](#)

13 - Coolant temperature sender for heater -G241-

- ☐ Removing ⇒ [page 88](#)
- ☐ Checking ⇒ [page 90](#)



Volkswagen Technical Site: <http://vwts.ru> <http://vwts.info>



14 - 2-pin connector

- ☐ To circulation pump -V55- .
- ☐ Only for vehicles with auxiliary heater

15 - 4-pin connector

- ☐ From vehicle wiring harness
- ☐ Only for vehicles with auxiliary heater

16 - 8-pin connector

- ☐ To heater control unit -J162-

17 - Water jacket

- ☐ Clean inside and outside with brass wire brush (spark plug brush).

18 - Heat exchanger

- ☐ Removing ⇒ [page 85](#)
- ☐ Note installation position ⇒ [page 85](#) .
- ☐ Clean inside and outside with brass wire brush (spark plug brush).

19 - O-ring

- ☐ Renew
- ☐ Moisten with coolant additive G12 when installing.

20 - Seal

- ☐ Always renew after dismantling.

21 - Flame monitor -G64-

- ☐ Removing ⇒ [page 86](#)
- ☐ Checking ⇒ [page 89](#)

22 - Seal

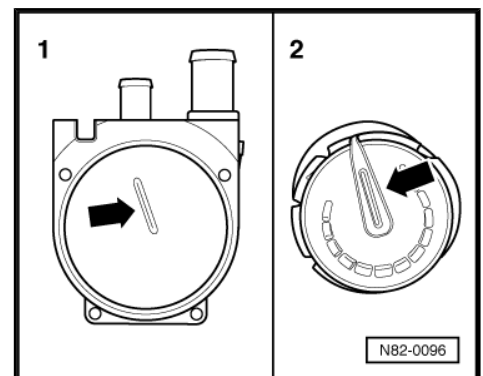
- ☐ Always renew after dismantling.

23 - Seal

- ☐ Always renew after dismantling.

Heat exchanger installation position

- Insert heat exchanger -2- into water jacket -1- until centring -arrows- engages.
- Push heat exchanger tightly into seating.



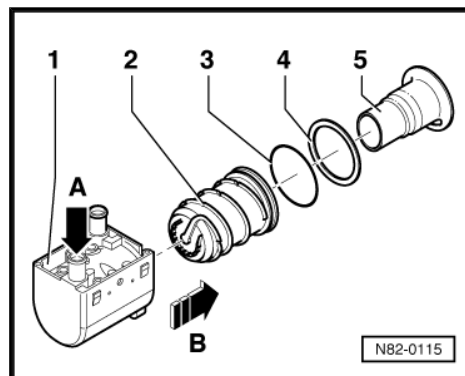
5.9 Removing heat exchanger

Before beginning repair work, perform the following jobs:

- Remove heater unit ⇒ [page 83](#) .



- Dismantling and assembling heater unit ➔ [page 83](#)
- Pull combustion chamber -5- out of heat exchanger -2-.
- Use suitable screwdriver carefully to press heat exchanger -2- through rear water connection (water inlet) -arrow A- out of water jacket -1- in direction of -arrow B-.
- Before assembling, always replace O-ring -3- and seal -4-, and observe installation position of heat exchanger ➔ [page 85](#)



5.10 Removing and installing flame monitor - G64-

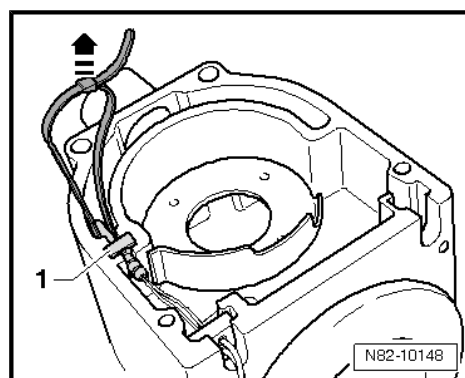
5.10.1 Removing

Special tools and workshop equipment required

- ◆ Ejection tool -VAS 1978/4-

Before beginning repair work, perform the following jobs:

- Remove heater unit ➔ [page 83](#) .
- Dismantling and assembling heater unit ➔ [page 83](#)
- Press both brown cables for flame monitor -G64- out of chambers 1 and 2 of 14-pin connector housing to heater control unit -J162- .
- Pull flame monitor -G64- -1- out using standard cable tie.



5.10.2 Installing

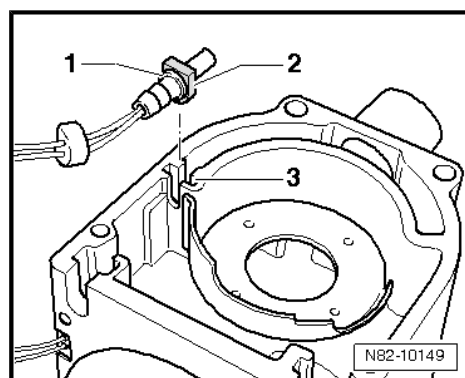
- Fit new graphite seal -2- on flame monitor -G64- -1-.



Note

The finless side of the graphite seal -2- must point towards the collar of flame monitor -G64- -1-.

- Insert flame monitor -G64- in groove -3-.

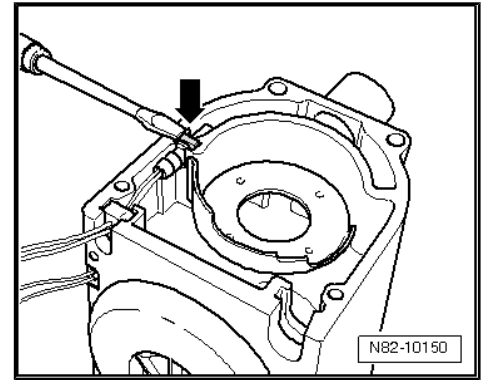


Caution

*The sealing surfaces could get damaged.
This can cause the heater unit to malfunction.
Do not use any other sharp-edged tools.*



- Press graphite seal in direction of -arrow- using screwdriver.



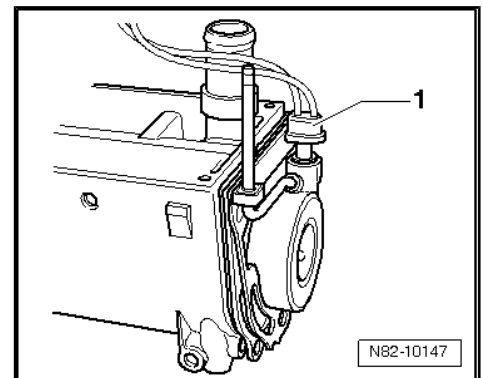
5.11 Removing glow plug for heater -Q9-

Special tools and workshop equipment required

- ◆ Ejection tool -VAS 1978/4-

Before beginning repair work, perform the following jobs:

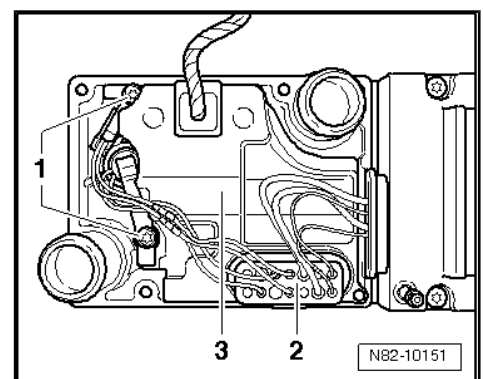
- Remove heater unit ⇒ [page 83](#) .
- Dismantling and assembling heater unit ⇒ [page 83](#)
- Press glow plug wiring out of 14-pin connector housing to heater control unit -J162- , chambers 3 and 6, using ejection tool -VAS 1978/4- .
- Remove glow plug for heater -Q9- .
- When installing, pay attention to position of seal -1- on cables to glow plug for heater -Q9- .
- Lock white cable in chamber 6 and brown cable in chamber 3 of 14-pin connector housing to heater control unit -J162- .



5.12 Removing heater control unit -J162-

Before beginning repair work, perform the following jobs:

- Remove heater unit ⇒ [page 83](#) .
- Dismantling and assembling heater unit ⇒ [page 83](#)
- Remove cover for combustion air blower -V6- ⇒ [Item 4 \(page 84\)](#) .
- Disconnect connector to heater control unit -J162- -2-.
- Remove bolts from heater control unit -J162- -1-.
- Carefully remove control unit -3-.



5.13 Renewing combustion air blower -V6-

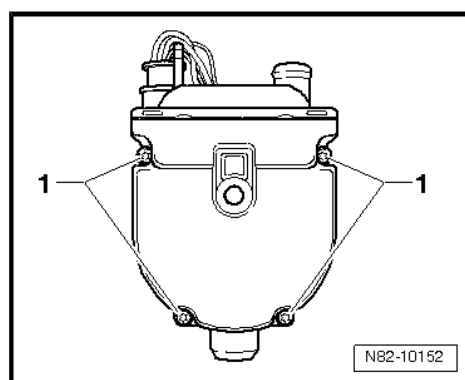
Special tools and workshop equipment required



◆ Ejection tool -VAS 1978/4-

Before beginning repair work, perform the following jobs:

- Remove heater unit ⇒ [page 83](#) .
- Dismantling and assembling heater unit ⇒ [page 83](#)
- Remove cover for combustion air blower -V6-
⇒ [Item 4 \(page 84\)](#) .
- Press brown cables for flame monitor -G64- out of chambers 1 and 2 of 14-pin connector housing to heater control unit -J162- .
- Press black cable out of chamber 13 of 14-pin connector housing to heater control unit -J162- .
- Press brown cable out of chamber 14 of 14-pin connector housing to heater control unit -J162- .
- Remove Torx screws -1- from combustion air blower -V6- .
- Remove combustion air blower -V6- .



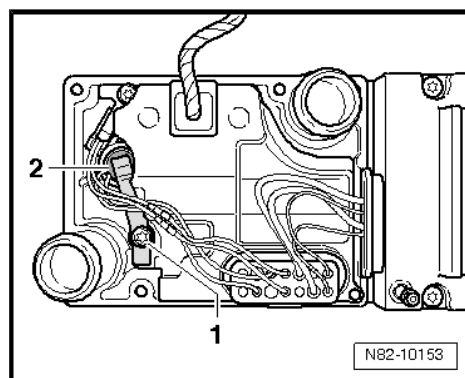
5.14 Removing overheating sensor -G189-

Special tools and workshop equipment required

◆ Ejection tool -VAS 1978/4-

Before beginning repair work, perform the following jobs:

- Remove heater unit ⇒ [page 83](#) .
- Dismantling and assembling heater unit ⇒ [page 83](#)
- Remove cover for combustion air blower -V6-
⇒ [Item 4 \(page 84\)](#) .
- Press black cables out of chambers 10 and 11 of 14-pin connector housing to heater control unit -J162- .
- Unscrew Torx screw -1- and remove retaining clip.
- Pull overheating sensor -G189- -1- out.



5.15 Removing coolant temperature sender for heater -G241-

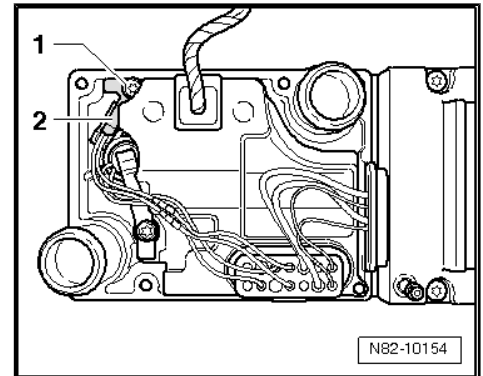
Special tools and workshop equipment required

◆ Ejection tool -VAS 1978/4-



Before beginning repair work, perform the following jobs:

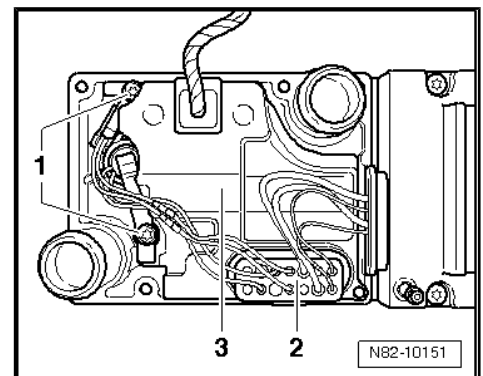
- Remove heater unit ➔ [page 83](#) .
- Dismantling and assembling heater unit ➔ [page 83](#)
- Remove cover for combustion air blower -V6- ➔ [Item 4 \(page 84\)](#) .
- Press white cables out of chambers 7 and 8 of 14-pin connector housing to heater control unit -J162- .
- Unscrew Torx screw -1- and remove retaining clip.
- Pull coolant temperature sender for heater -G241- -1- out.



5.16 Checking flame monitor -G64-

Before beginning repair work, perform the following jobs:

- Remove heater unit ➔ [page 83](#) .
- Remove cover for combustion air blower -V6- ➔ [Item 4 \(page 84\)](#) .
- Pull connector housing -2- off heater control unit -J162- -3- .



- Measure resistance between chamber 2 and chamber 1 at brown cables.

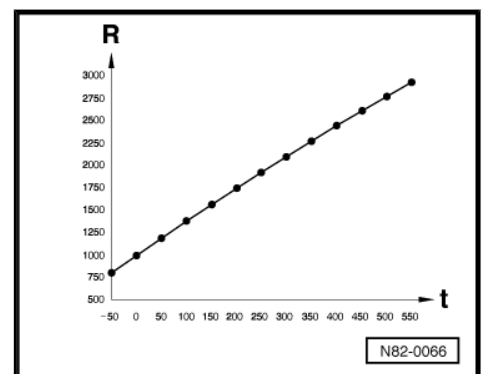
R = resistance in Ω

t = temperature in $^{\circ}\text{C}$

- Please measure resistance at prevailing temperature.

Evaluation:

- ◆ Defective > 3040 Ω = open circuit
- ◆ Defective < 780 Ω = short circuit



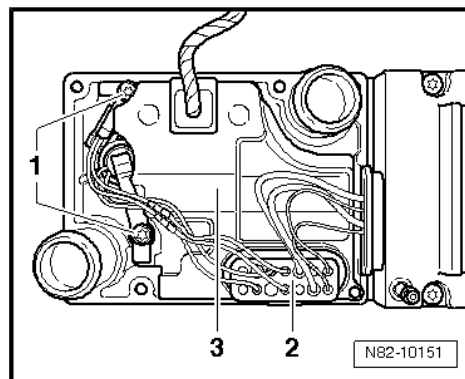
5.17 Checking overheating sensor -G189-

Before beginning repair work, perform the following jobs:

- Remove heater unit ➔ [page 83](#) .
- Remove cover for combustion air blower -V6- ➔ [Item 4 \(page 84\)](#) .



- Pull connector housing -2- off heater control unit -J162- -3-.



- Measure resistance between chamber 0 and chamber 1 at black cables.

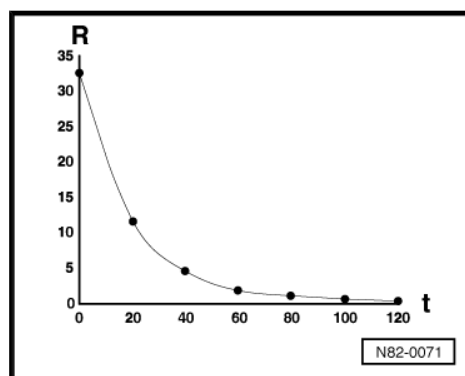
R = resistance in $K\Omega$

t = temperature in $^{\circ}C$

- Please measure resistance at prevailing temperature.

Evaluation:

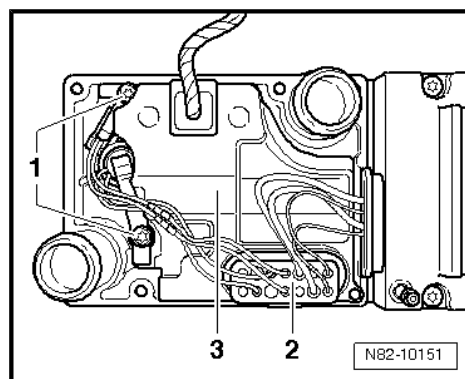
- ♦ Defective $> 2M \Omega$ = open circuit
- ♦ Defective $< 50 \Omega$ = short circuit



5.18 Checking coolant temperature sender for heater -G241-

Before beginning repair work, perform the following jobs:

- Remove heater unit ➔ [page 83](#) .
- Pull connector housing -2- off heater control unit -J162- -3-.



- Measure resistance between chamber 7 and chamber 8 at white cables.

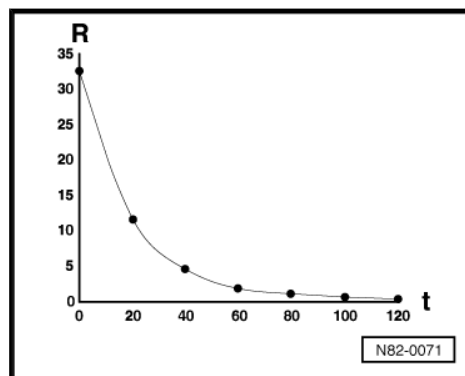
R = resistance in $K\Omega$

t = temperature in $^{\circ}C$

- Please measure resistance at prevailing temperature.

Evaluation:

- ♦ Defective $> \text{approx. } 2M \Omega$ = open circuit
- ♦ Defective $< 50 \Omega$ = short circuit





5.19 Checking ambient temperature switch - F38-

The external components, sensors and actuators are identical with the auxiliary heaters -B5W- S / -D5W- S.

- Checking ambient temperature switch -F38- ⇒ [page 70](#)

5.20 Connecting auxiliary heater -D5Z- F to coolant circuit

Connecting auxiliary heater -D5Z- F to the coolant circuit is the same as for auxiliary heaters -B5W- S / -D5W- S ⇒ [page 72](#) .

5.21 Coolant hose routing on vehicles with 2nd heat exchanger

In the case of auxiliary heater -D5Z- F, the coolant hose routing in vehicles with a 2nd heat exchanger is the same as for auxiliary heaters -B5W- S / -D5W- S ⇒ [page 75](#) .

5.22 Bleeding coolant circuit in vehicles with auxiliary heater -D5Z- F

Bleeding the coolant circuit in vehicles with auxiliary heater -D5Z- F is the same as for auxiliary heater -B5W- S, -D5W- S or -D5W- Z ⇒ [page 76](#) .

5.23 Fuel supply to auxiliary heater -D5Z- F

The external components, sensors and actuators are identical with auxiliary heater -B5W- S, -D5W- S or -D5W- Z ⇒ [page 76](#) .

5.24 Removing and installing metering pump -V54-

The external components, sensors and actuators are identical with the auxiliary heaters -B5W- S / -D5W- S.

- Removing and installing metering pump -V54- ⇒ [page 78](#)

5.25 Testing quantity of fuel delivered

The external components, sensors and actuators are identical with the auxiliary heaters -B5W- S / -D5W- S.

- Testing quantity of fuel delivered ⇒ [page 79](#)

5.26 Regulation of auxiliary heater -D5Z- F

The external components, sensors and actuators are identical with the auxiliary heaters -B5W- S / -D5W- S.

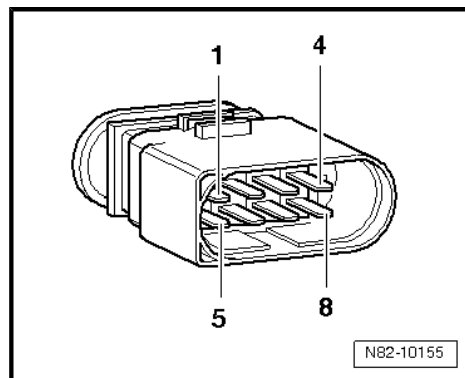
- Regulation of auxiliary heater ⇒ [page 80](#)



5.27 Start sequence

5.27.1 Pin assignment for 8-pin connector on heater unit (harness end)

- 1 - Terminal 30
- 2 - Terminal 31
- 3 - Metering pump -V54- +
- 4 - Metering pump -V54- -
- 5 - Diagnosis
- 6 - Terminal 15
- 7 - Alternator D+
- 8 - Diagnosis



5.27.2 Start signals

- ◆ Terminal 30 from 2nd battery
- ◆ "Ignition on" signal from terminal 15
- ◆ "Engine running" signal from alternator D+
- ◆ Temperature at coolant temperature sender for heater -G241- below approx. 77 °C
- ◆ Temperature at ambient temperature switch -F38- below approx. 10 °C (TDI only)



Note

If the temperature at the flame monitor -G64- is greater than 70 °C, it will be cooled for 4 minutes at a higher blower speed. Then the unit will start.

5.27.3 Start procedure

After each engine start the flame monitor -G64- must inform the heater control unit -J162- within 130 seconds after the heating has switched on, that the flame is burning normally. If this not the case then the heater unit will automatically attempt a second start. If, after the second start, the flame still does not burn normally, the heater will remain switched off until the auxiliary heater is switched on again.

In part load mode the combustion air blower -V6- operates at reduced rpm and the metering pump -V54- delivers only approx. 50% of fuel (reduced pulse frequency).

Abortion of start procedure

The start procedure is aborted if:

- ◆ The flame monitor -G64- registers that the flame is not burning normally within 130 seconds.
- ◆ The coolant temperature sender for heater -G241- or the overheating sensor -G189- detects a temperature above 125 °C.
- ◆ There is a temperature difference of more than 15 °C between the coolant temperature sender for heater -G241- and the overheating sensor -G189- .



- ◆ The heater control unit -J162- detects a fault; read out the fault memory using the vehicle diagnosis, testing and information system -VAS 5051A- .



6 Auxiliary heater -D5S- F / -B5S- F, vehicles 05.2004 ➤



Note

Vehicles with engine code AYL (6 cyl.) are equipped with a vacuum switch for auxiliary heater -F359-. This vacuum switch for auxiliary heater -F359- switches off the auxiliary heater when there is no vacuum. The reason for this is that the two pneumatic valves in the coolant circuit (big / small coolant circuit) are controlled by vacuum to close them. If there is no vacuum, the auxiliary heater operates in the big coolant circuit. On starting the engine, the engine control unit operates with implausible temperature values and will not let the engine start. The vacuum switch for auxiliary heater -F359- is located behind the engine control unit.

6.1 Repairing auxiliary heater -D5S- F / -B5S- F

The external components, sensors and actuators are identical with the auxiliary heaters -B5W- S / -D5W- S.

Repairing auxiliary heaters -D5S- F / -B5S- F ➔ [page 53](#)

6.2 Removing ambient temperature switch -F38-

The external components, sensors and actuators are identical with auxiliary heaters -B5W- S / -D5W- S.

Removing ambient temperature switch -F38- ➔ [page 55](#)

6.3 Removing circulation pump -V55-

The external components, sensors and actuators are identical with the auxiliary heaters -B5W- S / -D5W- S.

Removing circulation pump -V55- ➔ [page 55](#)

6.4 Removing pre-selection clock -E111-

The external components, sensors and actuators are identical with the auxiliary heaters -B5W- S / -D5W- S.

Removing pre-selection clock -E111- ➔ [page 56](#)

6.5 Removing and installing exhaust system

The external components, sensors and actuators are identical with the auxiliary heaters -B5W- S / -D5W- S.

Removing and installing exhaust system ➔ [page 56](#) .

6.6 Road test for auxiliary heater in vehicle without Climatronic

The external components, sensors and actuators are identical with the auxiliary heaters -B5W- S / -D5W- S.

Road test for auxiliary heater in vehicle without Climatronic ➔ [page 58](#)



6.7 Road test for auxiliary heater in vehicle with Climatronic

The external components, sensors and actuators are identical with the auxiliary heaters -B5W- S / -D5W- S.

Road test for auxiliary heater in vehicle with Climatronic

⇒ [page 60](#)

6.8 Removing and installing heater unit

The external components, sensors and actuators are identical with the auxiliary heaters -B5W- S / -D5W- S.

Removing and installing heater unit ⇒ [page 61](#)

6.9 Dismantling and assembling heater unit

Dismantling and assembling the heater unit is the same as for auxiliary heater -D5Z- F ⇒ [page 83](#) .

6.10 Removing heat exchanger

The external components, sensors and actuators are identical with auxiliary heater -D5Z- F.

Removing heat exchanger ⇒ [page 85](#)

6.11 Removing and installing flame monitor - G64-

The external components, sensors and actuators are identical with auxiliary heater -D5Z- F.

Removing and installing flame monitor -G64- ⇒ [page 86](#)

6.12 Removing glow plug for heater -Q9-

The external components, sensors and actuators are identical with auxiliary heater -D5Z- F.

– Remove glow plug for heater -Q9- ⇒ [page 87](#) .

6.13 Removing heater control unit -J162-

The external components, sensors and actuators are identical with auxiliary heater -D5Z- F.

– Remove heater control unit -J162- ⇒ [page 87](#) .

6.14 Renewing combustion air blower -V6-

The external components, sensors and actuators are identical with auxiliary heater -D5Z- F.

– Renew combustion air blower -V6- ⇒ [page 87](#) .

6.15 Removing overheating sensor -G189-

The external components, sensors and actuators are identical with auxiliary heater -D5Z- F.

– Remove overheating sensor -G189- ⇒ [page 88](#) .

6.16 Removing coolant temperature sender for heater -G241-

The external components, sensors and actuators are identical with auxiliary heater -D5Z- F.



- Remove coolant temperature sender for heater -G241-
⇒ [page 88](#) .

6.17 Checking flame monitor -G64-

The external components, sensors and actuators are identical with auxiliary heater -D5Z- F.

- Check flame monitor -G64- ⇒ [page 89](#) .

6.18 Checking overheating sensor -G189-

The external components, sensors and actuators are identical with auxiliary heater -D5Z- F.

- Check overheating sensor -G189- ⇒ [page 89](#) .

6.19 Checking coolant temperature sender for heater -G241-

The external components, sensors and actuators are identical with auxiliary heater -D5S- F / B5S- F.

- Check coolant temperature sender for heater -G241-
⇒ [page 90](#) .

6.20 Checking ambient temperature switch - F38-

The external components, sensors and actuators are identical with the auxiliary heaters -B5W- S / -D5W- S.

Checking ambient temperature switch -F38- ⇒ [page 70](#)

6.21 Connecting auxiliary heater -D5S- F / - B5S- F to coolant circuit

Connecting auxiliary heater -D5S- F / -B5S- F to the coolant circuit is the same as for auxiliary heater -B5W- S / -D5W- S
⇒ [page 72](#) .

6.22 Coolant hose routing on vehicles with 2nd heat exchanger

In the case of auxiliary heater -D5S- F / -B5S- F, the coolant hose routing in vehicles with a 2nd heat exchanger is the same as for auxiliary heater -B5W- S / -D5W- S ⇒ [page 75](#) .

6.23 Bleeding coolant circuit in vehicles with auxiliary heater -D5S- F / -B5S- F

Bleeding the coolant circuit in vehicles with auxiliary heater -D5S- F / -B5S- F is the same as for auxiliary heater -B5W- S, -D5W- S or -D5W- Z ⇒ [page 76](#) .

6.24 Fuel supply to auxiliary heater -D5S- F / -B5S- F

The external components, sensors and actuators are identical with auxiliary heater -B5W- S, -D5W- S or -D5W- Z ⇒ [page 76](#) .

6.25 Removing and installing metering pump -V54-

The external components, sensors and actuators are identical with the auxiliary heaters -B5W- S / -D5W- S.

Removing and installing metering pump -V54- ⇒ [page 78](#)



6.26 Testing quantity of fuel delivered

The external components, sensors and actuators are identical with the auxiliary heaters -B5W- S / -D5W- S.

Testing quantity of fuel delivered ⇒ [page 79](#)

6.27 Regulation of auxiliary heater -D5S- F / -B5S- F

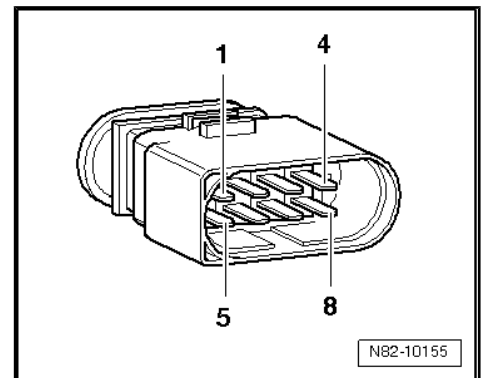
The external components, sensors and actuators are identical with the auxiliary heaters -B5W- S / -D5W- S.

Regulation of auxiliary heater ⇒ [page 80](#)

6.28 Start sequence

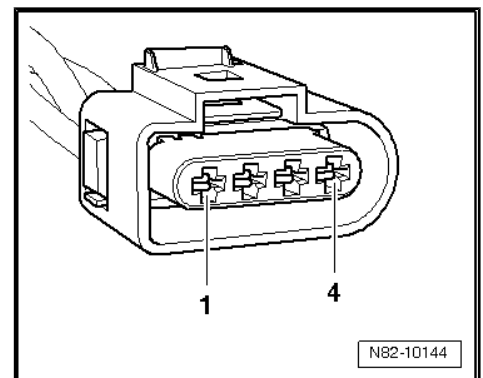
6.28.1 Pin assignment for 8-pin connector on heater unit (harness end)

- 1 - Terminal 30
- 2 - Terminal 31
- 3 - Fresh air blower -V2-
- 4 - Metering pump -V54- +
- 5 - Diagnosis
- 6 - Criterion for supplementary heating
- 7 - Pre-selection clock -E111-
- 8 - Diagnosis



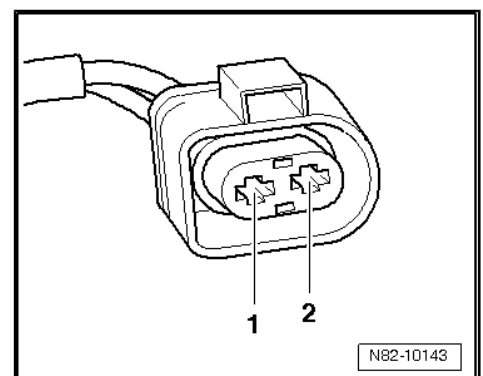
6.28.2 Pin assignment for 4-pin connector on heater unit (harness end)

- 1 - Circulation pump -V55- signal +
- 2 - Vacant
- 3 - Circulation pump -V55- from onboard power supply +
- 4 - Circulation pump -V55- from onboard power supply -



6.28.3 Pin assignment for 2-pin connector on heater unit (harness end)

- 1 - To circulation pump -V55- +
- 2 - To circulation pump -V55- -



6.28.4 Start signals

- ◆ Terminal 30 from 2nd battery
- ◆ "Heater on" signal from pre-selection clock -E111-



- ◆ Temperature at coolant temperature sender for heater -G241- below approx. 77 °C
- ◆ Temperature at ambient temperature switch -F38- below approx. 10 °C (TDI only)



Note

If the temperature at the flame monitor -G64- is greater than 70 °C, it will be cooled for 4 minutes at a higher blower speed. Then the unit will start.

6.28.5 Start procedure

After each engine start the flame monitor -G64- must inform the heater control unit -J162- within 130 seconds after the heating has switched on, that the flame is burning normally. If this not the case then the heater unit will automatically attempt a second start. If, after the second start, the flame still does not burn normally, the heater will remain switched off until the auxiliary heater is switched on again.

In part load mode the combustion air blower -V6- operates at reduced rpm and the metering pump -V54- delivers only approx. 50% of fuel (reduced pulse frequency).

Abortion of start procedure

The start procedure is aborted if:

- ◆ The flame monitor -G64- registers that the flame is not burning normally within 130 seconds.
- ◆ The coolant temperature sender for heater -G241- or the overheating sensor -G189- detects a temperature above 125 °C.
- ◆ There is a temperature difference of more than 15 °C between the coolant temperature sender for heater -G241- and the overheating sensor -G189- .
- ◆ The heater control unit -J162- detects a fault; read out the fault memory using the vehicle diagnosis, testing and information system -VAS 5051A- .