Workshop Manual
Audi A6 1998 ▸

Booklet Auxiliary heater

Edition 04.99

Service.

List of Workshop Manual Repair Groups
Audi A6 1998 ▸

Heft **Auxiliary heater**
Edition 04.99

Repair Group	Technical Bulletins					
01 Self-diagnosis, Electrical check						
82 Auxiliary heating						

Technical Information should always be available to all foremen and mechanics, because their com- pliance with the instructions given is essential to ensure vehicle roadworthiness and safety. In the normal safety precautions to be observed when working on motor vehicles are also applicable.

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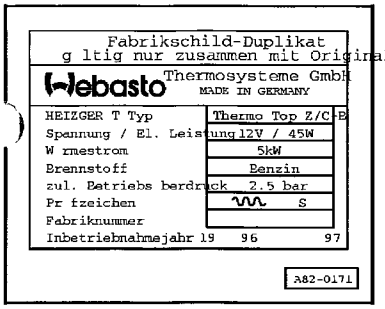

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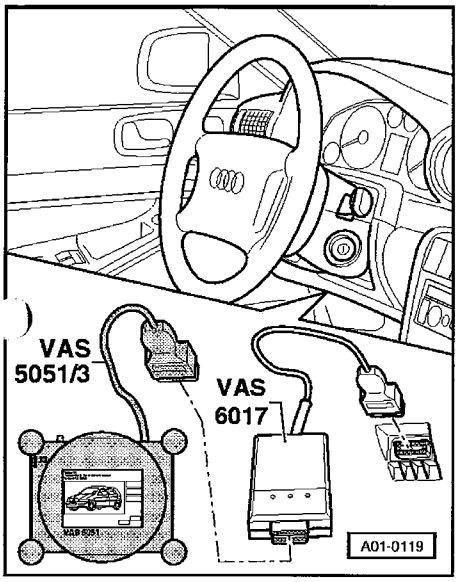
Auxiliary heater self-diagnosis

Notes:

- The heater rating plate indicates the version concerned.
  - Type "Z/C-D" with recirculating pump -V55 = auxiliary heater or auxiliary heater with additional heater (for vehicles with diesel engine only)
  - Type "Z/C-B" with recirculating pump -V55 = auxiliary heater (for vehicles with petrol engine only)
- Auxiliary heater control functions remain in operation during self-diagnosis.



- Adapter VAS 6017 is required for performing self-diagnosis on vehicles as of Model Year 2002. On these vehicles, diagnostic wire to auxiliary heater is connected to a different diagnostic connector contact.

On vehicles with diesel engine, the additional heater or auxiliary heater additional heating function is switched on by the engine control unit each time the vehicle is started as soon as the following conditions are met.

- Engine speed greater than 600 rpm
- Ambient temperature less than +5° C
- Air conditioner not set to "Econ" mode
- Coolant temperature less than 70° C to 80° C (depending on ambient temperature)

=> Relevant Diesel Direct-injection and Glow Plug System Workshop Manual; Repair Group 01; Reading measured value block =>

- Heater control unit -J162 adapted in adaption channel "10" with "0" or "2" as additional heater => Page 01-125 (applies to additional heaters with control unit as of software version "D50")

On vehicles with 8-cyl. engine and small coolant circuit (gradual introduction as of Model Year 2002), auxiliary heater recirculating pump

-V55 is switched on each time cold engine is started if earth is applied to auxiliary heater by coolant shut-off valve relay -J541.
Prerequisite:

- Heater control unit -J162 adapted in adaption channel "10" with "1" or "3" =>Page 01-125 (applies to auxiliary heaters with control unit as of software version "D50")

Operation

Heater control unit -J162 receives information from electrical and electronic components (information transmitters) and processes this information in line with specifications.

The output signals of the control unit then actuate the electrical components (control elements).

To permit rapid determination of the cause of the problem in the event of component failure or open circuit in wiring, heater control unit -J162 is provided with a fault memory which can be read out with fault reader V.A.G 1551, vehicle diagnostic system VAS 5051 or vehicle system tester V.A.G 1552. Adapter VAS 6017 is required for vehicles as of Model Year 2002.

Faults occurring in monitored sensors or components are stored in fault memory together with an indication of the type of fault.

Before starting fault-finding procedure, always implement self-diagnosis and interrogate stored information with the

Fault reader V.A.G 1551

The

Vehicle system tester V.A.G 1552

Or the

Vehicle diagnostic, testing and information system VAS 5051

The fault information displayed is used in conjunction with a fault table (containing information on possible causes of trouble) to perform pin-pointed repair measures.

Notes on fault indication:

- If a fault condition exists for longer than a pre-determined period, the fault is stored as being static. If the fault condition is then no longer detected for a pre-determined period, the fault is re-classified as being a sporadic fault. This process is constantly repeated. Sporadic faults are additionally identified as such by /SP on the right of the display.

The possibilities offered by self-diagnosis can only be utilised by way of V.A.G 1551 (mode 1 "Rapid data transfer"), V.A.G 1552 or VAS 5051.

Self-diagnosis is not restricted to storage, interrogation, erasing and final control diagnosis. It also offers basic setting, control unit identification, measured value display, adaption and encoding functions.

Mode -2- (flash code output) is not provided for auxiliary heater. Modes -3- (self-test) and -4- (workshop code) apply only to fault reader V.A.G 1551 and vehicle system tester V.A.G 1552 and are described in the appropriate operating instructions.

Note:

The following description refers solely to implementation of self-diagnosis using fault reader V.A.G 1551.

Self-diagnosis can be performed in the same manner with VAS 5051 or V.A.G 1552. In order to be able to furnish proof of faults in the event of subsequent enquiries, it is appropriate to print out the faults present after interrogating the fault memory.

If fault memory has been read out using V.A.G 1552, connect up V.A.G 1551 or VAS 5051 before erasing memory and print out faults present (V.A.G 1552 has no printer).

Technical data of self-diagnosis

● Memory	Non-volatile memory
● Data output	Rapid data transfer "Mode 1"
● Self-diagnosis	Additional/auxiliary heater"Address word 18"
– Interrogating control unit version	Function 01
– Interrogating fault memory	Function 02
– Performing final control diagnosis	Function 03
– Performing basic setting	Function 04
– Erasing fault memory	Function 05
– End of output	Function 06
– Encoding control unit	Function 07
– Reading measured value block	Function 08
– Adaption	Function 10

Notes:

♦ Component fitting locations => Page 82-8

♦ There are several different codes for the auxiliary heater (heater type "Z/C"), e.g. undervoltage cut-out via learnt battery voltage characteristic curve, undervoltage cut-out at fixed battery voltage input value, different codes for different software versions => Page 01-86 (Encoding control unit).

♦ During implementation of functions:

– *Final control diagnosis*

– *Basic setting (adaption of battery)*

it is not possible to have auxiliary heater operation.

♦ If operating and display unit for air conditioner/Climatronic -E87 or thermotronic control unit -J214 remains in operation after switching off ignition, check for "short to positive" in wiring to -E87 or to -J214.

=> Current Flow Diagrams, Electrical Fault-finding and Fitting Locations binder

♦ On vehicles with auxiliary heater, application of voltage with ignition off switches on operating and display unit for air conditioner/Climatronic -E87 (connector D contact 1)/thermotronic control unit -J214 (contact 9 in 16-pin connector).

=> Current Flow Diagrams, Electrical Fault-finding and Fitting Locations binder

♦ The electric additional heater was gradually discontinued in Model Year 1999 for vehicles with auxiliary heater and 6-cyl. diesel engine. On vehicles with no electric additional heater, the auxiliary heater is switched on as additional heater by the engine control unit each time the vehicle is started as soon as the following conditions are met.

– *Engine speed greater than 600 rpm*

– *Ambient temperature less than +5° C*

– *Air conditioner not set to "Econ" mode*

– *Coolant temperature less than 70° C to 80° C (depending on ambient temperature)*

=> Relevant Diesel Direct-injection and Glow Plug System Workshop Manual; Repair Group 01; Reading measured value block=>

♦ If a fault occurs several times in succession (e.g. fault "flame interruption"), auxiliary heater is interlocked and can only be switched on after erasing fault memory (part number is displayed by way of "Control unit identification" function).

-Auxiliary heater with part number 4D0 265 105 up to index "C"

♦ If a fault occurs several times in succession (e.g. fault "flame interruption"), auxiliary heater is no longer interlocked. If a fault occurs in additional heating mode (only applies to vehicles with 6-cyl. diesel engine), auxiliary and additional heater is interlocked once a fault has occurred 6 times and switch-on is only possible after erasing fault memory (part number is displayed by way of "Control unit identification" function).

-Auxiliary heater with part number 4B0 265 105 as of index "D"

♦ As of January 1999, auxiliary heaters with which CO2 level in exhaust gas can be adjusted were gradually introduced (part number is displayed by way of "Control unit identification" function).

-Auxiliary heater part number 4B0 265 105 as of index "D"

- As the CO2 level in the exhaust gas can be adjusted, auxiliary heaters with a control unit as of software version "D49" designed for the Audi A8 (part number 4D0 265 105 as of index "G" or "H") can be fitted on the Audi A6.

=> Parts List

- Auxiliary heater encoding has been modified. Auxiliary heaters with part number 4B0 265 105 as of index "D" (4D0 265 105 as of index "G") are to be encoded to 000XX instead of 0000X => Page 01-86 (encoding control unit).
- Auxiliary/additional heater encoding has been modified. Auxiliary heaters with part number 4D0 265 105 as of index "J" are to be encoded to 00XXX instead of 000XX => Page 01-86 (encoding control unit).
- As of November 2000, auxiliary heaters with part number 4D0 265 105 as of index "G" (originally intended for Audi A8) have gradually been introduced in production for the Audi A6 as well.

Test requirements for self-diagnosis

- All fuses OK as per current flow diagram
- Battery voltage OK
- Battery -A adequately charged

Safety precautions

Pay attention to the following if testers and measuring instruments have to be used in the course of a test drive:

Attention:

- **Always attach testers and measuring instruments to back seat and have them operated from there by a second person.**
- **If testers and measuring instruments were to be operated from front passenger's seat, person sitting there could suffer injury in the event of an accident due to triggering of front passenger's airbag.**

Modifications to auxiliary heater

Modifications to auxiliary heater introduced in Model Year 1999/Model Year 2000

Notes:

♦ Various modifications to the vehicle as a whole were gradually introduced in Model Year 2000 for the Audi A6. Introduction of a modified dash panel insert resulted in the following:

- Discontinuation of auxiliary heater pre-selection clock - E111
- Auxiliary heating/auxiliary ventilation is now set by way of a rotary knob/pushbutton in the centre console. Settings made are indicated on driver information system display in dash panel insert =>Page 82-35.
- Auxiliary heating/auxiliary ventilation operating time when switched on via remote control depends on setting in dash panel insert (between 30 and 60 min.).
- Provision of a remote control system, the signal of which contains a time module for an operating period of 60 min. (as opposed to 30 min. with version for vehicles with pre-selection clock).

♦ Heater control unit -J162 has been modified, with the addition of certain new functions and changes to existing ones. Auxiliary/additional heaters with modified control unit can be identified from part number and software version indicated on fault reader display by way of "Interrogating control unit version" function. Gradual introduction commenced in January 1999.

Heater control unit -J162 with modified software

4B0 815 071 X	Additional heater	Diesel	D49
Code XXXXX		WSC	ZZZZZ

Control unit -J162 with modified software (as of "D49") can be identified from part number and software version.

- The following part number and software version are displayed on interrogating control unit version.
- Vehicles with petrol engine:
  - 4B0 265 105 as of index "D" (auxiliary heater)
- Vehicles with diesel engine:
  - 4B0 265 105 as of index "E" (auxiliary heater or auxiliary heater with additional heater for vehicles with 6-cyl. engine with no electric additional heater)

– "D49" or higher is displayed as software version

Notes:

♦ The following modifications have been made to the heater control unit -J162:

– CO2 level in exhaust gas can be set by way of "Adaption" function.

– Encoding has been altered.

– Additional measured values appear in measured value block, display group "004".

– Measured value block, display group "008" is new.

♦ As the CO2 level in the exhaust gas can be adjusted, auxiliary heaters with a control unit as of software version "D49" designed for the Audi A8 (part number 4D0 265 105 as of index "G" or "H") can be fitted on the Audi A6.

=> Parts List

♦ The electric additional heater was gradually discontinued in Model Year 1999 for vehicles with auxiliary heater and 6-cyl. diesel engine. On these vehicles (with no electric additional heater), the auxiliary heater is switched on as additional heater by the engine control unit each time the vehicle is started as soon as certain conditions are met.

– Engine speed greater than 600 rpm

– Ambient temperature less than +5° C

– Air conditioner not set to "Econ" mode

– Coolant temperature less than 70° C to 80° C (depending on ambient temperature)

=> Relevant Diesel Direct-injection and Glow Plug System Workshop Manual; Repair Group 01; Reading measured value block=>

Modifications to auxiliary heater introduced in Model Year 2001/as of Model Year 2002

Notes:

♦ Various modifications were made to the auxiliary heater in Model Year 2001.

– Auxiliary heaters with part number 4D0 265 105 as of index "J" with software version "D50" or "D51" have been gradually introduced into production since November 2000. Encoding to "small coolant circuit" is possible as of software version "D50".

– Auxiliary heaters with part number as of index "J" with software version "D52" have been gradually introduced into production since April 2001. With these auxiliary heaters, actuation of recirculating pump may be modified depending on encoding and adaption in adaption channel "10". With code "000XX" (large coolant circuit), output of recirculating pump is reduced up to a coolant temperature of approx. 72 °C so as to increase temperature of coolant exiting from auxiliary heater (actuation time approx. 20 % at less than 60 °C and 100% at greater than 72 °C).

♦ Various modifications relating to the auxiliary heater are being introduced as of Model Year 2002.

– The vehicle electrical system is to be modified as of Model Year 2002. Following introduction of modified wiring harness, auxiliary heater diagnostic wire on these vehicles will no longer be connected to contact "7" of diagnostic connector in vehicle, but rather to contact "15". For this reason, adapter VAS 6017 is required for self-diagnosis.

=> Current Flow Diagrams, Electrical Fault-finding and Fitting Locations binder

– As of Model Year 2002, coolant circuit is gradually being converted on vehicles with 8-cyl. engine. Following introduction of modified coolant circuit, auxiliary heater coolant is no longer drawn in via engine in auxiliary heating mode (small circuit).

Heater control unit -J162 with modified software

4D0 265 105 X	Aux. heater	Petrol D50
Code XXXXX		WSC ZZZZZ

Control unit -J162 with modified software (as of "D50") can be identified from part number and software version.

- The following part number and software version are displayed on interrogating control unit version.
  - 4D0 265 105 as of index "J" (auxiliary heater)
  - "D50" or higher is displayed as software version

Notes:

♦ The following modifications were made to the auxiliary heater software as of software version "D50"/"D51":

- Extension of encoding to include "small coolant circuit" version

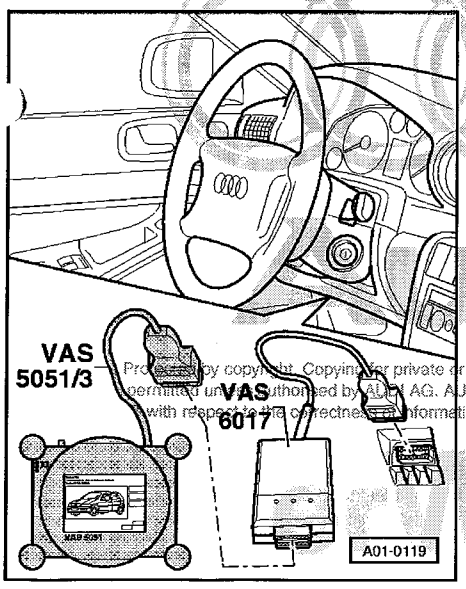
- When auxiliary heater is encoded for a small coolant circuit, a square-wave signal is emitted via output for actuation of fresh-air blower (operating and display unit for air conditioner/Climatronic -E87). This signal is processed by coolant shut-off valve relay -J541 (-E87 cannot process signal). This signal is used to output temperature of coolant in auxiliary heater and instantaneous auxiliary heater operating status. A positive signal is output if auxiliary heater is encoded for large coolant circuit (as for software versions "D49" and "D48") =>Page 01-220.
- Auxiliary heater recirculating pump -V55 can now also be switched on via "Additional heater" input with version for "petrol" (thus assisting engine coolant pump on vehicles with small coolant circuit). This connection is however not provided on all vehicles with small coolant circuit.

=> Current Flow Diagrams, Electrical Fault-finding and Fitting Locations binder

– Auxiliary heater switching temperatures (from full to part load and to control interval) have been increased by approx. 4 °C.

♦ With software version "D50", operating and display unit for air conditioner/Climatronic -E87 is briefly deactivated during run-on on switching from part load mode to control interval. This function is no longer provided as of software version "D51".

Connecting vehicle diagnostic, testing and information system VAS 5051/fault reader V.A.G 1551 and selecting function



– Switch off ignition.

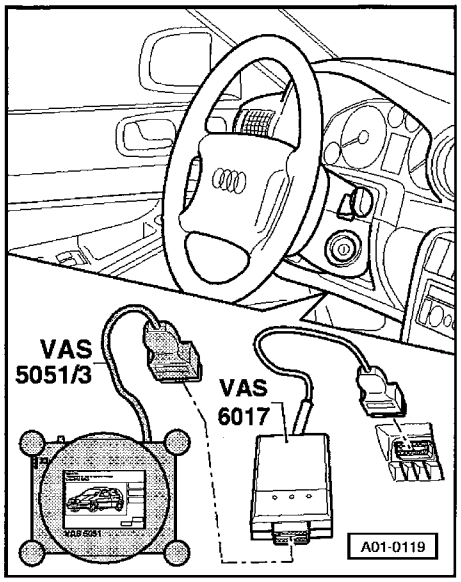
– Remove cover for diagnostic connector.

Vehicles up to Model Year 2001:

– Use diagnostic wire VAS 5051/1 to connect up vehicle diagnostic, testing and information system VAS 5051.

Vehicles as of Model Year 2002:

– Use diagnostic wire VAS 5051/1 and adapter VAS 6017 to connect up vehicle diagnostic, testing and information system VAS 5051 to diagnostic connector.



Notes:

- ♦ Adapter VAS 6017 is required for performing self-diagnosis on vehicles as of Model Year 2002. On these vehicles, diagnostic wire to auxiliary heater is connected to a different diagnostic connector contact.

  => Current Flow Diagrams, Electrical Fault-finding and Fitting Locations binder
- ♦ Alternatively, connect up fault reader V.A.G 1551 or vehicle system tester V.A.G 1552 using diagnostic wire V.A.G 1551/3.
- ♦ If testers and measuring instruments have to be used in the course of a test drive, pay attention to safety measures => Page 01-12.
- ♦ The following description refers solely to implementation of self-diagnosis using fault reader V.A.G 1551.
- ♦ Proceed in line with equipment operating instructions if use is made of vehicle diagnostic, testing and information system VAS 5051 or vehicle system tester V.A.G 1552.

V.A.G self-diagnosis	HELP
1 – Rapid data transfer*	
2 – Flash code output*	

Indicated on display:

* Displayed alternately

Notes:

- ♦ If there is no display on fault reader V.A.G 1551, use current flow diagram to check wiring of diagnosis connector.

  => Current Flow Diagrams, Electrical Fault-finding and Fitting Locations binder
- ♦ Depending on the program, additional operating instructions can be printed out by pressing HELP key on V.A.G 1551.
- ♦ Next step in program sequence can be selected by pressing →key.
- ♦ Printer is switched on by pressing PRINT key (lamp in key lights).
- ♦ Fault memory must be interrogated before it can be erased.

Press key 1 for "Rapid data transfer" mode.

Rapid data transfer	HELP
Enter address word XX	

Indicated on display:

– Press keys -1- and -8- to enter address word 18 for vehicle system to be tested (namely "Additional/auxiliary heater").

Rapid data transfer Q 18 – Additional/auxiliary heater

Indicated on display:

– Confirm entry with Q key.

Rapid data transfer Tester transmits address word 18

Indicated on display following entry of address word 18:

4B0 265 105 X Auxiliary heater Diesel XXX Code XXXXX WSC ZZZZZ

Control unit identification, code and workshop code of V.A.G 1551 are displayed after a brief delay.

♦ The following versions may be fitted, depending on vehicle equipment:

– 4B0 265 105 X /4D0 265 105 X
Auxiliary heater Diesel XXX
(heater type "Z/C-D")

– 4B0 265 105 X /4D0 265 105 X
Auxiliary heater Petrol XXX
(heater type "Z/C-B")

Notes:

♦ As the CO2 level in the exhaust gas can be adjusted, auxiliary heaters with a control unit as of software version "D49" designed for the Audi A8 (part number 4D0 265 105 as of index "G" or "H") can be fitted on the Audi A6.

=> Parts List

♦ The electric additional heater was gradually discontinued in Model Year 1999 for vehicles with auxiliary heater and 6-cyl. diesel engine. Auxiliary heater is used as additional heater on vehicles with no electric additional heater.

♦ On vehicles with petrol and diesel engines, auxiliary heater can also be used as additional heater. Cut-in is automatic on vehicles with 6-cyl. diesel engine with no electric additional heater (gradual conversion in Model Year 1999).

♦ Auxiliary heater versions with control unit with software version "D47/D48" have a different code number to those with a control unit as of software version "D49" =>Page 01-30.

♦ Auxiliary heater versions with control unit with software version "D49" have a different code number to those with a control unit as of software version "D50" =>Page 01-30.

♦ Vehicles with 8-cyl. engine and small coolant circuit for auxiliary heater (gradual introduction as of Model Year 2002) are only to be fitted with auxiliary heaters with part number as of index K (software version as of "D50").

♦ Control unit identification (depending on vehicle equipment and encoding, assignment => Parts List)

=> Parts List

♦ WSC ZZZZZ indicates workshop code of V.A.G 1551 with which encoding/adaption was last performed.

♦ XXX indicates software version of heater control unit -J162.

Note:

Encoding heater control unit -J162 =>Page 01-86

List of functions	Page
01 – Interrogating control unit version	01-22
02 – Interrogating fault memory	01-38
03 – Final control diagnosis	01-54
04 – Basic setting	01-65
05 – Erasing fault memory	01-83
06 – End of output	01-83
07 – Encoding control unit	01-86
08 – Reading measured value block	01-99
10 – Adaption	01-125

Only the functions listed here can be used for auxiliary heater self-diagnosis.

Note:

"Basic setting" function is to be performed for vehicles with auxiliary heater on which temperature-dependent undervoltage cut-out is activated with code "00XX1" =>Page 01-65.

– Press →key.

Rapid data transfer HELP
Select function XX

Indicated on display (function selection, e.g. 02 – Interrogating fault memory):

Notes:

♦ Pressing HELP key prints out a list of possible functions.

♦ Program of V.A.G 1551 returns to start after pressing →key.

♦ If one of the following fault messages appears on the display:

Rapid data transfer HELP
No control unit response

– Press HELP key for printout of possible fault causes.

Rapid data transfer HELP
K-wire not switched to positive

– Use current flow diagram to check diagnostic connector wiring.
=> Current Flow Diagrams, Electrical Fault-finding and Fitting Locations binder

Rapid data transfer →
No signal from control unit

Rapid data transfer →
Fault in communication link

♦ If adjacent display appears at the start of or during the program, faults have occurred and data exchange between fault reader V.A.G 1551 and heater control unit -J162 is no longer possible. Use current flow diagram to check diagnostic connector wiring.
=> Current Flow Diagrams, Electrical Fault-finding and Fitting Locations binder

– After eliminating possible causes of trouble, enter address word 18 for "Additional/auxiliary heater" again and confirm with Q key.

Rapid data transfer
Tester transmits address word 18

Indicated on display following entry of address word 18:

Following display then appears, e.g.:

4B0 265 105 X Auxiliary heater Diesel XXX
Code XXXXX WSC ZZZZZ

Control unit identification, code and workshop code of V.A.G 1551 are displayed.
– Press → key.

Rapid data transfer HELP
Select function XX

Indicated on display (function selection, e.g. 02 – Interrogating fault memory):

Encoding tables

Notes:

♦ As of January 1999, auxiliary heaters with which CO2 level in exhaust gas can be adjusted were gradually introduced (part number is displayed by way of "Control unit identification" function) => Page 01-22.

– *Auxiliary heater part number 4B0 265 105 as of index "D" (vehicles with petrol engine)*

– *Auxiliary heater part number 4B0 265 105 as of index "E" (vehicles with diesel engine)*

=> Parts List

♦ Auxiliary heaters with part number 4D0 265 105 as of index "J" with software version "D50" have been gradually introduced into production since November 2000. Encoding to "small coolant circuit" is possible as of software version "D50".

=> Parts List

Encoding of auxiliary heater (with control unit -J162 with software version "D47" or "D48"):

Code					Significance
0	0	0	0	1	Undervoltage cut-out is effected at voltage value learnt in basic setting function
0	0	0	0	2	Undervoltage cut-out is effected at voltage value entered in adaption function

Notes:

- Code "00001" is always to be entered for heaters used for auxiliary heating. "00002" is only to be entered if specifically requested by customer => Page 01-86 (encoding control unit).
- Software version "D47" or "D48" is used for auxiliary heaters with part number 4B0 265 105 up to index "C". Part number and software version can be called up by way of "Interrogating control unit version" function with fault reader V.A.G 1551.
- With code "00001", undervoltage cut-out takes place as soon as battery voltage learnt in "Basic setting" function is not reached in auxiliary heating mode. This temperature-dependent cut-out curve is learnt in "Basic setting" function => Page 01-65.
- With code "00002", undervoltage cut-out takes place as soon as battery voltage entered in "Adaption" function is not reached in auxiliary heating mode.

- If "Undervoltage cut-out (fixed value)" is displayed as fault for auxiliary heater encoded to "00001":

– Encode auxiliary heater to "00002" => Page 01-86 (encoding control unit).

– Use adaption function to read out value entered for undervoltage cut-out (fixed value) => Page 01-125 (adaption).

– Alter fixed value by way of "Adaption" function (specification less than 10,5 V).

– Encode auxiliary heater to "00001" => Page 01-86 (encoding control unit).

Encoding of auxiliary heater (with control unit -J162 with software version "D49"):

Code					Significance
0	0	0	1	1	– Recirculating pump -V55 fitted Undervoltage cut-out is effected at voltage value learnt in basic setting function
0	0	0	1	2	– Recirculating pump -V55 fitted Undervoltage cut-out is effected at voltage value entered in adaption function

Notes:

- Code "00011" is always to be entered for heaters used for auxiliary heating. "00012" is only to be entered if specifically requested by customer => Page 01-86 (encoding control unit).
- Software version "D49" is used for auxiliary heaters with part number 4B0 265 105 with index "D" or "E" (4D0 265 105 with index "G" or "H"). Part number and software version can be called up by way of "Interrogating control unit version" function with fault reader V.A.G 1551.

- With code "00011", undervoltage cut-out takes place as soon as battery voltage learnt in "Basic setting" function is not reached in auxiliary heating mode. This temperature-dependent cut-out curve is learnt in "Basic setting" function => Page 01-65.
- With code "00012", undervoltage cut-out takes place as soon as battery voltage entered in "Adaption" function is not reached in auxiliary heating mode.
- If "Undervoltage cut-out (fixed value)" is displayed as fault for auxiliary heater encoded to "00011":

– Encode auxiliary heater to "00012" => Page 01-86 (encoding control unit).

– Use adaption function to read out value entered for undervoltage cut-out (fixed value) => Page 01-125 (adaption).

– Alter fixed value by way of "Adaption" function (specification less than 10.5 V).

– Encode auxiliary heater to "00011" => Page 01-86 (encoding control unit).

Encoding of auxiliary heater (with control unit -J162 as of software version "D50"):

Code					Significance
0					No assignment
	0				No assignment
					Vehicle version
		0			Auxiliary heater in vehicle with no coolant shut-off valve -N279 (large coolant circuit)
		1			Auxiliary heater in vehicle with coolant shut-off valve -N279 (small coolant circuit, only applies to vehicles with 8-cyl. engine as of Model Year 2002, gradual introduction)
					Auxiliary heater recirculating pump -V55
			0		Not installed (not intended for Audi A6)
			1		Installed (auxiliary heater)
					Nature of undervoltage cut-out
				1	Undervoltage cut-out is effected at voltage value learnt in basic setting function
				2	Undervoltage cut-out is effected at voltage value entered in adaption function

Notes:

- For encoding nature of undervoltage cut-out, heed notes on Page 01-33 (same as for software "D49").
- As of Model Year 2002, coolant circuit is gradually being converted on vehicles with 8-cyl. engine. Following introduction of coolant shut-off valve -N279 (modified coolant circuit), auxiliary heater coolant is no longer drawn in via engine in auxiliary heating mode (small coolant circuit).
- When auxiliary heater is encoded for a small coolant circuit, a square-wave signal is emitted via output for actuation of fresh-air blower (operating and display unit for air conditioner/Climatronic -E87). This signal is processed by coolant shut-off valve relay -J541 (-E87 cannot process signal). This signal is used to output temperature of coolant in auxiliary heater and instantaneous auxiliary heater operating status. A positive signal is output if auxiliary heater is encoded for large coolant circuit (as for software versions "D49" and "D48") =>Page 01-220.
- Software version "D50" or above is used for auxiliary heaters with part number 4D0 265 105 and index "J" or "K". Part number and software version can be called up by way of "Interrogating control unit version" function with fault reader V.A.G 1551.
- Auxiliary heaters with part number as of index "K2" or "J" with software version "D52" have been gradually introduced into production since April 2001. With these auxiliary heaters, actuation of recirculating pump may be modified depending on encoding.

  With code "000XX" (large coolant circuit), output of recirculating pump is reduced up to a coolant temperature of approx. 72 °C so as to increase temperature of coolant exiting from auxiliary heater (actuation time approx. 20 % at less than 60 °C and 100% at greater than 72 °C).

  With code "001XX" (only permitted for vehicles with 8-cyl. engine as of Model Year 2002, small coolant circuit fitted), output of recirculating pump is also reduced as a function of coolant temperature => Page 01-125.

- If, on vehicles with 6-cyl. diesel engine, auxiliary heater is not switched on as additional heater and only recirculating pump -V55 starts up instead, check adaption in adaption channel "10" => Page 01-125.
- If, on vehicles with 8-cyl. engine, auxiliary heater is switched on as additional heater, check adaption in adaption channel "10" => Page 01-125.
- If, on vehicles with 8-cyl. engine and coolant shut-off valve -N279, auxiliary heater is switched on as additional heater, also check encoding of auxiliary heater. If auxiliary heater is encoded for a vehicle with no shut-off valve and earth is applied to contact "3" in 6-pin connector to auxiliary heater (via coolant shut-off valve relay -J541), auxiliary heater is switched on as additional heater => Page 01-125.

Interrogating auxiliary heater fault memory

– Connect up fault reader V.A.G 1551,
enter address word 18 "Additional/auxiliary heater" and keep switching until "Select function XX" appears on display (=>Page 01-22 onwards).

– Switch on printer by pressing PRINT key (lamp in key lights).

Rapid data transfer HELP Select function XX

Indicated on display (function selection):

– Press keys -0- and -2- to enter "Interrogating fault memory" function 02.

Rapid data transfer Q 02 – Interrogating fault memory

Indicated on display:

– Confirm entry with Q key.

X faults detected

The number of stored faults or "No faults detected" appears on the display.

No faults detected

– Press → key.

The stored faults are consecutively displayed and printed out.

- Following display and printout of last fault, select function "Reading measured value block 08, Display Groups 005 to 007" =>Page 01-99 and display/print out ambient conditions under which faults indicated occurred.
- Following display and printout of last fault, eliminate faults as per fault table (=>Page 01-41).

As is the case with "No faults detected", program returns to start after pressing →key.

Rapid data transfer HELP
Select function XX

Indicated on display (function selection):

- End output (function 06) =>Page 01-83.
- Unplug diagnostic connector.

Notes:

♦ If a fault has been detected:

- 1. Eliminate fault.
- 2. Interrogate fault memory (function 02).
- 3. Erase fault memory (function 05).

- 4. Check encoding (function 01)/encode control unit (function 07).
- 5. On auxiliary heaters with code "00XX1", perform basic setting (function 04).
- 6. End output (function 06).

♦ Proceed as follows if no fault is detected but there are problems with auxiliary heater (e.g. does not start, inadequate heat output):

- 1. Read measured value block (function 08) =>Page 01-99.
- 2. Perform final control diagnosis (function 03) =>Page 01-54.
- 3. Check operation of auxiliary heater=> Page 01-190.
- 4. On vehicles with 6-cyl. diesel engine or 8-cyl. engine with small coolant circuit (gradual introduction as of Model Year 2002), check adaption of auxiliary heater (only applies to auxiliary heater as of software version "D50")=> Page 01-134.

Auxiliary heater fault table

Notes:

- Listed in the following in ascending order of fault codes are all the faults which can be detected by the heater control unit -J162 and displayed on V.A.G 1551.
- The fault memory can store a maximum of 3 faults. If a further fault occurs, the first fault is erased. The ambient conditions under which they occurred are stored for all faults and can be called up via the function "Reading measured value block 08, display groups 005 to 007" =>Page 01-99.
- If faults only occur intermittently or if fault memory is not erased after fault elimination, such faults are displayed as being "sporadic faults" ("/SP") and content of fault memory is retained until memory is erased ("non-volatile memory").
- Fault code and flash code (certain components only) only appear on printout in "Rapid data transfer" mode.

Example:

Fault code

5-digit

00532

- The fault table may also indicate the type of fault (one of the displays marked with an * appears in addition to the component concerned/"info" display).

- On completion of repair work, always interrogate fault memory again with fault reader V.A.G 1551 and erase it.
- Before replacing components, always use current flow diagram to check corresponding positive and earth connections (terminals 30 and 31) as well as all connectors (between -J162 and component detected as being faulty).
- As regards all sporadic faults, pay particular attention to possible loose contacts in connectors.
- After replacing auxiliary heater component, always read out fault memory, eliminate any faults displayed and erase fault memory (functions 02 and 05).
- If operating and display unit for air conditioner/Climatronic -E87 or thermotronic control unit -J214 remains in operation after switching off ignition, check for "short to positive" in wiring to -E87 (connector D contact 1) or to -J214 (contact 9 in 16-pin connector).
- If no fault is detected in spite of complaints about auxiliary heater, implement functions "Final control diagnosis 03" and "Reading measured value block 08".
- If a fault occurs several times in succession (e.g. fault "flame interruption"), auxiliary heater is interlocked and can only be switched on after erasing fault memory (part number is displayed by way of "Control unit identification" function).

-Auxiliary heater with part number 4B0 265 105 up to index "C"

- If a fault occurs several times in succession (e.g. fault "flame interruption"), auxiliary heater is no longer interlocked. If a fault occurs in additional heating mode (only applies to vehicles with 6-cyl. diesel engine), auxiliary and additional heater is interlocked once a fault has occurred 6 times and switch-on is only possible after erasing fault memory (part number is displayed by way of "Control unit identification" function).

-Auxiliary heater with part number 4B0 265 105 as of index "D" (part number 4D0 265 105 as of index "G")

- Checking operation of auxiliary heater => Page 01-190.

Output on printer of V.A.G 1551	Possible cause of trouble	Fault remedy
00000 No faults detected	Self-diagnosis is over if "No faults detected" appears on completion of repair work and checking operation of auxiliary heater	
00532 Supply voltage * Signal too high /SP	– Electrical system voltage too high with engine running Charger with excessively high charging voltage used to charge battery	– Check alternator and voltage regulator => Electrical System; Repair Group 01 => Erase fault memory Check or replace battery
01044 Control unit incorrectly coded	– Newly installed auxiliary heater not encoded	– Encode auxiliary heater => Page 01-86 Erase fault memory

Output on printer of V.A.G 1551	Possible cause of trouble	Fault remedy
01406 No flame	– Constriction or leakage in area around air intake or in exhaust system Fault in auxiliary heater fuel supply Combustion air blower -V6 defective Glow plug with flame monitor -Q8 defective Metering pump -V54 defective Leak in auxiliary heater Residue in burner element (operation of auxiliary heater with vegetable-oil methylester fuel only)	– Check air-intake area and exhaust system of auxiliary heater Check fuel delivery =>Page 82-89 Perform final control diagnosis =>Page 01-54 Check electrical components of auxiliary heater =>Page 01-144 Dismantle auxiliary heater and examine seals =>Page 82-129 Remove residue from burner element => Page 82-109

Note:

The cause of this fault may be incorrect routing of pipe for diverting fuel in fuel tank. If this fault occurs, fuel delivery should therefore be checked with fuel tank not more than 1/3 full.

Output on printer of V.A.G 1551	Possible cause of trouble	Fault remedy
01407 Flame stop	– Constriction or leakage in area around air intake or in exhaust system Fault in auxiliary heater fuel supply Combustion air blower -V6 defective Glow plug with flame monitor -Q8 defective Metering pump -V54 defective Leak in auxiliary heater Residue in burner element (operation of auxiliary heater with vegetable-oil methylester fuel only)	– Check air-intake area and exhaust system of auxiliary heater Check fuel delivery =>Page 82-89 Perform final control diagnosis =>Page 01-54 Check electrical components of auxiliary heater =>Page 01-144 Dismantle auxiliary heater and examine seals =>Page 82-129 Remove residue from burner element => Page 82-109

Note:

The cause of this fault may be incorrect routing of pipe for diverting fuel in fuel tank. If this fault occurs, fuel delivery should therefore be checked with fuel tank not more than 1/3 full.

Output on printer of V.A.G 1551	Possible cause of trouble	Fault remedy
01408 Insuff. voltage switch-off (predet. value)	– Voltage dips during operation of auxiliary heater to below specified minimum voltage value Contact resistance in wiring to -J162 Battery insufficiently charged or defective Excessive fixed value entered for undervoltage cut-out	– Check alternator and voltage regulator => Electrical System; Repair Group 01 => Use current flow diagram to locate and eliminate contact resistance Check, recharge or replace battery Alter fixed value by way of "Adaption" function => Page 01-125

Notes:

- The fixed value for undervoltage cut-out is active with code "00XX2"; it can be entered or altered using the "Adaption" function => Page 01-125. The current cut-out voltage value is displayed in the measured value block => Page 01-99.
- The fixed value for undervoltage cut-out is also active with code "00XX1", but is not displayed. If the voltage value has been changed for a control unit encoded "00XX2" and the control unit then re-encoded "00XX1", this fault may also be displayed for control units encoded for automatic undervoltage cut-out.

  Remedy:

  Encode control unit to "00XX2" => Page 01-86.

  Alter fixed value by way of "Adaption" function (specification less than 10.5 V) =>Page 01-125.

  Re-encode control unit to "00XX1".
- In the event of frequent use of auxiliary heating mode, the battery may no longer be adequately charged if the vehicle is only used for short journeys, for example.

- Depending on last operating status and coolant temperature in auxiliary heater, no-load current input of auxiliary heater may be up to max. 60 mA for a period of up to 5 hours following switch-off. During this time, the degree of cooling of the coolant for the period following switch-off is calculated by the heater control unit - J162.
- At the latest 5 hours after switch-off, the no-load current input of the heater control unit -J162 is less than 2 mA.

Output on printer of V.A.G 1551	Possible cause of trouble	Fault remedy
01409 Repeated flame interruption	– Constriction or leakage in area around air intake or in exhaust system Fault in auxiliary heater fuel supply Combustion air blower -V6 defective Glow plug with flame monitor -Q8 defective Metering pump -V54 defective Leak in auxiliary heater	– Check air-intake area and exhaust system of auxiliary heater Check fuel delivery =>Page 82-89 Perform final control diagnosis =>Page 01-54 Check electrical components of auxiliary heater =>Page 01-144 Dismantle auxiliary heater and examine seals

Note:

The cause of this fault may be incorrect routing of pipe for diverting fuel in fuel tank. If this fault occurs, fuel delivery should therefore be checked with fuel tank not more than 1/3 full.

Output on printer of V.A.G 1551	Possible cause of trouble	Fault remedy
01410 Heating unit overheated	– Air in coolant circuit Constriction in coolant circuit No recirculating pump -V55 operation Fault at temperature sender in heater control unit -J162	– Bleed coolant circuit in specified manner Eliminate constriction in coolant circuit Perform final control diagnosis =>Page 01-54 Check electrical components of auxiliary heater =>Page 01-144 Replace auxiliary heater
01411 Temperature sensor -G18 * Defective	– Fault in heater control unit -J162	– Replace auxiliary heater

Output on printer of V.A.G 1551	Possible cause of trouble	Fault remedy
01412 Glow plug with flame monitor -Q8 * Implausible signal * Open circuit * Short to positive	– Fault in wiring between control unit -J162 and glow plug with flame monitor -Q8 Glow plug with flame monitor -Q8 defective Fault in heater control unit -J162	– Perform final control diagnosis =>Page 01-54 Check electrical components of auxiliary heater =>Page 01-144 Replace auxiliary heater

Notes:

- In the case of auxiliary heaters with software version "D47" or "D48", fault "Glow plug with flame monitor Q8, short to positive" may be stored under unfavourable usage conditions. If, for example, "cold" engine is started at the same time as auxiliary heater starts up from control interval, engine coolant pump pumps cold water through auxiliary heater, auxiliary heater cannot heat the large quantity of water as intended during the starting sequence, the temperature of the water in the auxiliary heater drops and the heater control unit -J162 sets this fault.
- If this fault is displayed together with "Flame interruption" or "Repeated flame interruption" fault, start by eliminating cause of these faults.
- If this fault is displayed, additionally check for contact resistance in connector between control unit -J162 and glow plug -Q8 (glow plug is also flame monitor). As the flow of current when interrogating the flame monitor is very low, even a slight contact resistance (e.g. due to inadequate contact pressure) can cause this fault to be stored.

Output on printer of V.A.G 1551	Possible cause of trouble	Fault remedy
01413 Metering pump -V54 * Short to earth * Open circuit * Short to positive	– Fault in wiring between control unit -J162 and metering pump -V54 Metering pump -V54 defective Fault in heater control unit -J162	– Locate and eliminate fault in wiring between -J162 and -V54 Perform final control diagnosis =>Page 01-54 Check electrical components of auxiliary heater =>Page 01-144 Replace auxiliary heater
01414 Combustion air blower -V6 * Open circuit * Short to positive	– Fault in wiring between control unit -J162 and combustion air blower -V6 Combustion air blower -V6 defective Fault in heater control unit -J162	– Perform final control diagnosis =>Page 01-54 Check electrical components of auxiliary heater =>Page 01-144 Replace auxiliary heater
01415 Recirculating pump -V55 * Open circuit * Short to positive	– Fault in wiring between control unit -J162 and recirculating pump -V55 Recirculating pump -V55 defective Fault in heater control unit -J162	– Perform final control diagnosis =>Page 01-54 Check electrical components of auxiliary heater =>Page 01-144 Replace auxiliary heater

Output on printer of V.A.G 1551	Possible cause of trouble	Fault remedy
01416 Fresh-air blower activation sign. * Short to earth * Open circuit * Short to positive	– Fault in wiring between control unit -J162 and operating and display unit for air conditioner/Climatronic - E87/thermotronic control unit - J214 Fault in heater control unit -J162	– Locate and eliminate fault in wiring between -J162 and -E87/-J214 Perform final control diagnosis =>Page 01-54 Check electrical components of auxiliary heater =>Page 01-144 Replace auxiliary heater
	– Fault in coolant shut-off valve relay -J541 (only fitted on vehicles with small coolant circuit)	– Check wiring between relay -J541 and control unit -J162 Check operation of relay -J541 => Page 01-232

Notes:

- As of Model Year 2002, vehicle electrical system and coolant circuit are gradually being converted on vehicles with 8-cyl. engine. Following introduction of modified vehicle electrical system and coolant circuit, auxiliary heater coolant is no longer drawn in via engine in auxiliary heating mode (small circuit).
- When auxiliary heater is encoded for a small coolant circuit, a square-wave signal is emitted via output for actuation of fresh-air blower (operating and display unit for air conditioner/Climatronic -E87). This signal is processed by coolant shut-off valve relay -J541 (-E87 cannot process signal). This signal is used to output temperature of coolant in auxiliary heater and instantaneous auxiliary heater operating status. A positive signal is output if auxiliary heater is encoded for large coolant circuit (as for software versions "D49" and "D48") =>Page 01-220.

Output on printer of V.A.G 1551	Possible cause of trouble	Fault remedy
01443 Matching to battery not carried out	– Basic setting not performed for auxiliary heater encoded to "00XX1" Basic setting not performed after last encoding for auxiliary heater encoded to "00XX1"	– Perform basic setting (learning of temperature-dependent cut-out curve for undervoltage cut-out) =>Page 01-65
01444 Insuff. voltage switch-off (automatic)	– Voltage dips during operation of auxiliary heater to below specified minimum voltage value Contact resistance in wiring to -J162 Battery insufficiently charged or defective	– Check alternator and voltage regulator => Electrical System; Repair Group 01 => Use current flow diagram to locate and eliminate contact resistance Check, recharge or replace battery

Notes:

- The "automatic" value for undervoltage cut-out is active with code "00XX1" and is learnt in the "Basic setting" function => Page 01-65. The current cut-out voltage value is displayed in the measured value block => Page 01-99.

- In the event of frequent use of auxiliary heating mode, the battery may no longer be adequately charged if the vehicle is only used for short journeys, for example.
- If other faults are displayed together with the fault "Undervoltage cut-out (automatic)", start by eliminating the cause of the fault "Undervoltage cut-out (automatic)".
- Depending on last operating status and coolant temperature in auxiliary heater, no-load current input of auxiliary heater may be up to max. 60 mA for a period of up to 5 hours following switch-off. During this time, the degree of cooling of the coolant for the period following switch-off is calculated by the heater control unit - J162.
- At the latest 5 hours after switch-off, the no-load current input of the heater control unit -J162 is less than 2 mA.

Output on printer of V.A.G 1551	Possible cause of trouble	Fault remedy
65535 Control unit (-J162) * Defective	– Open circuit, contact resistance or loose contact in wiring (terminal 30 or 31) to -J162 Fault in heater control unit -J162	– Use current flow diagram to locate and eliminate fault in wiring to -J162 Replace auxiliary heater

Auxiliary heater final control diagnosis

Notes:

- Fitting locations of components actuated =>Page 82-8
- If final control diagnosis is to be repeated, self-diagnosis must be terminated and re-started.
- Each component is actuated for a defined period, which can be terminated prematurely by pressing →key. This simultaneously effects switching to the next component.
- On completion of envisaged period, next component is to be selected by pressing →key.

Starting final control diagnosis

– Switch off ignition and all electr. loads.

– Connect up fault reader V.A.G 1551,
enter address word 18 "Additional/auxiliary heater" and keep switching until "Select function XX" appears on display =>Page 01-22.

- Switch on printer by pressing PRINT key (lamp in key lights).
- Interrogate fault memory => Page 01-38.

Rapid data transfer HELP
Select function XX

Indicated on display (function selection):

- Press keys -0- and -3- to select "Final control diagnosis" function 03.

Note:

Final control diagnosis can be terminated by pressing C key.

- Connect up current probe of ammeter (e.g. of multimeter V.A.G 1715) via positive connection of battery -A.
- Set measuring instrument to current measurement with current probe (measuring range 0 – 10 A).

Rapid data transfer Q
03 – Final control diagnosis

Indicated on display:

- Confirm entry with Q key.

Final control diagnosis
Glow plug with flame monitor -Q8

Indicated on display:

- Next component can be selected by pressing →key.

Notes:

- On completion of final control diagnosis, interrogate fault memory => Page 01-38.
- If "Function unknown or cannot be implemented at present" appears on display at start of final control diagnosis, e.g. on account of fault in auxiliary heater, press → key and interrogate fault memory => Page 01-38.

Function unknown or cannot →
be implemented at present

Indicated on display:

- Final control diagnosis is over when this display appears.
- Press →key.

Indicated on display	Specified function	Fault remedy
Glow plug with flame monitor -Q8	Glow plug is actuated for 60 s Reading on multimeter V.A.G 1715 increases during actuation of -Q8 by 4 to 10 A	– Check wiring between -Q8 and -J162 Check electrical components of auxiliary heater => Page 01-144

Press → key

Notes:

- Fault in glow plug with flame monitor -Q8 is stored in fault memory.
- Current input of glow plug is limited by control unit such that power output at glow plug is approx. 96 W (varies with battery voltage).

Indicated on display	Specified function	Fault remedy
Metering pump -V54	Metering pump is actuated for 10 s Pulsation is audible in vicinity of metering pump	– Check wiring between -V54 and -J162 Check electrical components of auxiliary heater => Page 01-144

Press → key

Notes:

- Metering pump is installed in area of rear right wheel.
- During actuation of metering pump -V54, approx. 4 cm 3 of fuel is supplied to auxiliary heater.
- On vehicles with 6-cyl. diesel engine on which auxiliary heater is also used as additional heater (since discontinuation of electric additional heater in Model Year 1999), consumption value displayed by on-board computer includes fuel consumption of auxiliary/additional heater. This function is executed by engine control unit, however only when engine is running (metering pump -V54 is connected to engine control unit by a wire).

Indicated on display	Specified function	Fault remedy
Combustion air blower -V6	Combustion air blower -V6 is actuated for 30 s Running noise is audible in vicinity of auxiliary heater	– Check wiring between -V6 and -J162 Check electrical components of auxiliary heater =>Page 01-144
Press → key		
Recirculating pump -V55	Recirculating pump -V55 is actuated for 30 s Running noise is audible in vicinity of auxiliary heater	– Check wiring between -V55 and -J162 Check electrical components of auxiliary heater =>Page 01-144
Press → key		

Indicated on display	Specified function	Fault remedy
Fresh-air blower actuation signal	On vehicles with "large coolant circuit" Operating and display unit for air conditioner/Climatronic -E87 starts up for 30 s Fresh-air blower -V2 is actuated for 30 s by -E87	Check wiring between -E87 and -J162 Check encoding of heater control unit -J162 (only as of software version "D50") => Page 01-86 Check electrical components of auxiliary heater =>Page 01-144
	– Thermotronic control unit -J214 starts up for 30 s (air distribution can be influenced via rotary control) Fresh-air blower -V2 is actuated for 30 s via relay -J13 (and series resistor -N6) by -J162	– Check wiring between -J214, -J13 (-N6, -V2) and -J162 Check electrical components of auxiliary heater =>Page 01-144

Continued ▼

Notes:

- Large coolant circuit is fitted on all vehicles except vehicles with 8-cyl. engine as of Model Year 2002.
- As of Model Year 2002, vehicle electrical system and coolant circuit are gradually being converted on vehicles with 8-cyl. engine (small circuit).
- As of Model Year 2002, auxiliary heater will only be available in combination with air conditioner.

Indicated on display	Specified function	Fault remedy
Continuation (fresh-air blower actuation signal)	On vehicles with "small coolant circuit" Coolant shut-off valve relay -J541 is actuated by heater control unit -J162 for 30 s Relay -J541 actuates -E87 for 30 s and -E87 starts up Fresh-air blower -V2 is actuated for 30 s by -E87	Check wiring between -E87, -J541 and -J162 Check encoding of heater control unit -J162 (only as of software version "D50") => Page 01-86 Check operation of coolant shut-off valve relay -J541 => Page 01-221 Check electrical components of auxiliary/additional heater =>Page 01-144

Notes:

- As of Model Year 2002, vehicle electrical system and coolant circuit are gradually being converted on vehicles with 8-cyl. engine. Coolant shut-off valve relay -J541 can only be actuated with a square-wave signal by auxiliary heaters for petrol with part number as of index "K" (software version "D50").
=> Current Flow Diagrams, Electrical Fault-finding and Fitting Locations binder
- When auxiliary heater is encoded for a small coolant circuit, a square-wave signal is emitted via output for actuation of fresh-air blower (operating and display unit for air conditioner/Climatronic -E87). This signal is processed by coolant shut-off valve relay -J541 (-E87 cannot process signal). This signal is used to output temperature of coolant in auxiliary heater and instantaneous auxiliary heater operating status. A positive signal is output if auxiliary heater is encoded for large coolant circuit (as for software versions "D49" and "D48") =>Page 01-220.

Indicated on display	Specified function	Fault remedy
Press → key		
End		
For auxiliary heaters up to and including software version "D49" For auxiliary heaters as of software version "D50" encoded for vehicle with no coolant shut-off valve -N279 (large coolant circuit)		

Notes:

- Large coolant circuit is fitted on all vehicles except vehicles with 8-cyl. engine as of Model Year 2002.
- As of Model Year 2002, vehicle electrical system and coolant circuit are gradually being converted on vehicles with 8-cyl. engine (small circuit).
- Coolant shut-off valve -N279 is only fitted on vehicles with 8-cyl. engine as of Model Year 2002 (small circuit, gradual introduction).

Indicated on display	Specified function	Fault remedy
Coolant shut-off valve -N279	Coolant shut-off valve -N279 is actuated via coolant shut-off valve relay -J541 for 30 s at 5 s intervals Pulsation is audible in vicinity of shut-off valve	– Check wiring between relay -J541 and control unit -J162 Check encoding of heater control unit -J162 (only as of software version "D50") => Page 01-86 Check wiring between relay -J541 and shut-off valve -N279 Check operation of relay -J541 => Page 01-232
– Press → key		
End		

Notes:

- Coolant shut-off valve -N279 is only fitted on vehicles with 8-cyl. engine as of Model Year 2002 (gradual introduction).
- Operation of coolant shut-off valve relay -J541 => Page 01-221
- In auxiliary heating mode with engine stopped, coolant leaving air-conditioner heat exchanger is routed directly back to auxiliary heater via coolant shut-off valve -N279 (small coolant circuit) to provide better heating of passenger compartment => Page 01-221 (operation of coolant shut-off valve relay -J541).

Basic setting of auxiliary heater

The "Basic setting" function can be used to perform the following switching operations.

♦ Pipe filling(display group number 055)

– This function permits checking of the fuel delivery of the metering pump -V54 =>Page 82-89.

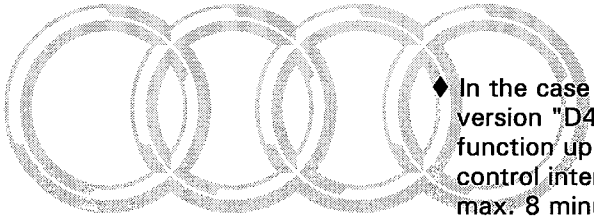
♦ Auxiliary heater battery adaption (display group number 099) =>Page 01-66

– Only for heaters encoded for automatic undervoltage cut-out =>Page 01-86

♦ Heater on (display group number 022) =>Page 01-77

Notes:

♦ If link with fault reader is interrupted whilst auxiliary heater is switched on, auxiliary heater is switched off automatically.



♦ In the case of heaters with control unit -J162 as of software version "D49", auxiliary heater can be operated by way of this function up to a coolant temperature of 115° C. Starting from control interval is possible. The operating time is limited to max. 8 minutes.

♦ Heater off (display group number 033) =>Page 01-77

Note:

The functions "Pipe filling" (display group number 044) and "Auxiliary heater battery adaption" (display group number 066) apply to the Audi A8 and are not to be used for the Audi A6.

Basic setting of auxiliary heater (adaption of battery)

Notes:

♦ "Battery adaption" is only to be implemented for vehicles with auxiliary heater in which automatic (temperature-dependent) undervoltage cut-out is activated with code "00XX1".

- Basic setting is to be performed with code "00XX1":
  - After replacing vehicle battery
  - After replacing auxiliary heater
  - After performing vehicle wiring work affecting auxiliary heater wires
- Metering pump is also actuated during battery adaption and roughly 20 cm3 of fuel supplied. As a result, smoke may briefly emerge from exhaust pipe when auxiliary heater is first started up following basic setting.

Requirements

- Battery fully charged
- If a new battery has been fitted, it must not have been re-charged after filling with electrolyte
- If battery has been re-charged, charging must have been completed at least 2 hours previously and no-load voltage of fully charged battery must have settled at a level between 12.5 and 12.7 V

- Temperature of engine and battery must be greater than 15 °C but less than 30 °C (e.g. ambient temperature)
- Temperature of coolant in auxiliary heater and vehicle battery must be roughly the same

Notes:

- Heater control unit -J162 bases its calculation on identical coolant and battery temperatures. If engine is warm and battery temperature less than 20 °C during battery adaption, an incorrect cut-out voltage will result.
- If battery has been charged using a charger, no-load voltage is often higher than voltage occurring during vehicle operation depending on charger. If basic setting is performed with a battery charged in this manner, the cut-out voltage will be too high and the auxiliary heater may be switched off on account of "undervoltage".

♦ Ignition off

♦ All electr. loads off (including interior lights and radio)

Performing basic setting

– Connect up fault reader V.A.G 1551,
enter address word 18 "Additional/auxiliary heater" and keep switching until "Select function XX" appears on display => Page 01-22 onwards.

– Switch on printer by pressing PRINT key (lamp in key lights).

– Interrogate fault memory =>Page 01-38 and eliminate any faults displayed.

– Erase fault memory =>Page 01-83.

– Check encoding => Page 01-86 and correct if necessary.

Rapid data transfer HELP Select function XX

Indicated on display (function selection):

– Press keys -0- and -4- to select "Basic setting" function 04.

Rapid data transfer Q 04 – Starting basic setting

Indicated on display:

– Confirm entry with Q key.

Start basic setting HELP Enter display number XXX

Indicated on display:

– Enter display group number 099.

– Confirm entry with Q key.

System in basic setting 99→ Battery adaption

Indicated on display:

Notes:

Function unknown or cannot → be implemented at present

♦ If this display appears, heater control unit -J162 has been incorrectly encoded, battery voltage is too high (e.g. engine running) or heater is on.

- ♦ Battery adaption takes approx. 168 s.
- ♦ The following components are then actuated:
  - Glow plug with flame monitor -Q8
  - Combustion air blower -V6
  - Recirculating pump -V55
  - Metering pump -V54
- ♦ During component actuation, battery voltage dip is measured by heater control unit -J162 and stored. The data determined in this test sequence form the basis for the cut-out value calculated by the heater control unit -J162 for the lowest permissible battery voltage in auxiliary heating mode.
- ♦ If calculated voltage value is not reached, control unit -J162 switches off auxiliary heater and fault "Undervoltage cut-out (automatic)" is entered in fault memory.

System in basic setting 99→ END

Wait until the following display appears:
- Press → key.

Checking voltage value learnt

Rapid data transfer HELP Select function XX

Indicated on display (function selection):

- Press keys -1- and -0- to select "Adaption" function 10.

Rapid data transfer Q 10 – Adaption

Indicated on display:
- Confirm entry with Q key.

Adaption Q Enter channel number XX

Indicated on display:
- Enter channel number -01-.
- Confirm entry with Q key.

Channel 01 Adaption XX Undervoltage cut-out (-1 3-)

Indicated on display:

A number between 165 and 175 must be displayed as adaption value.

Alter adaption value to 157 to increase availability of auxiliary heater ("165" for "D47" and "D48"). This value corresponds to roughly 12.25 V.
- Keep pressing key -1- until "157" is displayed as adaption value.

Channel 01 Adaption 157 Q Store altered value?

Indicated on display:
- Confirm entry with Q key.

Channel 01 Adaption 157 → Altered value stored

Indicated on display:

– Press → key.

Rapid data transfer HELP
Select function XX

Indicated on display (function selection):

Notes:

- If value displayed is less than 165, battery voltage is too low (battery flat or not OK, check).
- If value displayed is greater than 175, battery voltage is too high (battery fully charged prior to basic setting or engine operation during basic setting).
- As of August 2000, 12.25 V has been set at the factory as the lowest permissible cut-out voltage value (adaption value "157"). This value can also be set for vehicles manufactured prior to the above date (as of software version "D49" of heater control unit -J162).
- If frequent use is made of the auxiliary heater, the adaption value learnt can be reduced to 151 (as of "D49") if so requested by customer to increase auxiliary heater availability still further. Customers must however be informed of the possible consequences (this setting may lead to engine starting problems on account of high drain on battery).

- Problems with auxiliary heater operation may be encountered if voltage value learnt is too high (undervoltage cut-out).
- Engine starting problems may occur if voltage value learnt is too low.

Adaption value displayed	Battery voltage learnt
151	12.15 V
155	12.22 V
160	12.29 V
165	12.36 V
170	12.44 V
175	12.51 V
180	12.58 V
185	12.66 V

Notes:

- Conversion factors may result in slight differences between actual cut-out voltage and value given in table.

◆ For auxiliary heaters with code "00XX1" for automatic (temperature-dependent) undervoltage cut-out, cut-out voltage value determined during basic setting may only be varied within the specified limits.

Channel	01	Adaption	170
Undervoltage cut-out			(-1 3-)

- The lowest cut-out voltage which can be entered to increase auxiliary heater availability is 12.25V (adaption value "157").
- For heaters with control unit as of software version "D49", cut-out voltage can be reduced to 12.15V (input value "151"). If cut-out voltage setting is less than 12.25V (input value "157"), customers must be informed of possible consequences (engine starting problems on account of high drain on battery).
- If greater importance is attached to reliable engine starting, a cut-out voltage of 12.51 V is to be entered (input value e.g. "175").

◆ If, however, basic setting was performed following vehicle battery charging and the voltage value determined is too high, the adaption value must be altered by pressing key "1" on fault reader such that the "battery voltage learnt" is less than 12.50 V (display value e.g. "157" for 12.25 V with heater control unit -J162 as of software version "D49").

Rapid data transfer	HELP
Select function XX	

Indicated on display (function selection):

- Press key -C- twice.

Rapid data transfer	HELP
Select function XX	

Indicated on display (function selection):

- Interrogate fault memory =>Page 01-38 and eliminate any faults displayed.
- On vehicles with 6-cyl. diesel engine or 8-cyl. engine with small coolant circuit (gradual introduction as of Model Year 2002) and for auxiliary heaters with control unit -J162 as of software version "D50", check adaption in adaption channel "10" =>Page 01-134.

Basic setting of auxiliary heater (switching on and off)

Requirements

- ♦ Battery fully charged
- ♦ Ignition off

Performing basic setting

- Connect up fault reader V.A.G 1551,

  enter address word 18 "Additional/auxiliary heater" and keep switching until "Select function XX" appears on display => Page 01-22 onwards.
- Switch on printer by pressing PRINT key (lamp in key lights).
- Interrogate fault memory =>Page 01-38 and eliminate any faults displayed.
- Erase fault memory =>Page 01-83.

Rapid data transfer HELP
Select function XX

Indicated on display (function selection):

- Press keys -0- and -4- to select "Basic setting" function 04.

Rapid data transfer Q
04 – Starting basic setting

Indicated on display:

- Confirm entry with Q key.

Heater on

Start basic setting HELP
Enter display number XXX

Indicated on display:

- Enter display group number "022".
- Confirm entry with Q key.

System in basic setting 22→		
On	Off	Heating

Indicated on display:

Indicated on line 2 of display		
Position	**Text**	**Significance**
1	Test ON	Basic setting
2	- (Fault)	Auxiliary heater is in a mode which does not permit switch-on
3	Heating OFF Heating ON	Actuation
4	Heating Ventilation	Mode

Notes:

♦ "Fault" display in line 2 may be caused by the following:

- Auxiliary heater had been switched on and is currently in "run-on" mode.
- Fault stored in auxiliary heater which prevents switch-on.

♦ To switch off heater, press → key and enter basic setting (display group number 033) =>Page 01-81.

♦ If fault occurs during function "Basic setting, heating on", heater cannot be re-started until it has been switched off by way of "Basic setting, heating off" function.

♦ If operation of auxiliary heater is to be observed, it is possible to press→key and enter "08" to switch to "Reading measured value block" function. Pressing →key and entering "04" effects return to "Basic setting" function.

♦ If link with fault reader is interrupted whilst auxiliary heater is switched on, auxiliary heater is switched off automatically.

♦ In the case of heaters with control unit -J162 as of software version "D49", auxiliary heater can be operated by way of this function up to a coolant temperature of 115° C. Starting from control interval is possible. The operating time is limited to max. 8 minutes.

Heating off

Rapid data transfer	HELP
Select function XX	

Indicated on display (function selection):

- Press keys -0- and -4- to select "Basic setting" function 04.

Start basic setting	HELP
Enter display number XXX	

Indicated on display:

- Enter display group number "033".
- Confirm entry with Q key.

System in basic setting		33→
Off	Off	Heating

Indicated on display:

Indicated on line 2 of display		
Position	**Text**	**Significance**
1	Test OFF	Basic setting
2	- (Fault)	Auxiliary heater is in a mode which does not permit switch-on

Indicated on line 2 of display		
3	Heating OFF Heating ON	Actuation
4	Heating Ventilation	Mode

Note:

"Fault" display in line 2 may be caused by the following:

- Auxiliary heater had been switched on and is currently in "run-on" mode.
- Fault stored in auxiliary heater which prevents switch-on.
- Press → key.

Rapid data transfer	HELP
Select function XX	

Indicated on display (function selection):

Erasing fault memory, end of output

Requirements

♦ Fault memory interrogated

Erasing fault memory

– Press →key.

Rapid data transfer HELP Select function XX

Indicated on display (function selection):

– Press keys -0- and -5- to enter "Erasing fault memory" function 05.

Rapid data transfer Q 05 – Erasing fault memory

Indicated on display:

– Confirm entry with Q key.

Rapid data transfer → Fault memory erased

Indicated on display:

– Press → key.

Rapid data transfer HELP Select function XX

Indicated on display:

Notes:

Attention: Fault memory not interrogated

♦ Test sequence has not been correctly implemented if adjacent display appears.

♦ Keep exactly to test sequence:

– Interrogate fault memory.

– Eliminate any faults.

– Erase fault memory.

♦ If, for example, ignition is switched off between "Interrogating fault memory" and "Erasing fault memory", fault memory is not erased (interrogate fault memory again).

End of output

Note:

Fault memory interrogated/erased and encoding checked.

Rapid data transfer HELP Select function XX

Indicated on display:

– Press keys -0- and -6- to enter "End output" function 06.

Rapid data transfer Q 06 – End of output

Indicated on display:
– Confirm entry with Q key.

Rapid data transfer HELP Enter address word XX

Indicated on display:
– Unplug diagnostic connector.

Encoding auxiliary heater

– Connect up fault reader V.A.G 1551,
enter address word 18 "Additional/auxiliary heater" and keep switching until "Select function XX" appears on display (=>Page 01-22 onwards).
– Switch on printer by pressing PRINT key (lamp in key lights).

Rapid data transfer HELP Select function XX

Indicated on display (function selection):
– Press keys -0- and -7- to select "Encoding control unit" function 07.

Rapid data transfer Q 07 – Encoding control unit

Indicated on display:
– Confirm entry with Q key.

Encoding control unit Enter code number XXXXX

Indicated on display:

Note:

Next position can be selected by pressing → key.

- Encode heater control unit -J162 in line with version and desired undervoltage cut-out.
- Encoding tables =>Pages 01-90 and 01-92
- Confirm entry with Q key.

4B0 265 071 X	Auxiliary heater Diesel	XXX
Code XXXXX		WSC ZZZZZ

Control unit identification, code and workshop code of V.A.G 1551 are displayed after a brief delay.

- If code is "00XX1", perform basic setting =>Page 01-65.
- If code is "00XX2", enter cut-out voltage by way of adaption function =>Page 01-125.
- On vehicles with 6-cyl. diesel engine or 8-cyl. engine with small coolant circuit (gradual introduction as of Model Year 2002) and for auxiliary heaters with control unit -J162 as of software version "D50", check adaption in adaption channel "10" =>Page 01-134.

♦ The following versions may be fitted, depending on vehicle equipment:

- 4B0 265 105 X /4D0 265 105 X
  Auxiliary heater Diesel XXX
  (heater type "Z/C-D")
- 4B0 265 105 X /4D0 265 105 X
  Auxiliary heater Petrol XXX
  (heater type "Z/C-B")

Notes:

♦ As the CO2 level in the exhaust gas can be adjusted, auxiliary heaters with a control unit as of software version "D49" designed for the Audi A8 (part number 4D0 265 105 as of index "G" or "H") can be fitted on the Audi A6.

=> Parts List

♦ On vehicles with petrol and diesel engines, auxiliary heater can also be used as additional heater. Cut-in is automatic on vehicles with 6-cyl. diesel engine with no electric additional heater.

Principal differences between the two auxiliary heater codes

- Code "00XX1" allows for the changes in battery voltage at different temperatures. The voltage dip determined during basic setting also forms part of the calculation =>Page 01-65.
- With code "00XX2", cut-out is effected at the voltage value entered in the "Adaption" function =>Page 01-125.

Notes:

- As a general rule, use is always to be made of code "00XX1", as it permits a higher level of auxiliary heater availability without jeopardising reliable starting of the vehicle.
- Auxiliary heater code "00XX2" is only to be entered in exceptional circumstances (e.g. customer request). Customers are to be informed that it may no longer be possible to start the engine if the cut-out voltage selected is too low.
- If vehicles previously fitted with an auxiliary heater with software version "D49" are fitted with an auxiliary heater with software version as of "D50", the new auxiliary heater is to be encoded to "000XX" for "large coolant circuit" => Page 01-220.

Encoding of auxiliary heater (with control unit -J162 with software version "D47" or "D48"):

Code					Significance
0	0	0	0	1	Undervoltage cut-out is effected at voltage value learnt in basic setting function
0	0	0	0	2	Undervoltage cut-out is effected at voltage value entered in adaption function

Notes:

- Always enter code "00001". "00002" is only to be entered if requested by customer.
- Software version "D47" or "D48" is used for auxiliary heaters with part number 4B0 265 105 up to index "C". Part number and software version can be called up by way of "Interrogating control unit version" function with fault reader V.A.G 1551.
- With code "00001", undervoltage cut-out takes place as soon as battery voltage learnt in "Basic setting" function is not reached in auxiliary heating mode =>Page 01-65.
- With code "00002", undervoltage cut-out takes place as soon as battery voltage entered in "Adaption" function is not reached in auxiliary heating mode.

♦ If "Undervoltage cut-out (fixed value)" is displayed as fault for auxiliary heater encoded to "00001":

– Encode auxiliary heater to "00002" => Page 01-86 (encoding control unit).

– Use adaption function to read out value entered for undervoltage cut-out (fixed value) => Page 01-125 (adaption).

– Alter fixed value by way of "Adaption" function (specification less than 10.5 V).

– Encode auxiliary heater to "00001" => Page 01-86 (encoding control unit).

Encoding of auxiliary heater (with control unit -J162 with software version "D49"):

Code					Significance
0	0	0	1	1	– Recirculating pump -V55 fitted Undervoltage cut-out is effected at voltage value learnt in basic setting function
0	0	0	1	2	– Recirculating pump -V55 fitted Undervoltage cut-out is effected at voltage value entered in adaption function

Notes:

♦ Always enter code "00011". "00012" is only to be entered if requested by customer.

♦ Software version "D49" is used for auxiliary heaters with part number 4B0 265 105 as of index "D". Part number and software version can be called up by way of "Interrogating control unit version" function with fault reader V.A.G 1551.

♦ With code "00011", undervoltage cut-out takes place as soon as battery voltage learnt in "Basic setting" function is not reached in auxiliary heating mode => Page 01-65.

♦ With code "00012", undervoltage cut-out takes place as soon as battery voltage entered in "Adaption" function is not reached in auxiliary heating mode.

♦ If "Undervoltage cut-out (fixed value)" is displayed as fault for auxiliary heater encoded to "00011":

– Encode auxiliary heater to "00012" => Page 01-86 (encoding control unit).

– Use adaption function to read out value entered for undervoltage cut-out (fixed value) => Page 01-125 (adaption).

– Alter fixed value by way of "Adaption" function (specification less than 10.5 V).

– Encode auxiliary heater to "00011" => Page 01-86 (encoding control unit).

Encoding of auxiliary heater (with control unit -J162 as of software version "D50"):

Code					Significance
0					No assignment
	0				No assignment
					Vehicle version
		0			Auxiliary heater in vehicle with no coolant shut-off valve -N279 (large coolant circuit)
		1			Auxiliary heater in vehicle with coolant shut-off valve -N279 (small coolant circuit, only applies to vehicles with 8-cyl. engine as of Model Year 2002, gradual introduction)
					Auxiliary heater recirculating pump -V55
			0		Not installed (not intended for Audi A6)
			1		Installed (auxiliary heater)
					Nature of undervoltage cut-out
				1	Undervoltage cut-out is effected at voltage value learnt in basic setting function
				2	Undervoltage cut-out is effected at voltage value entered in adaption function

Notes:

- For encoding nature of undervoltage cut-out, heed notes on Page 01-92 (same as for software "D49").
- As of Model Year 2002, coolant circuit is gradually being converted on vehicles with 8-cyl. engine. Following introduction of coolant shut-off valve -N279 (modified coolant circuit), auxiliary heater coolant is no longer drawn in via engine in auxiliary heating mode (small coolant circuit).
- When auxiliary heater is encoded for a small coolant circuit, a square-wave signal is emitted via output for actuation of fresh-air blower (operating and display unit for air conditioner/Climatronic -E87). This signal is processed by coolant shut-off valve relay -J541 (-E87 cannot process signal). This signal is used to output temperature of coolant in auxiliary heater and instantaneous auxiliary heater operating status. A positive signal is output if auxiliary heater is encoded for large coolant circuit (as for software versions "D49" and "D48") =>Page 01-220.
- Software version "D50" or above is used for auxiliary heaters with part number 4D0 265 105 and index "J" or "K". Part number and software version can be called up by way of "Interrogating control unit version" function with fault reader V.A.G 1551.

- Auxiliary heaters with part number as of index "K" or "J" with software version "D52" have been gradually introduced into production since April 2001. With these auxiliary heaters, actuation of recirculating pump may be modified depending on encoding.

  With code "000XX" (large coolant circuit), output of recirculating pump is reduced up to a coolant temperature of approx. 72 °C so as to increase temperature of coolant exiting from auxiliary heater (actuation time approx. 20 % at less than 60 °C and 100% at greater than 72 °C).

  With code "001XX" (only permitted for vehicles with 8-cyl. engine as of Model Year 2002, small coolant circuit fitted), output of recirculating pump is also reduced as a function of coolant temperature.
- If, on vehicles with 6-cyl. diesel engine, auxiliary heater is not switched on as additional heater and only recirculating pump -V55 starts up instead, check adaption in adaption channel "10" => Page 01-125.
- If, on vehicles with 8-cyl. engine and small coolant circuit (gradual introduction as of Model Year 2002), auxiliary heater is switched on as additional heater, check adaption in adaption channel "10" => Page 01-125.

Example:

Significance	Code "00001"	Code "00001"	Code "00002"
– Temperature of coolant in auxiliary heater on starting	+ 20 °C	– 10 °C	Any
Battery output voltage at + 20 °C determined in "Basic setting" function	**12.40 V**	**12.40 V**	-
● Cut-out voltage entered in "Adaption" function	-	-	11.60 V
– Voltage dip (on account of wiring resistance between battery and heater) determined in "Basic setting" function	(-) 0.2 V	(-) 0.2 V	-
– Specified permissible voltage dip during heater opeartion (temperature-dependent)	(-) 0.50 V	(-) 0.40 V	-
– Temperature-dependent voltage correction value	(-) 0.00 V	(-) 0.30 V	-
Auxiliary heater voltage at which undervoltage cut-out takes place (indicated in measured value block, display group 003)	**11.70 V**	**11.50 V**	**11.60 V**
– Voltage dip (in wiring) during auxiliary heater operation	(+) 0.2 V	(+) 0.2 V	(+) 0.2 V
Battery voltage at which undervoltage cut-out takes place	11.90 V	11.70 V	11.80 V

Notes:

- Cut-out voltage determined in "Basic setting" function or entered in "Adaption" functionand voltage dip determined in wiringare indicated in measured value block, display groups "003" and "004" = > Pages 01-114 and 01-120.
- Battery output voltage at + 20 °C determined in "Basic setting" function can be read out by way of adaption function "10" = > Page 01-71.
- Batteries have a tendency to supply less power at low temperatures, however more power is required for starting a cold engine. The temperature-dependent undervoltage cut-out with code "00XX1" ensures that the auxiliary heater remains operative over a broad range under various usage conditions without jeopardising reliable starting of the engine.
- The voltage dip in the wiring during auxiliary heater operation is governed by the instantaneous current flow. During basic setting, the current flow is approx. 2.6 A.

Reading measured value block

Notes:

- There are 7 measured value blocks with 4 measured values each for auxiliary heaters with control unit -J162 up to software version "D48".
- There are 8 measured value blocks with 4 measured values each for auxiliary heaters with control unit -J162 as of software version "D49".
- The auxiliary heater function remains active during self-diagnosis ("Reading measured value block" function) and the current measured values are displayed.
- Provided that printer is switched on, current display is printed out on record slip.

Starting "Reading measured value block" function

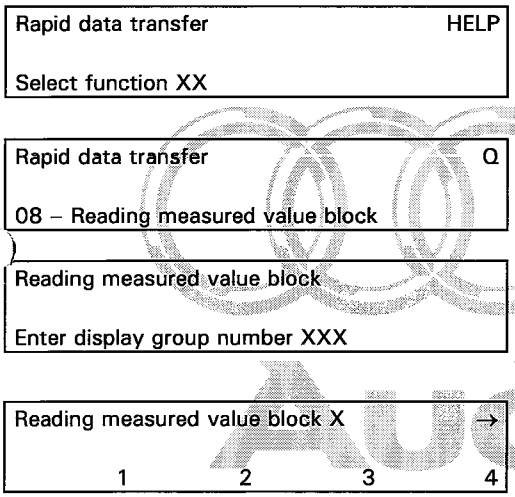
- Switch off ignition.
- Connect up fault reader V.A.G 1551,

  enter address word 18 "Additional/auxiliary heater" and keep switching until "Select function XX" appears on display (=>Page 01-22 onwards).
- Switch on auxiliary heater (e.g. by way of pre-selection clock - E111 or dash panel insert; only applies if operation of auxiliary heater is to be checked).

Notes:

- If auxiliary heater operation is to be observed, function "08" can be selected for example to switch from "Basic setting" function to "Reading measured value block" function. Pressing → key and selecting function "04" effects return to "Basic setting" function.
- If there is a fault in the auxiliary heater, the measured value blocks are to be read out with the auxiliary heater switched off.
- Various modifications to the vehicle as a whole have been gradually introduced from Model Year 2000 onwards for the Audi A6. Introduction of a modified dash panel insert resulted in the following:
  - Discontinuation of pre-selection clock -E111
  - Auxiliary heating/auxiliary ventilation is now set by way of a rotary knob/pushbutton in the centre console. Settings made are indicated on driver information system display in dash panel insert.

- ♦ Auxiliary heaters with a modified control unit have been gradually introduced at the factory since January 1999. These auxiliary heaters can be identified from the part number and software version (as of "D49"). The built-in heater control unit - J162 has been modified, with the addition of certain new functions and changes to existing ones = >Page 01-13.
- ♦ Auxiliary heaters with a modified control unit have been gradually introduced at the factory since November 2000. These auxiliary heaters can be identified from the part number and software version (as of "D50"). The built-in heater control unit - J162 has been modified, with the addition of certain new functions and changes to existing ones = >Page 01-13.
- ♦ The electric additional heater was gradually discontinued in Model Year 1999 for vehicles with auxiliary heater and 6-cyl. diesel engine. On these vehicles (with no electric additional heater), the auxiliary heater is switched on as additional heater by the engine control unit each time the vehicle is started as soon as certain conditions are met = >Page 01-13.



Indicated on display (function selection):

– Press keys -0- and -8- to select "Reading measured value block" function 08.

Indicated on display:

– Confirm entry with Q key.

Indicated on display:

– Enter display group number (list = >Page 01-104).

– Confirm entry with Q key.

Indicated on display:

To select different display group:

– Press C key.

Reading measured value block Enter display group number XXX

Indicated on display:

– Enter display group number.

Notes:

- The next display group can be selected by pressing key "3" or "↑". To return to previous display group, press key "1" or "↓".
- If readings match specifications in all display zones:

– Press → key.

Rapid data transfer HELP Select function XX

Indicated on display:

List of available display group numbers

Display group number	Display zone	Designation	Explanatory notes on Page
001	1-4	Instantaneous operating voltage (in V) Instantaneous coolant temperature (in °C) Current operating status of auxiliary heater	01-106
002	1-4	Power factors of actuated components (-V6, -Q8, -V54 and -V55)	01-111
003	1-4	Specified cut-out voltage for auxiliary heater Nature of undervoltage cut-out Desired operating status of auxiliary heater Auxiliary heater mode set (heating/ventilation)	01-114
004	1-4	Voltage dip determined during basic setting (only of significance for auxiliary heater with code "00XX1")	01-120
	2	Auxiliary heater heating time	
	3	Auxiliary heater "on" time	
	4	Number of pre-heating cycles (starting operations) of auxiliary heater	

Display group number	Display zone	Designation	Explanatory notes on Page
005	1-4	Conditions under which last fault occurred	01-123
006	1-4	Conditions under which last but one fault occurred	01-123
007	1-4	Conditions under which third last fault occurred	01-123
008	1	Number of instances of auxiliary/additional heater cut-out due to fault in heating operation	01-124
	2 ... 4	Display zone not used	

Note:

Zones 2 to 4 in display group 004 are only used for heater control units -J162 as of software version "D49".
Display group 008 is only provided for control units -J162 as of software version "D49".

Display group 001

Instantaneous operating voltage, instantaneous coolant temperature, instantaneous operating status

Display zone	Display
1	Instantaneous voltage at auxiliary heater in V If value displayed with auxiliary heater on and ignition off is less than cut-out voltage specified in display group 003: – Check battery (charge and condition of battery) – Check for contact resistance in wiring between battery and heater (positive and earth) If value displayed with additional heater on and engine running is less than instantaneous alternator voltage (only applies to vehicles with 6-cyl. diesel engine with no electric additional heater): – Check for contact resistance in wiring between battery and heater (positive and earth)
2	Instantaneous temperature of coolant in auxiliary heater in °C

Display zone	Display
3	Current operating status of auxiliary heater Off No cut-in signal Starting Heater in start sequence Part load Heater in part load operation (coolant temperature in heater between 69°C and 77°C / 73°C and 81°C) Full load Heater in full load operation (coolant temperature in heater less than 71°C / 75°C) Run-on Heater switched off or coolant temperature in excess of 77°C / 81°C (heater switches to control interval) and heater in run-on mode Control interval Heater in control interval (coolant temperature previously greater than 77°C / 81°C and still greater than 73°C / 77°C) Ventilation Auxiliary ventilation mode ("Ventilation mode" set on pre-selection clock -E111 / in dash panel insert, input connected to earth) Fault Heater switched off on account of a fault affecting auxiliary heater operation (=> Display groups 005 to 007)

Note:

Fig. shows auxiliary heater switching temperatures applicable up to software version "D49". As of software version "D50" of heater control unit -J162, switching temperatures were increased by 4 °C (as of "D50", switching from full to part load for example takes place at 75 °C instead of 71 °C as used to be the case).

Display zone	Display
4	Output for actuation of operating and display unit for air conditioner/Climatronic -E87, thermotronic control unit -J214 and coolant shut-off valve relay -J541 On -E87/-J214 switched on (switch in auxiliary heater closed, approx. battery voltage at output to -E87/-J214) -J541 is actuated (data telegram; only applies if control unit code is "001XX" for small coolant circuit) Off -E87/-J214 switched off (switch in auxiliary heater open) Actuation not signalled to -J541

Notes:

- At low coolant temperatures (less than 30 °C), operating and display unit for air conditioner/Climatronic -E87, thermotronic control unit -J214 and fresh-air blower -V2 are not actuated in auxiliary heating mode until coolant temperature has exceeded 30 °C (generally valid up to software version "D49", as of software version "D50" only applicable with code "000XX").
- In the case of auxiliary heaters as of software version "D50" and with code "001XX" (small coolant circuit; gradual introduction for vehicles with 8-cyl. engine only as of Model Year 2002), a data telegram is transmitted irrespective of coolant temperature to the coolant shut-off valve relay -J541, which performs the appropriate switching operations.
- In auxiliary ventilation mode, the operating and display unit for air conditioner/Climatronic -E87, thermotronic control unit -J214 and fresh-air blower -V2 are activated immediately irrespective of coolant temperature.
- As the "additional heating" function can only be implemented when the engine is running, the output to -E87 remains open when an auxiliary heater is in "additional heating" mode (only intended for vehicles with 6-cyl. diesel engine with no electric additional heater).
- Checking operation of coolant shut-off valve relay -J541 => Page 01-221.
- Coolant shut-off valve relay -J541 can only be actuated with a square-wave signal by auxiliary heaters for petrol with part number as of index "K" (software version "D50"). Such auxiliary heaters were gradually introduced into production as of November 2000 (initially for vehicles with 8-cyl. petrol engine). Relay is fitted in all vehicles with 12-cyl. engine but is currently not intended for vehicles with 6-cyl. engine and 8-cyl. diesel engine.

- When auxiliary heater is encoded for a small coolant circuit, a square-wave signal is emitted via output for actuation of fresh-air blower (operating and display unit for air conditioner/Climatronic -E87). This signal is processed by coolant shut-off valve relay -J541 (-E87 cannot process signal). This signal is used to output temperature of coolant in auxiliary heater and instantaneous auxiliary heater operating status. A positive signal is output if auxiliary heater is encoded for large coolant circuit (as for software versions "D49" and "D48") =>Page 01-220.
- Auxiliary heaters with part number as of index "K" or "J" with software version "D52" have been gradually introduced into production since April 2001. With these auxiliary heaters, actuation of recirculating pump may be modified depending on encoding and adaption (=> Page 01-125) of heater control unit -J162.

– With code "000XX" (large coolant circuit), output of recirculating pump is reduced up to a coolant temperature of approx. 72 °C so as to increase temperature of coolant exiting from auxiliary heater (actuation time approx. 20 % at less than 60 °C and 100% at greater than 72 °C).

– With code "001XX" (vehicles with 8-cyl. engine and small coolant circuit), output of recirculating pump is reduced up to a coolant temperature of approx. 60 °C so as to increase temperature of coolant exiting from auxiliary heater (actuation time approx. 20 % at less than 50 °C and 100% at greater than 60 °C).

– Output is controlled by switching recirculating pump on and off (period is 4 s; with 50%, recirculating pump is switched on for 2 s and off for 2 s for example).

– With code "001XX" (vehicles with 8-cyl. engine and small coolant circuit), temperature of coolant is additionally regulated by relay -J541 by actuating coolant shut-off valve -N279. With this code, output of recirculating pump is regulated in line with auxiliary/additional heater control unit version and adaption => Page 01-125.

Display group 002

Power factor of components actuated

Display zone	Display
1	Combustion air blower -V6 0 % = Combustion air blower off 10 to 100 % = Combustion air blower in control mode (starting, part load or full load)
2	Glow plug with flame monitor -Q8 0 % = Glow plug not actuated 50 to 100 % = Actuation of glow plug (preheating) 10 to 50 % = Actuation of glow plug (post-glow during run-on)
3	Metering pump -V54 0 % = Metering pump not actuated 50 to 100 % = Actuation of metering pump (heating mode with part or full load) 10 to 110 % = Actuation of metering pump (starting)

Notes:

- Power factors are selected by heater control unit -J162 such that heater functions as close as possible to optimum operating point.
- The power factors for component actuation are governed by the instantaneous battery voltage and the operating status of the heater.

Display zone	Display
4	Recirculating pump -V55 ● Auxiliary heater up to software version "D51" Off = Recirculating pump not actuated On = Actuation of recirculating pump with maximum voltage ● Auxiliary heater as of software version "D52" 0% = Recirculating pump not actuated 20...100% = Recirculating pump in control mode (pulsed actuation)

Notes:

If auxiliary heater is used as additional heater (only intended for vehicles with 6-cyl. diesel engine with no electric additional heater), recirculating pump -V55 is also switched on in "additional heating" mode.

- Auxiliary heaters with part number as of index "J" with software version "D52" have been gradually introduced into production since April 2001. With these auxiliary heaters, actuation of recirculating pump may be modified depending on encoding.

– With code "000XX" (large coolant circuit), output of recirculating pump is reduced up to a coolant temperature of approx. 72 °C so as to increase temperature of coolant exiting from auxiliary heater

(actuation time approx. 20 % at less than 60 °C and 100% at greater than 72 °C).

– With code "001XX" (vehicles with 8-cyl. engine and small coolant circuit), output of recirculating pump is reduced up to a coolant temperature of approx. 60 °C so as to increase temperature of coolant exiting from auxiliary heater (actuation time approx. 20 % at less than 50 °C and 100% at greater than 60 °C).

– Output is controlled by switching recirculating pump on and off (period is 4 s; with 50%, recirculating pump is switched on for 2 s and off for 2 s for example).

– With code "001XX" (vehicles with 8-cyl. engine and small coolant circuit), temperature of coolant is additionally regulated by relay -J541 by actuating coolant shut-off valve -N279. With this code, output of recirculating pump is regulated in line with auxiliary/additional heater control unit version and adaption => Page 01-125.

Display group 003

Specified values for undervoltage cut-out, nature of undervoltage cut-out, desired auxiliary heater operating status and auxiliary heater operating mode set

Display zone	Display
1	Voltage value for undervoltage cut-out (in V) Code "00XX1" "Automatic" displayed in zone 2: Greater than 11.30 V and less than 12.10 V (depending on currently valid temperature and battery voltage determined during basic setting) "Manual" displayed in zone 2: Voltage specified by manufacturer or entered in "Adaption" function (9.5 V or greater) Code "00XX2" Voltage entered in "Adaption" function (greater than 11.60 V)

Notes:

♦ Depending on whether "auxiliary heating" or "additional heating" setting was last active (only intended for vehicles with 6-cyl. diesel engine with no electric additional heater), nature of undervoltage cut-out applicable to this setting is displayed for code "00XX1" in zone "2". The corresponding voltage value can be seen from display zone "1".

- Cut-out voltage displayed in zone "1" is not active during start sequence. Auxiliary heater is only switched off during start phase if voltage is less than 9.5 V.
- The correlation between voltage dip and temperature-dependent battery voltage for undervoltage cut-out is shown on the basis of an example on Page 01-97.
- If voltage value displayed is not reached for a specific period, undervoltage cut-out is effected (=>Example on Page 01-97).
- With code "00XX2", voltage value entered should not be too low so as not to jeopardise reliable starting of the engine.

Display zone	Display
2	Nature of undervoltage cut-out ● Auxiliary heater (heater with recirculating pump -V55) Automat. Code "00XX1" entered Auxiliary/additional heater last used as auxiliary heater Manual Code "00XX1" entered Auxiliary heater last used as additional heater or Code "00XX2" entered

Notes:

- The following applies if auxiliary heater code is "00XX1":
  - Automatic undervoltage cut-out takes effect if auxiliary heater is operated as auxiliary heater
  - Manual undervoltage cut-out takes effect if auxiliary heater is operated as additional heater (only intended for vehicles with 6-cyl. diesel engine and no electric additional heater)
- So as not to impair auxiliary heater operation with code "00XX1", value for "manual cut-out voltage" must be less than 10.5 V (manual cut-out voltage value is active with this code but is not displayed).
- Depending on whether "Auxiliary heater" or "Additional heater" setting was last active, the nature of the undervoltage cut-out applicable to this setting is displayed with code "00XX1". Display zone "1" shows the corresponding voltage value.

Display zone	Display
3	Desired operating status of auxiliary heater ● Auxiliary heater Heating off No cut-in signal from pre-selection clock -E111 or dash panel insert No cut-in signal from engine control unit (only intended for vehicles with 6-cyl. diesel engine with no electric additional heater) Heating on Cut-in signal from pre-selection clock -E111 or dash panel insert Additional heating (only intended for vehicles with 6-cyl. diesel engine with no electric additional heater) Cut-in signal from engine control unit (voltage less than 5V, input of engine control unit connected to earth)

Notes:

- Actuation of auxiliary heater as additional heater (by engine control unit) is only intended for vehicles with 6-cyl. diesel engine. Actuation wiring between engine control unit and auxiliary heater is however only fitted on vehicles with no electric additional heater (gradual discontinuation of electric additional heater in Model Year 1999).
- On vehicles with 6-cyl. diesel engine, values relating to electric additional heater or actuation of auxiliary heater as additional heater can be read out from engine control unit measured value block.

=> Relevant Diesel Direct-injection and Glow Plug System Workshop Manual; Repair Group 01 =>

- If on starting cold engine on vehicles with 8-cyl. engine and small coolant circuit (gradual introduction as of Model Year 2002), auxiliary heater starts up as additional heater, check adaption of heater control unit -J162. Adaption "1" must be set in adaption channel "10" for software versions "D50" and "D51". As of software version "D52", the adaption setting must be "3". Alter adaption of heater control unit -J162 if necessary.

Display zone	Display
4	Auxiliary heater operating mode set on pre-selection clock -E111 (gradual discontinuation in Model Year 2000) Auxiliary heater operating mode set in dash panel insert driver information system (gradual introduction in Model Year 2000) Heating Auxiliary heating (heating mode set on pre-selection clock or in dash panel insert, switch open = no earth connection) Ventilation Auxiliary ventilation (ventilation mode set on pre-selection clock or in dash panel insert, switch closed = connected to earth)

Note:

On vehicles with no pre-selection clock -E111, auxiliary heating and auxiliary ventilation are switched on and off by way of dash panel insert.

Display group 004

Voltage dip determined during basic setting (only applicable to heaters encoded "00XX1")

Heating time, "on" time and preheating cycles (only used for auxiliary heaters with control unit -J162 as of software version "D49")

Display zone	Display
1	Voltage dip between auxiliary heater and battery -A ● Auxiliary heater code "00XX1" Less than 0.350 V ● Auxiliary heater code "00XX2" Display can be ignored

Notes:

♦ Voltage dip is measured during basic setting "Battery adaption".

♦ If voltage dip determined is greater than 0.350 V:

– *Check battery*

– *Locate and eliminate contact resistance in wiring (positive and earth) between battery and auxiliary heater*

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♦ The correlation between voltage dip and temperature-dependent battery voltage for undervoltage cut-out is shown on the basis of an example on Page 01-97.

Auxiliary heaters with control unit -J162 up to software version "D48"

Display zone	Display
2	Display zone not used (ignore display)
3	Display zone not used (ignore display)
4	Display zone not used (ignore display)

Auxiliary heaters with control unit -J162 as of software version "D49"

Display zone	Display
2	Auxiliary heater heating time in hours Display: 0 to XXXXX
3	Operating time ("on" time) of auxiliary heater in hours Display: 0 to XXXXX
4	Number of pre-heating cycles (starting operations) of auxiliary heater Display: 0 to XXXXX

Notes:

- The values displayed in zones 2 to 4 relate to the total "on" time of the auxiliary heater. The counter starts at zero on heater production and cannot be reset.
- Display zone 2 shows the actual heating time (auxiliary heating or additional heating).
- Display zone 3 shows the time during which a cut-in signal (from dash panel insert, engine control unit or pre-selection clock) was applied to auxiliary heater control unit (auxiliary heating, additional heating, control interval or auxiliary ventilation).
- Display zone 4 shows the number of starting operations (pre-heating cycles) of the auxiliary heater. If the first attempted start does not produce a flame and start repetition is necessary, this classes as a separate pre-heating cycle (display is incremented by two, not one).

Display group 005 (conditions under which last fault occurred)
Display group 006 (conditions under which last but one fault occurred)
Display group 007 (conditions under which third last fault occurred)

Display zone	Display
1	Fault code (nature and location => Page 01-41) for this fault
2	Fault code "1444" or "1408" (undervoltage cut-out) Coolant temperature in heater at start of auxiliary heating/auxiliary ventilation at which fault occurred If auxiliary heating/auxiliary ventilation is switched on several times within a 5-hour period, the applicable value is the one measured on first start (cold start = least favourable condition) Any other fault code Coolant temperature in heater when fault occurred
3	Operating status when fault occurred
4	Voltage at auxiliary heater when fault occurred

Note on display zones 2 and 4:

On starting (first 5 minutes after switch-on) undervoltage cut-out is only implemented if voltage drops below a value of 9.5V (automatic undervoltage cut-out is suppressed). If battery is flat, it is therefore possible for the voltage value displayed in zone 4 to be less than that indicated in zone 1 of display group 003.

Display group 008
Number of instances of auxiliary heater cut-out due to fault in heating operation

Display zone	Display
1	Number of instances of cut-out due to fault in heating operation Display: 0 to XXXX ● Version providing auxiliary heating Number of faults since fault memory last erased ● Version providing auxiliary heating and additional heating (vehicles with 6-cyl. diesel engine with no electric additional heater only) Number of faults since fault memory last erased "0" if auxiliary heating disabled following 6 consecutive faults in additional heating mode with no correct sequence in between (complete sequence without fault)
2	Display zone not used (ignore display)
3	Display zone not used (ignore display)
4	Display zone not used (ignore display)

Notes:

- ♦ Display group 008 is only provided for heater control units -J162 as of software version "D49".
- ♦ Display shows number of times auxiliary heater has been switched off on account of a fault in heating operation. The nature of the fault is stored in the fault memory. The faults "No flame" and "Flame interruption" are examples of faults in heating operation.

Auxiliary heater adaption

The following adaption channels are provided for the auxiliary heater

♦ Adaption channel "01"

– For adaption of fixed undervoltage cut-out value with code "00XX2" => Page 01-129

– For adaption of automatic undervoltage cut-out value with code "00XX1" => Page 01-65

♦ Adaption channel "02"

– Only applies to auxiliary/additional heaters with control unit as of software version "D49"

– For adaption (adjustment) of CO2 level in auxiliary heater exhaust gas => Page 82-97

♦ Adaption channel "10"

– Only applies to auxiliary/additional heaters with control unit as of software version "D50"

– For adaption of auxiliary/additional heater to different usage conditions as additional heater or for actuation of recirculating pump -V55 => Page 01-134

Notes:

♦ "Adaption" function is to be implemented for vehicles with auxiliary heater with control unit -J162 as of software version "D49" for adjusting CO2 level in exhaust gas (channel number "02") => Page 82-97.

♦ "Adaption" function is to be implemented for vehicles with auxiliary heater as follows:

– If automatic undervoltage cut-out is active with code "00XX1" (cut-out takes place at temperature-dependent voltage value learnt in "Basic setting" function), to check and if necessary alter adaption value learnt => Page 01-65.

  – So as not to impair auxiliary heater operation with code "00XX1", value for "manual cut-out voltage" must be less than 10.5 V (manual cut-out voltage value is active with this code but is not displayed).

- If manual undervoltage cut-out is active with code "00XX2" (cut-out at fixed voltage value), to check, enter or alter cut-out voltage value => Page 01-129.
  - So as not to impair reliable engine starting on vehicles with auxiliary heater, value entered for undervoltage cut-out with code "00XX2" must be greater than 11.10 V.

♦ As a general rule, use is always to be made of code "00XX1", as it permits a higher level of auxiliary heater availability without jeopardising reliable starting of the vehicle (=> Page 01-86, encoding auxiliary heater).

♦ The fixed value for undervoltage cut-out is also active with code "00XX1", but is not displayed. If voltage value has been altered for a heater control unit -J162 encoded to "00XX2" and the control unit then re-encoded to "00XX1", fault "Undervoltage cut-out (fixed value)" may be displayed.

- Remedy:
  - Encode control unit to "00XX2" => Page 01-86.
  - Alter fixed value by way of "Adaption" function (specification less than 10.5 V).
  - Re-encode control unit to "00XX1".
  - Interrogate and erase fault memory.

Performing adaption (adaption channel "01", fixed value for manual undervoltage cut-out)

- Connect up fault reader V.A.G 1551,
  enter address word 18 "Additional/auxiliary heater" and keep switching until "Select function XX" appears on display => Page 01-22 onwards.
- Check auxiliary heater encoding (code must be "00XX2").
- Switch on printer by pressing PRINT key (lamp in key lights).
- Interrogate fault memory =>Page 01-38 and eliminate any faults displayed.
- Erase fault memory =>Page 01-83.

Rapid data transfer HELP
Select function XX

Indicated on display (function selection):

- Press keys -1- and -0- to select "Adaption" function 10.

Rapid data transfer Q
10 – Adaption

Indicated on display:

- Confirm entry with Q key.

Adaption Q
Enter channel number XX

Indicated on display:

- Enter channel number -01-.
- Confirm entry with Q key.

Notes:

- Only channel "01" is accepted by heater control units -J162 with software version "D47" or "D48".
- Heater control units -J162 as of software version "D49" also accept channel number "02". This channel number can be used to adjust CO2 level in exhaust gas => Page 82-97.

Function unknown or cannot →
be implemented at present

- If this display appears, a fault has occurred and manual adaption cannot be implemented =>Page 01-66.

Channel 01 Adaption XX →
Undervoltage cut-out (-1 3-)

Indicated on display:

- Press → key.

Channel 01 Adaption XX
Enter adaption value XXXXX

Indicated on display:

Input	Assignment of cut-out voltages
00000	9.5 V
00005	9.85 V
00010	10.20 V
00015	10.55 V
00020	10.90 V
00025	11.25 V
00030	11.60 V
00035	11.95 V
00040	12.30 V
00045	12.65 V

Notes:

- ♦ Adaption value of between "00000" and "00045" can be entered.
- ♦ It is also possible to enter voltage values between those indicated in the table. In this case, each number increment corresponds to approx. 0.07 V.

- ♦ Conversion factors may result in slight differences between actual cut-out voltage and value given in table.
- ♦ To ensure reliable engine starting, value entered for undervoltage cut-out with code "00XX2" must be greater than 11.10 V (input value greater than 00022).

– Enter desired value for undervoltage cut-out (e.g. 00025 for 11.25 V).

Channel 01 Adaption XX Q
Enter adaption value 00025

Indicated on display:

– Confirm entry with Q key.

Channel 1 Adaption 25 Q
New value 11.25 V

Indicated on display:

Note:

Value displayed can be altered by pressing keys 1 and 3 or ↓ and ↑.

– Confirm entry with Q key.

Channel 01 Adaption 25 Q
Store altered value?

Indicated on display:

– Confirm entry with Q key.

Channel 01 Adaption 25 →
Altered value stored

Indicated on display:

Notes:

- ♦ Current undervoltage cut-out value can be read off in function "Reading measured value block, display group 003" =>Page 01-99.
- ♦ The correlation between voltage dip and temperature-dependent battery voltage for undervoltage cut-out is shown on the basis of an example on Page 01-97.

– Press →key.

Rapid data transfer HELP
Select function XX

Indicated on display (function selection):

Performing adaption (adaption channel "10", actuation as additional heater/of recirculating pump -V55)

Notes:

- ♦ Adaption of auxiliary heater actuation as additional heater (on vehicles with 6-cyl. diesel engine) and auxiliary heater recirculating pump actuation (to assist engine coolant pump) on vehicles with 8-cyl. engine and small coolant circuit (gradual introduction as of Model Year 2002) is only possible for auxiliary heaters with software version as of "D50".
- ♦ On auxiliary heaters with control unit as of software version "D52", adaption can be used to alter recirculating pump actuation.
- ♦ As regards auxiliary/additional heating function, it is important to ensure matching adaption and encoding. Encoding should therefore be checked before carrying out adaption => Page 01-86.

- Connect up fault reader V.A.G 1551,
  enter address word 18 "Additional/auxiliary heater" and keep switching until "Select function XX" appears on display => Page 01-22 onwards.
- Check auxiliary heater encoding => Page 01-22 onwards.
- Switch on printer by pressing PRINT key (lamp in key lights).
- Interrogate fault memory =>Page 01-38 and eliminate any faults displayed.
- Erase fault memory =>Page 01-83.

Rapid data transfer HELP
Select function XX

Indicated on display (function selection):
- Press keys -1- and -0- to select "Adaption" function 10.

Rapid data transfer Q
10 – Adaption

Indicated on display:
- Confirm entry with Q key.

Adaption Q
Enter channel number XX

Indicated on display:
- Enter channel number -10-.
- Confirm entry with Q key.

Notes:

♦ Only channel "01" is accepted by heater control units -J162 with software version "X46", "D47" or "D48".

Function unknown or cannot →
be implemented at present

♦ If this display appears, a fault has occurred and adaption cannot be implemented =>Page 01-66.

Channel 10 Adaption XX →
(-1 3-)

Indicated on display:
- Press → key.

Channel 10 Adaption XX
Enter adaption value XXXXX

Indicated on display:
- Enter adaption value for vehicle concerned:
- Adaption value for control unit with software versions "D50" and "D51" =>Page 01-138
- Adaption value for control unit as of software version "D52" =>Page 01-140

Channel 10 Adaption XX Q	◀ – Confirm entry with Q key.
New value (-1 3-)	

Channel 10 Adaption XX Q	◀ Indicated on display: – Confirm entry with Q key.
Store altered value?	

Channel 10 Adaption XX →	◀ Indicated on display: – Press →key.
Altered value stored	

Rapid data transfer HELP	◀ Indicated on display (function selection): – Check function if necessary.
Select function XX	

Adaption value in adaption channel for control unit with software versions "D50" and "D51"

Adaption value (input)	Intended for vehicle with	Significance
0 (00000)	6-cyl. diesel engine	♦ Auxiliary heater operates as additional heater as soon as earth is applied to contact "3" of 6-pin connector at auxiliary heater
1 (00001)	8-cyl. engine and small coolant circuit	♦ Auxiliary heater recirculating pump starts up as soon as earth is applied to contact "3" of 6-pin connector at auxiliary heater This provides assistance for engine coolant pump at low coolant temperatures

Notes:

♦ On vehicles with 6-cyl. diesel engine (and no electric additional heater), contact "3" of 6-pin connector at auxiliary heater is connected to engine control unit.

=> Relevant Diesel Direct-injection and Glow Plug System Workshop Manual; Repair Group 01 =>

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♦ On vehicles with petrol engine and coolant shut-off valve relay -J541 (gradually being installed in vehicles with 8-cyl. engine as of Model Year 2002), contact "3" of 6-pin connector at auxiliary heater is connected to coolant shut-off valve relay -J541.

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♦ On vehicles with 4-cyl. diesel engine, 6-cyl. diesel engine (with electric additional heater), 6-cyl. petrol engine and 8-cyl. engine with no coolant shut-off valve relay -J541 (gradual introduction of relay -J541 and small coolant circuit on vehicles with 8-cyl. engine as of Model Year 2002), contact "3" of 6-pin connector at auxiliary heater is not used or not assigned in socket for coolant shut-off valve relay -J541. Adaption in channel "10" has no function for these vehicles.

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♦ Only adaption "0" or "1" is envisaged in adaption channel "10" for auxiliary heaters with control unit with software version "D50" or "D51".

Adaption value in adaption channel for control unit as of software version "D52"

Adaption value (input)	Intended for vehicle with	Significance
0 (00000)	♦ This adaption value is currently not used It can however be entered for vehicles with 6-cyl. diesel engine if requested by customer	♦ Auxiliary heater operates as additional heater as soon as earth is applied to contact "3" of 6-pin connector at auxiliary heater If auxiliary heater is switched on as auxiliary heater, there is no regulation of auxiliary heater recirculating pump delivery
1 (00001)	♦ This adaption value is currently not used It can however be entered for vehicles with petrol engine if requested by customer	♦ Auxiliary heater recirculating pump starts up as soon as earth is applied to contact "3" of 6-pin connector at auxiliary heater This provides assistance for engine coolant pump at low coolant temperatures ♦ If auxiliary heater is switched on, there is no regulation of auxiliary heater recirculating pump delivery

Adaption value (input)	Intended for vehicle with	Significance
2 (00002)	♦ This adaption value is intended for vehicles with diesel engine Adaption for vehicles with diesel engine by manufacturer	♦ Auxiliary heater operates as additional heater as soon as earth is applied to contact "3" of 6-pin connector at auxiliary heater If auxiliary heater is switched on as auxiliary heater, auxiliary heater control unit regulates delivery of recirculating pump -V55 as a function of coolant temperature in auxiliary heater (-V55 is pulsed)
3 (00003)	♦ This adaption value is intended for vehicles with petrol engine Adaption for vehicles with petrol engine by manufacturer	♦ Auxiliary heater recirculating pump starts up as soon as earth is applied to contact "3" of 6-pin connector at auxiliary heater This provides assistance for engine coolant pump at low coolant temperatures ♦ If auxiliary heater is switched on, auxiliary heater control unit regulates delivery of recirculating pump -V55 as a function of coolant temperature in auxiliary heater (-V55 is pulsed)

Adaption value (input)	Intended for vehicle with	Significance
4 (00004)	♦ This adaption value is currently not used	♦ Corresponds to adaption "2" with the following difference When coolant is cold, recirculating pump -V55 is actuated for at least 35 % of time (as opposed to approx. 25% with adaption "2")
5 (00005)	♦ This adaption value is currently not used	♦ Corresponds to adaption "3" with the following difference When coolant is cold, recirculating pump -V55 is actuated for at least 35 % of time (as opposed to approx. 25% with adaption "3")

Notes:

- On vehicles with 6-cyl. diesel engine (and no electric additional heater), contact "3" of 6-pin connector at auxiliary heater is connected to engine control unit.

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- On vehicles with 8-cyl. engine and coolant shut-off valve relay -J541 (gradually being installed in vehicles with 8-cyl. engine as of Model Year 2002), contact "3" of 6-pin connector at auxiliary heater is connected to coolant shut-off valve relay -J541.

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- On vehicles with 4-cyl. diesel engine, 6-cyl. diesel engine (with electric additional heater), 6-cyl. petrol engine and 8-cyl. engine with no coolant shut-off valve relay -J541 (gradual introduction of relay -J541 and small coolant circuit on vehicles with 8-cyl. engine as of Model Year 2002), contact "3" of 6-pin connector at auxiliary heater is not used or not assigned in socket for coolant shut-off valve relay -J541.

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- Only adaption "0" to "5" is envisaged in adaption channel "10" for auxiliary heaters with control unit as of software version "D52". Adaption values "4" and "5" are however not used at present. Adaption "2" is entered at the factory for version for vehicles with diesel engine and "3" for version for vehicles with petrol engine.
- Pulsed actuation of recirculating pump -V55 differs depending on code (adaption "00002" or "00003").

– With code "XX1XX", recirculating pump -V55 is regulated up to a coolant temperature of approx. 60 °C

-With code "XX0XX", recirculating pump -V55 is regulated up to a coolant temperature of approx. 70 °C

If temperature of coolant in auxiliary heater exceeds respective value, recirculating pump -V55 runs with 100% actuation.

Electrical check on auxiliary heater and preselection clock -E111

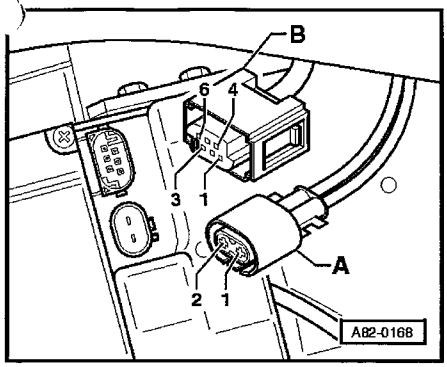
Measuring instruments and testers required

– Portable multimeter V.A.G 1526
– Adapter set V.A.G 1594
– Diode test lamp V.A.G 1527
– Test box V.A.G 1598/11

Test requirements

– All fuses OK as per current flow diagram
– Battery -A adequately charged
– Fault memory interrogated =>Page 01-38 and any faults displayed eliminated

Checking actuation and electrical connections of auxiliary heater



– Switch off ignition.

– Remove front noise insulation and unfasten front left wheel housing liner (vehicles with 6 or 8-cyl. engine only).

=> General Body Repairs, Exterior; Repair Group 63; Front Bumper =>

– Unplug connectors -A- and -B- from heater.

Notes:

- With auxiliary heater switched off, display illumination off and cut-in time not activated, maximum current input of pre-selection clock and auxiliary heater is less than 5 mA.
- If current input of pre-selection clock and auxiliary heater is not within permitted value range, check wiring in line with current flow diagram as well as actuation of auxiliary heater.

List of electrical checks envisaged

Test step	Component checked	Page
1	Power supply and earth connection To auxiliary heater	01-148
2	Actuation of auxiliary heater By pre-selection clock -E111 (prior to introduction of modified dash panel insert in Model Year 2000) By dash panel insert (gradually introduced in Model Year 2000 together with modified dash panel insert, no pre-selection clock -E111) By auxiliary heating radio wave receiver -R64 (with remote control only)	01-149
3	Auxiliary heater connection To metering pump -V54	01-155

Test step	Component checked	Page
4	Auxiliary heater connection To pre-selection clock -E111 (on vehicles with pre-selection clock -E111, prior to introduction of modified dash panel insert in Model Year 2000) To operating and display unit for air conditioner/Climatronic -E87 To heater control (thermotronic control unit -J214) and fresh-air blower -V2 To dash panel insert (gradually introduced in Model Year 2000 together with modified dash panel insert, no pre-selection clock -E111) To coolant shut-off valve relay -J541 (only fitted on vehicles with small coolant circuit) Input for actuation of recirculating pump -V55 (auxiliary heaters as of software version "D50" and "petrol" version only)	01-156
5	Actuation of auxiliary heater as additional heater By engine control unit (only intended for vehicles with 6-cyl. diesel engine with no electric additional heater)	01-163
6	Actuation of auxiliary/additional heater on vehicles with small coolant circuit (8-cyl. petrol engine as of Model Year 2002 only) By coolant shut-off valve relay -J541	01-167

Test step 1 (power supply and earth connection)

Measuring range to be set on portable multimeter V.A.G 1526:
Voltage measurement (20 V DC)

Test step	Heater connection	Testing of	● Test conditions – Additional work	Specification	Remedies if specification not attained
1.1	Connector A, contact 1 and connector A, contact 2	Terminal 30 and earth connection at -J162	● Ignition off	approx. battery voltage	– Use current flow diagram to check and repair power supply and earth connection

Notes:

- Depending on last operating status and coolant temperature in auxiliary heater, no-load current input of auxiliary heater may be up to max. 60 mA for a period of up to 5 hours following switch-off. During this time, the degree of cooling of the coolant for the period following switch-off is calculated by the heater control unit -J162.
- At the latest 5 hours after switch-off, the no-load current input of the heater control unit -J162 is less than 2 mA.

Test step 2 (actuation of auxiliary heater)

Measuring range to be set on portable multimeter V.A.G 1526: Voltage measurement (20 V DC)					
Test step	**Heater connection**	**Testing of**	**● Test conditions – Additional work**	**Specification**	**Remedies if specification not attained**
2.1	Connector B, contact 1 and connector A, contact 2	– -J162 actuation by pre-selection clock -E111	● Ignition off ● Auxiliary heater off Switch on auxiliary heater at pre-selection clock -E111	– Less than 2 V Voltage changes to greater than 7 V	– Use current flow diagram to check wiring and eliminate short circuit Use current flow diagram to check and repair wiring Check pre-selection clock -E111 (=>Page 01-177)

Continued on next page

Measuring range to be set on portable multimeter V.A.G 1526: Voltage measurement (20 V DC)					
Test step	**Heater connection**	**Testing of**	**● Test conditions – Additional work**	**Specification**	**Remedies if specification not attained**
2.1 (continued)		– -J162 actuation by dash panel insert	● Switch on ignition ● Auxiliary heater off Switch on auxiliary heater at dash panel insert	– Less than 2 V Voltage changes to greater than 7 V	– Use current flow diagram to check and repair wiring Use current flow diagram to check and repair wiring Check dash panel insert => Electrical System; Repair Group 01 =>

Notes:

♦ On vehicles with auxiliary heater remote control, pre-selection clock or dash panel insert is actuated by auxiliary heating radio wave receiver -R64. Pre-selection clock -E111 or dash panel insert then switches auxiliary heater on and off (fault determination =>Pages 82-61 and 82-64).

=> Current Flow Diagrams, Electrical Fault-finding and Fitting Locations binder

♦ Pre-selection clock -E111 was discontinued as of Model Year 2000 and auxiliary heater is actuated by dash panel insert (modified version).

=> Current Flow Diagrams, Electrical Fault-finding and Fitting Locations binder

=> Parts List

♦ On vehicles on which auxiliary heater is actuated by way of dash panel insert, auxiliary heater can only be switched on for the purposes of this test if ignition is on (otherwise driver information system is not active).

Measuring range to be set on portable multimeter V.A.G 1526: Voltage measurement (20 V DC)					
Test step	**Heater connection**	**Testing of**	**● Test conditions – Additional work**	**Specification**	**Remedies if specification not attained**
2.2	Connector B, contact 1 and connector A, contact 2	– Cut-in function of pre-selection clock -E111 Cut-in function of dash panel insert	● Ignition off ● Auxiliary heater off Set cut-in time (1, 2 or 3) to approx. 5 minutes before actual time and activate	– At activated cut-in time, voltage changes from less than 2V to greater than 7V	– Check pre-selection clock -E111 (=>Page 01-177) Replace pre-selection clock Check dash panel insert => Electrical System; Repair Group 01 =>

Notes:

♦ Pre-selection clock -E111 was gradually discontinued as of Model Year 2000 and auxiliary heater is actuated by dash panel insert (modified version). "Auxiliary heating/auxiliary ventilation" must be entered in dash panel insert by way of adaption function.

=> Electrical System; Repair Group 01 =>

♦ On vehicles on which auxiliary heater is actuated by way of dash panel insert, cut-in time can only be set for the purposes of this test if ignition is on (otherwise driver information system is not active).

Note:

Test step 2.3 only applies to vehicles with auxiliary heater remote control.

Measuring range to be set on portable multimeter V.A.G 1526: Voltage measurement (20 V DC)					
Test step	**Heater connection**	**Testing of**	**● Test conditions – Additional work**	**Specification**	**Remedies if specification not attained**
2.3	Connector B, contact 1 and connector A, contact 2	-J162 actuation by auxiliary heating radio wave receiver -R64 (via pre-selection clock -E111 or dash panel insert)	● Test step 2.1 and 2.2 functions OK ● Ignition off ● Auxiliary heater off Switch on auxiliary heater by way of remote control	– Less than 2 V Voltage changes to greater than 7 V	– Check actuation of pre-selection clock (=>Page 01-177) Remote control fault detection for vehicles with pre-selection clock (=>Page 82-61) Remote control fault detection for vehicles with no pre-selection clock (=>Page 82-64)

Note:

On vehicles with auxiliary heater remote control, pre-selection clock -E111 or dash panel insert is actuated by auxiliary heating radio wave receiver -R64 as soon as remote control signals are received (fault determination =>Pages 82-61 and 82-64). Pre-selection clock or dash panel insert then switches on auxiliary heater. If auxiliary heater has been switched on by way of remote control, it can also be switched off again in this manner.

Test step 3 (auxiliary heater connection to metering pump)

Measuring range to be set on portable multimeter V.A.G 1526: Resistance measurement (200 Ω)					
Test step	**Heater connection**	**Testing of**	**● Test conditions – Additional work**	**Specification**	**Remedies if specification not attained**
3.1	Connector B, contact 6 and connector A, contact 2	Wiring to metering pump -V54	● Ignition off	– Greater than 3 and less than 20Ω)	– Use current flow diagram to check and repair wiring Replace metering pump

Notes:

- Internal resistance of metering pump is 4.1 Ω+/- 0.2Ω
- On vehicles with 6-cyl. diesel engine on which auxiliary heater is also used as additional heater (vehicles with no electric additional heater), contact 6 of connector B is also connected to engine control unit. Engine control unit uses metering pump pulse signal to incorporate fuel consumption of additional heater into calculation of consumption signal with engine running.

=> Relevant Diesel Direct-injection and Glow Plug System Workshop Manual; Repair Group 01 =>

Test step 4 (auxiliary heater connection)

Measuring range to be set on portable multimeter V.A.G 1526: Voltage tester V.A.G 1527					
Test step	**Heater connection**	**Testing of**	**● Test conditions – Additional work**	**Specification**	**Remedies if specification not attained**
4.1	Connector B, contact 5 and connector A, contact 1	– Ventilation mode button of pre-selection clock -E111	● Ignition on ● Auxiliary heater off Press pre-selection clock ventilation mode button	– Diode in voltage tester does not light Diode in voltage tester lights	– Use current flow diagram to check wiring and eliminate short circuit Use current flow diagram to check and repair wiring Check pre-selection clock -E111 (=>Page 01-177)

Continued on next page

Note:

If earth is applied to connector B contact 5 (via pre-selection clock -E111), operating and display unit for air conditioner/Climatronic -E87/thermotronic control unit -J214 (in heater control) and fresh-air blower -V2 are switched on, but auxiliary heater does not start up (auxiliary ventilation mode).

Measuring range to be set on portable multimeter V.A.G 1526: Voltage tester V.A.G 1527					
Test step	**Heater connection**	**Testing of**	**● Test conditions – Additional work**	**Specification**	**Remedies if specification not attained**
4.1 (continued)		– "Auxiliary ventilation mode" function via dash panel insert (vehicles with no pre-selection clock -E111)	● Ignition off ● Auxiliary ventilation mode off Switch on ignition Switch on auxiliary ventilation mode Switch off ignition	● Diode in voltage tester does not light ● ● ● Diode in voltage tester lights	– Use current flow diagram to check wiring and eliminate short circuit Use current flow diagram to check and repair wiring Check dash panel insert => Electrical System; Repair Group 01 =>

Notes:

- ♦ On vehicles on which auxiliary heater is actuated by way of dash panel insert, auxiliary ventilation can only be switched on for the purposes of this test if ignition is on (otherwise driver information system is not active).
- ♦ If earth is applied to connector B contact 5 (via dash panel insert), operating and display unit for air conditioner/Climatronic -E87/thermotronic control unit -J214 (in heater control) and fresh-air blower -V2 are switched on, but auxiliary heater does not start up (auxiliary ventilation mode).

Measuring range to be set on portable multimeter V.A.G 1526: Current measurement (2000 mA DC)					
Test step	**Heater connection**	**Testing of**	**● Test conditions – Additional work**	**Specification**	**Remedies if specification not attained**
4.2	Connector B, contact 4 and connector A, contact 1	– Actuation of operating and display unit for air conditioner/Climatronic -E87 (vehicles with large coolant circuit)	● Ignition off	– Less than 500 mA Operating and display unit for air conditioner/Climatronic -E87 starts up	– Use current flow diagram to check and repair wiring Perform air conditioner self-diagnosis => Air Conditioner; Repair Group 01 =>
		Actuation of coolant shut-off valve relay -J541 (vehicles with small coolant circuit)	● Ignition off	– Less than 50 mA	– Use current flow diagram to check and repair wiring between -E87 and -J541 Check operation of coolant shut-off valve relay -J541 => Page 01-221

Continued on next page

Measuring range to be set on portable multimeter V.A.G 1526: Current measurement (2000 mA DC)					
Test step	**Heater connection**	**Testing of**	**● Test conditions – Additional work**	**Specification**	**Remedies if specification not attained**
4.2 (continued)		– Actuation of thermotronic control unit -J214 (in heater control) and fresh-air blower -V2 (via relay -J8)		– Control unit -J214 sets air distribution to windscreen Fresh-air blower -V2 runs	– Use current flow diagram to check and repair wiring Perform electrical check on heater control => Heating; Repair Group 01 =>

Notes:

♦ Large coolant circuit is fitted on all vehicles except vehicles with 8-cyl. engine as of Model Year 2002.

♦ As of Model Year 2002, coolant circuit is gradually being converted on vehicles with 8-cyl. engine. Following introduction of modified coolant circuit, auxiliary heater coolant is no longer drawn in via engine in auxiliary heating mode (small circuit).

=> Current Flow Diagrams, Electrical Fault-finding and Fitting Locations binder

♦ Coolant shut-off valve relay -J541 can only be actuated with a square-wave signal by auxiliary heaters for petrol with part number as of index "K" (software version "D50"). Such auxiliary heaters have been gradually introduced into production since November 2000.

♦ When auxiliary heater is encoded for a small coolant circuit, a square-wave signal is emitted via output for actuation of fresh-air blower (operating and display unit for air conditioner/Climatronic -E87). This signal is processed by coolant shut-off valve relay -J541 (-E87 cannot process signal). This signal is used to output temperature of coolant in auxiliary heater and instantaneous auxiliary heater operating status. A positive signal is output if auxiliary heater is encoded for large coolant circuit (as for software versions "D49" and "D48") =>Page 01-220.

♦ On vehicles with solar roof, solar cells isolation relay II -J354 is additionally actuated (for fresh-air blower -V2 power supply).

=> Current Flow Diagrams, Electrical Fault-finding and Fitting Locations binder

Measuring range to be set on portable multimeter V.A.G 1526: Voltage tester V.A.G 1527					
Test step	**Heater connection**	**Testing of**	**● Test conditions – Additional work**	**Specification**	**Remedies if specification not attained**
4.3	Connector B, contact 3 and connector A, contact 1	– Connection for actuation of auxiliary heater (only applies to auxiliary heaters as of software version "D50", "petrol" version)	● Ignition on ● Auxiliary heater off	– Diode in voltage tester does not light	– Use current flow diagram to check wiring and eliminate short circuit

Notes:

♦ If, on auxiliary heaters with software version as of "D50", "petrol" version, earth is applied to connector B contact 3, auxiliary heater recirculating pump -V55 is switched on.

♦ If auxiliary heater starts up as additional heater on starting cold engine on vehicles with petrol engine, check adaption of heater control unit -J162. Adaption "1" must be set in adaption channel "10" for software versions "D50" and "D51". As of software version "D52", the adaption setting must be "3". Alter adaption of heater control unit -J162 if necessary.

♦ If, on "diesel" version auxiliary heaters, earth is applied to connector B contact 3, auxiliary heater is switched on as additional heater (refer to test step 5).

♦ On auxiliary heaters with software version as of "D50", auxiliary heater recirculating pump -V55 can be switched on via "Additional heater" input with "petrol" version as well (thus assisting engine coolant pump on vehicles with small coolant circuit). This connection is however not provided on all vehicles with small coolant circuit => Page 01-220 (operation of coolant shut-off valve relay -J541).

=> Current Flow Diagrams, Electrical Fault-finding and Fitting Locations binder

Test step 5 (actuation of auxiliary heater as additional heater)

Notes:

- ♦ Auxiliary heater runs constantly if auxiliary heater for diesel is fitted and earth applied to contact 3 of auxiliary heater connector B.
- ♦ Vehicles with 4-cyl. diesel engine are fitted with an electric additional heater. No provision is made for actuation of auxiliary heater as additional heater by way of engine control unit.

=> Heating; Repair Group 01 =>

=> Air Conditioner; Repair Group 01 =>

- ♦ Vehicles with 6-cyl. diesel engine were fitted with an electric additional heater up to Model Year 1999. On vehicles with auxiliary heater as optional extra, no provision was made prior to Model Year 1999 for actuation of auxiliary heater as additional heater by way of engine control unit. In Model Year 1999, the electric additional heater on vehicles with auxiliary heater (as optional extra) was gradually discontinued and the auxiliary heater is used as additional heater.
- ♦ Actuation of auxiliary heater as additional heater (by engine control unit) is only intended for vehicles with 6-cyl. diesel engine with no electric additional heater. Actuation wiring between engine control unit and auxiliary heater is only fitted on such vehicles (gradual discontinuation of electric additional heater in Model Year 1999).

=> Heating; Repair Group 01 =>

=> Air Conditioner; Repair Group 01 =>

=> Relevant Diesel Direct-injection and Glow Plug System Workshop Manual; Repair Group 01 =>

Note:

Test step 5.1 applies to all vehicles except vehicles with 6-cyl. diesel engine with no electric additional heater.

Measuring range to be set on portable multimeter V.A.G 1526: Voltage tester V.A.G 1527					
Test step	**Heater connection**	**Testing of**	**● Test conditions – Additional work**	**Specification**	**Remedies if specification not attained**
5.1	Connector B, contact 3 and connector A, contact 1	-J162 actuation by engine control unit	● Ignition on ● Engine not running Start engine Start engine final control diagnosis and select control element "Additional heater" => Relevant Diesel Direct-injection and Glow Plug System Workshop Manual; Repair Group 01 =>	– Diode in voltage tester does not light Diode in voltage tester does not light	– Use current flow diagram to check wiring and eliminate short circuit Use current flow diagram to check and repair wiring

Note:

Test step 5.2 only applies to vehicles with 6-cyl. diesel engine with no electric additional heater.

Measuring range to be set on portable multimeter V.A.G 1526: Voltage tester V.A.G 1527					
Test step	**Heater connection**	**Testing of**	**● Test conditions – Additional work**	**Specification**	**Remedies if specification not attained**
5.2	Connector B, contact 3 and connector A, contact 1	-J162 actuation by engine control unit	● Ignition on ● Engine not running Start engine Start engine final control diagnosis and select control element "Additional heater" => Relevant Diesel Direct-injection and Glow Plug System Workshop Manual; Repair Group 01 =>	● Diode in voltage tester does not light ● Diode in voltage tester lights	– Use current flow diagram to check wiring and eliminate short circuit Use current flow diagram to check and repair wiring Check engine control unit => Relevant Diesel Direct-injection and Glow Plug System Workshop Manual; Repair Group 01 =>

♦ On auxiliary heaters with software version as of "D50", auxiliary heater recirculating pump -V55 can be switched on via "Additional heater" input with "petrol" version as well (thus assisting engine coolant pump on vehicles with small coolant circuit). This connection is however not provided on all vehicles with small coolant circuit =>Page 01-220 (operation of coolant shut-off valve relay -J541).

=> Current Flow Diagrams, Electrical Fault-finding and Fitting Locations binder

♦ If, on vehicles with diesel engine, auxiliary heater is not switched on as additional heater and only recirculating pump -V55 starts up instead, check adaption in adaption channel "10" => Page 01-125.

♦ If, on vehicles with 8-cyl. engine and small coolant circuit, auxiliary heater is switched on as additional heater, check adaption in adaption channel "10" => Page 01-125.

Test step 6 (actuation of auxiliary/additional heater on vehicles with small coolant circuit)

Measuring range to be set on portable multimeter V.A.G 1526: Voltage tester V.A.G 1527					
Test step	**Heater connection**	**Testing of**	**● Test conditions – Additional work**	**Specification**	**Remedies if specification not attained**
6.1	Connector B, contact 3 and connector A, contact 1	-J162 actuation by coolant shut-off valve relay -J541	● Ignition on ● Engine coolant temperature below 40 °C ● Engine not running Start engine	● Diode in voltage tester does not light ● ● Diode in voltage tester lights	– Use current flow diagram to check wiring and eliminate short circuit Use current flow diagram to check and repair wiring Check operation of coolant shut-off valve relay -J541 => Page 01-221

Notes:

- Connection between relay -J541 and contact "3" in connector "B" at heater control unit -J162 was not fitted at start of production (introduction not yet finalised).

=> Current Flow Diagrams, Electrical Fault-finding and Fitting Locations binder

- Relay -J541 is only intended for vehicles with 8-cyl. engine with small coolant circuit (gradual introduction as of Model Year 2002).
- Voltage at terminal D+ is used by relay -J541 for detection of whether engine is running (voltage is applied if it is).
- If engine is running and engine coolant temperature transmitted to -J541 by dash panel insert is less than approx. 80°C, relay -J541 connects earth to connector "B" contact "3" at heater control unit -J162 and control unit -J162 switches on recirculating pump -V55. Under certain circumstances, this improves coolant supply for air-conditioner heat exchanger and increases heat output.

♦ Coolant shut-off valve relay -J541 can only be actuated with a square-wave signal by auxiliary heaters for petrol with part number as of index "K" (software version "D50") and this is the only auxiliary heater version which switches on recirculating pump when actuated by -J541 (earth applied to connector "B" contact "3"). Such auxiliary heaters have been gradually introduced into production since November 2000.

♦ When auxiliary heater is encoded for a small coolant circuit, a square-wave signal is emitted via output for actuation of fresh-air blower (operating and display unit for air conditioner/Climatronic -E87). This signal is processed by coolant shut-off valve relay -J541 (-E87 cannot process signal). This signal is used to output temperature of coolant in auxiliary heater and instantaneous auxiliary heater operating status. A positive signal is output if auxiliary heater is encoded for large coolant circuit (as for software versions "D49" and "D48") =>Page 01-220.

Note:

Test step 6.2 only applies to vehicles with 8-cyl. engine and small coolant circuit (gradual introduction as of Model Year 2002).

Measuring range to be set on portable multimeter V.A.G 1526:
Voltage tester V.A.G 1527

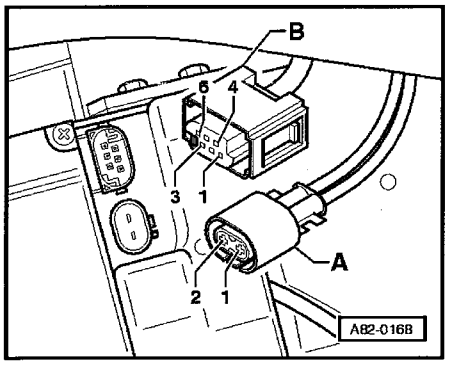
Test step	Heater connection	Testing of	● Test conditions – Additional work	Specification	Remedies if specification not attained
6.2	Connector B, contact 3 and connector A, contact 1	– Connection for actuation of auxiliary heater (only applies to auxiliary heaters as of software version "D50", "petrol" version)	● Ignition on ● Auxiliary heater off	– Diode in voltage tester does not light	– Use current flow diagram to check wiring and eliminate short circuit

Notes:

♦ If, on auxiliary heaters with software version as of "D50", "petrol" version, earth is applied to connector B contact 3, auxiliary heater recirculating pump -V55 is switched on (refer to test step 6.1).

- If, on "diesel" version auxiliary heaters, earth is applied to connector B contact 3, auxiliary heater is switched on as additional heater (refer to test step 5).
- If, on vehicles with diesel engine, auxiliary heater is not switched on as additional heater and only recirculating pump -V55 starts up instead, check adaption in adaption channel "10" => Page 01-125.
- If, on vehicles with 8-cyl. engine and small coolant circuit, auxiliary heater is switched on as additional heater, check adaption in adaption channel "10" => Page 01-125.

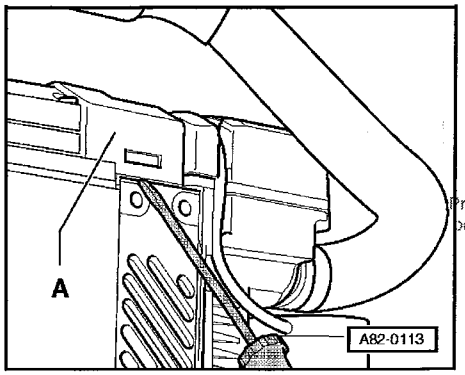
Checking auxiliary heater components



- Switch off ignition.
- Remove front noise insulation and unfasten front left wheel housing liner (vehicles with 6 or 8-cyl. engine).

=> General Body Repairs, Exterior; Repair Group 63; Front Bumper =>

- Unplug connectors -A- and -B- from heater.

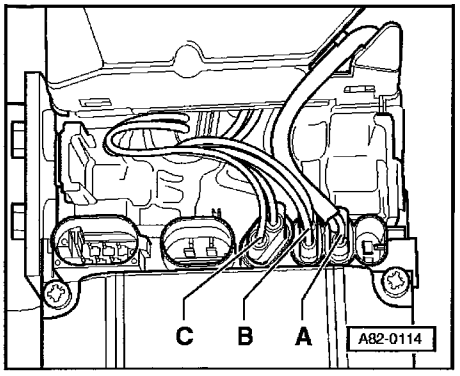


- Detach auxiliary heater from holder (vehicles with 6 or 8-cyl. engine only) => Page 82-124.
- Use screwdriver to prise off cover -A-.

List of electrical checks envisaged

Test step	Component checked	Page
1	Glow plug with flame monitor -Q8	01-173
2	Combustion air blower -V6	01-175
3	Recirculating pump -V55	01-176

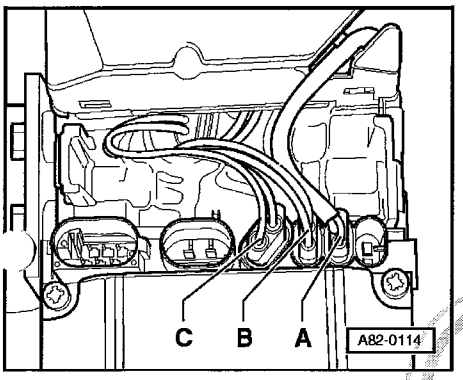
Test step 1 (glow plug with flame monitor -Q8)



- Unplug connector -C- from auxiliary heater.
- Measure resistance at connector -C- between contact 1 and housing of heater.

Specification:

∞Ω



- Measure resistance at connector -C- between contacts 1 and 2.

Specification:

Less than 1 Ω

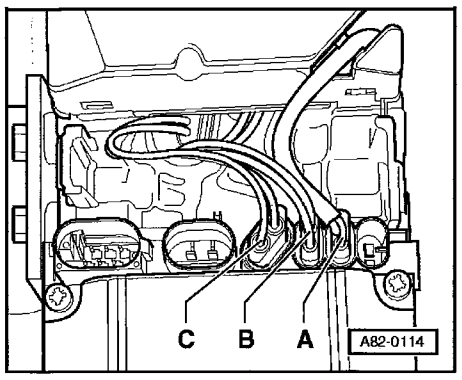
Rated value:

0.236 Ω +/- 0.033 Ω(at 25 °C)

Notes:

- Resistances of less than 1 Ωcan no longer be measured with sufficient accuracy using workshop equipment; this test can therefore only detect major component damage.
- The heater control unit -J162 can detect whether or not a flame has been formed in the heater by way of the resistance range of -Q8.
- If a voltage of 9 VDC is applied to the glow plug with flame monitor, the current input is between 9 and 12 A.

Test step 2 (combustion air blower -V6)



- Unplug connector -B- from auxiliary heater.
- Measure resistance at connector -B- between contact 1 and housing of heater.

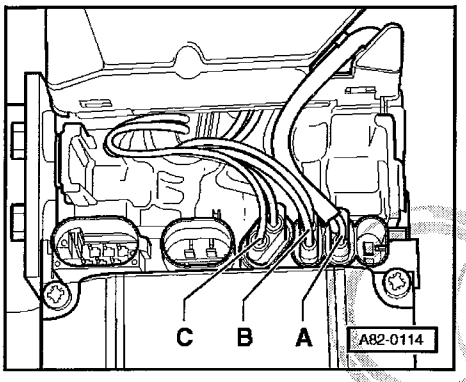
Specification:

∞Ω

Notes:

- If a voltage of 12 VDC is applied to combustion air blower -V6, current input is between 2 and 3 A.
- Internal resistance of combustion air blower -V6 is between 3 and 6 Ω(40 Ωif blower has not been in operation for a lengthy period). As resistances of less than 10 Ω can no longer be measured with sufficient accuracy using workshop equipment; this internal resistance test can only detect major component damage.

Test step 3 (recirculating pump -V55)



- Unplug connector -A- from auxiliary heater.
- Measure resistance at connector -A- between the two contacts (1 and 2) and housing of heater.

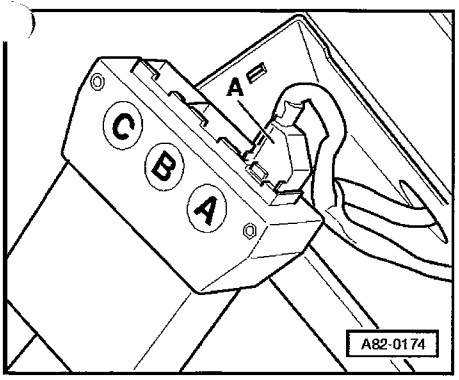
Specification:

∞Ω

Notes:

- If a voltage of 12 VDC is applied to the recirculating pump - V55, the current input is between 1 and 1.5 A.
- Internal resistance cannot be measured for recirculating pump - V55 (prevented by electronics in pump).

Checking actuation and electrical connections of pre-selection clock -E111



- Switch off ignition.
- Remove pre-selection clock -E111 =>Page 82-70.
- Unplug connector -A- from pre-selection clock -E111.
- Attach connector -A- at position "A" of adapter cable V.A.G 1598/11.

Notes:

- In adapter cable V.A.G 1598/11 position "A", assignment of sockets is not identical with pin assignment of pre-selection clock -E111

  =>Pin assignment, Page 01-178.
- Adapter cables of test box V.A.G 1598 are not to be connected to pre-selection clock -E111 when working with fault reader.
- With auxiliary heater switched off, display illumination off and cut-in time not activated, maximum current input of pre-selection clock is less than 5 mA.
- If current input of pre-selection clock is not within permitted value range, use current flow diagram to check wiring.

Pin assignment of test box V.A.G 1598 with adapter cable V.A.G 1598/11

Notes:

- For adapter cable V.A.G 1598/11, contact assignment of connector A is not identical to assignment of sockets at test box.

Connector A	V.A.G 1598 socket	Connector A	V.A.G 1598 socket	Connector A	V.A.G 1598 socket
1	41	5	45	9	49
2	42	6	46	10	50
3	43	7	47	11	51
4	44	8	48	12	52

List of electrical checks envisaged

Test step	Component checked	Page
1	Power supply, earth connection and illumination of pre-selection clock -E111 Terminals 30 and 15 Terminal 31 Terminals 58d and 58s	01-180
2	Actuation of pre-selection clock and indicator lamp Pre-selector clock switch -E255 Heater warning lamp -K11	01-183
3	Actuation of auxiliary heater by pre-selection clock -E111 Cut-in signal Signal for auxiliary heating, auxiliary ventilation	01-185
4	Actuation of pre-selection clock -E111 By auxiliary heating radio wave receiver -R64	01-187

Test step 1 (power supply, earth connection and illumination of pre-selection clock -E111)

Measuring range to be set on portable multimeter V.A.G 1526:
Voltage measurement (20 V DC)
– Adapter cable V.A.G 1598/11 connected

Test step	V.A.G 1598 socket	Testing of	● Test conditions – Additional work	Specification	Remedies if specification not attained
1.1	51 and 52	Terminal 30 and earth connection at -E111	● Ignition off	– approx. battery voltage	– Use current flow diagram to check and repair power supply and earth connection
1.2	45 and 52	Terminal 15 at -E111	● Ignition off Switch on ignition	– approx. 0 V approx. battery voltage	– Use current flow diagram to check wiring and eliminate short circuit Use current flow diagram to check and repair power supply

Note:

2 different settings can be made on pre-selection clock -E111 (=>Page 82-29 , setting pre-selection clock -E111):

– In basic setting (as-delivered condition), auxiliary heater runs until set program time has elapsed or until manual shut-off.

– In modified basic setting, auxiliary heater is switched off when ignition is switched off.

Measuring range to be set on portable multimeter V.A.G 1526: Voltage measurement (20 V DC) – Adapter cable V.A.G 1598/11 connected					
Test step	**V.A.G 1598 socket**	**Testing of**	**● Test conditions – Additional work**	**Specification**	**Remedies if specification not attained**
1.3	48 and 52	Terminal 58s at - E111	● Ignition on ● Switch on side lights	– 0 to 12 V	– Use current flow diagram to locate and eliminate short circuit/open circuit in wiring
1.4	48 and 52	Terminal 58s at - E111	● Ignition on ● Side lights off	– approx. 0 V	– Use current flow diagram to eliminate short to positive

Notes:

- ♦ Voltage at terminal 58s and thus brightness of -E111 button illumination are governed by illumination control setting.
- ♦ Voltage at terminal 58d is generated as square-wave signal by dash panel insert. Brightness of -E111 display is determined by actuation time. Measuring instrument shows mean value.
- ♦ Terminal 58d actuation time depends on setting of illumination control and brightness level determined by photosensor in dash panel insert.

Measuring range to be set on portable multimeter V.A.G 1526: Voltage measurement (20 V DC) – Adapter cable V.A.G 1598/11 connected					
Test step	**V.A.G 1598 socket**	**Testing of**	**● Test conditions – Additional work**	**Specification**	**Remedies if specification not attained**
1.5	41 and 52	Terminal 58d at - E111	● Ignition on ● Side lights on	– 0 to 12 V	– Use current flow diagram to locate and eliminate short circuit/open circuit in wiring
1.6	41 and 52	Terminal 58d at - E111	● Ignition on ● Side lights off	– 0 to 12 V	– Use current flow diagram to locate and eliminate short circuit/open circuit in wiring
1.7	41 and 52	Terminal 58d at - E111	● Ignition off ● Side lights off	– approx. 0 V	– Use current flow diagram to locate and eliminate short circuit

Test step 2 (actuation of pre-selection clock and indicator lamp)

Voltage tester V.A.G 1527 – Adapter cable V.A.G 1598/11 connected					
Test step	**V.A.G 1598 socket**	**Testing of**	**● Test conditions – Additional work**	**Specification**	**Remedies if specification not attained**
2.1	51 and 49	Pre-selector clock switch -E255	● Ignition off ● Flap open Close flap	– Diode in voltage tester does not light Diode in voltage tester goes out on closing flap	– Use current flow diagram to locate and eliminate short circuit/open circuit in wiring Check and service switch actuator in door trim Replace switch -E255 Use current flow diagram to locate and eliminate short circuit

Notes:

♦ When switch -E255 is open (flap closed, pre-selection clock not visible), illumination of pre-selection clock is switched off and operation of pre-selection clock -E111 is also restricted.

♦ The first 1000 vehicles with auxiliary heater were fitted with a pre-selection clock -E111 (part no. index A), on which all operating functions are deactivated when switch -E255 is open.

♦ In the case of pre-selection clocks (as of part no. index C), auxiliary ventilation/auxiliary heating can also be switched on and off with switch -E255 open by pressing buttons -B- and -C- (emergency operation if switch defective).

Measuring range to be set on portable multimeter V.A.G 1526: Current measurement (2 A DC) – Adapter cable V.A.G 1598/11 connected – Link between sockets 51 and 44					
Test step	**V.A.G 1598 socket**	**Testing of**	**● Test conditions – Additional work**	**Specification**	**Remedies if specification not attained**
2.2	46 and 52	Heater warning lamp -K11	● Ignition off	– Less than 100 mA Warning lamp -K11 lights	– Use current flow diagram to locate and eliminate short circuit/open circuit in wiring Replace warning lamp -K11

Notes:

♦ Warning lamp shows operating status of pre-selection clock/auxiliary heater:

– *Warning lamp off = auxiliary heater off, cut-in time not activated*

– *Warning lamp flashes = cut-in time activated in pre-selection clock -E111*

– *Warning lamp lights = auxiliary heater on (auxiliary heating or auxiliary ventilation mode)*

♦ Warning lamp is actuated with pre-selection clock -E111 flap closed and open.

♦ Warning lamp does not light if positive and negative are interchanged (LED).

Test step 3 (actuation of auxiliary heater by pre-selection clock -E111)

Measuring range to be set on portable multimeter V.A.G 1526: Current measurement (2 A DC) – Adapter cable V.A.G 1598/11 connected – Link between sockets 43 and 52					
Test step	**V.A.G 1598 socket**	**Testing of**	**● Test conditions – Additional work**	**Specification**	**Remedies if specification not attained**
3.1	51 and 42	Actuation of auxiliary heater	● Ignition off	– Less than 100 mA Auxiliary ventilation mode, auxiliary heater not in operation	– Use current flow diagram to locate and eliminate short circuit/open circuit in wiring Read measured value block 01 and check which signals are applied to auxiliary heater (=>Page 01-99)

Note:

If earth is applied to connector B contact 5 (via pre-selection clock -E111), operating and display unit for air conditioner/Climatronic -E87/thermotronic control unit -J214 (in heater control) and fresh-air blower -V2 are switched on, but auxiliary heater does not start up (auxiliary ventilation mode).

Measuring range to be set on portable multimeter V.A.G 1526: Current measurement (2 A DC) – Adapter cable V.A.G 1598/11 connected – Link between sockets 51 and 42					
Test step	**V.A.G 1598 socket**	**Testing of**	**● Test conditions – Additional work**	**Specification**	**Remedies if specification not attained**
3.2	43 and 52	Switching from auxiliary ventilation to auxiliary heating mode	● Ignition off – Remove connection to V.A.G 1526 from socket 43	– Less than 100mA Auxiliary ventilation mode, auxiliary heater not in operation – Auxiliary heater starts up	– Use current flow diagram to locate and eliminate short circuit/open circuit in wiring – Read measured value block 01 and check which signals are applied to auxiliary heater (=>Page 01-99)

Notes:

- If earth is applied to connector contact 3 (via pre-selection clock -E111), operating and display unit for air conditioner/Climatronic -E87/thermotronic control unit -J214 (in heater control) and fresh-air blower -V2 are switched on, but auxiliary heater does not start up (auxiliary ventilation mode).
- At low coolant temperatures (less than 30 °C),operating and display unit for air conditioner/Climatronic -E87, thermotronic control unit -J214 and fresh-air blower -V2 are not actuated in auxiliary heating mode until coolant temperature has exceeded 30 °C.

Test step 4 (actuation of pre-selection clock by auxiliary heating radio wave receiver -R64)

Voltage tester V.A.G 1527 – Adapter cable V.A.G 1598/11 connected					
Test step	**V.A.G 1598 socket**	**Testing of**	**● Test conditions – Additional work**	**Specification**	**Remedies if specification not attained**
4.1	47 and 52	Signal from auxiliary heating radio wave receiver -R64	● Ignition off ● Rod of aerial -R51 fitted ● Lamp in remote control not flashing – Press remote control "Start" button	– Diode in voltage tester does not light – Lamp in remote control flashes	– Use current flow diagram to locate and eliminate short circuit Remote control fault detection for vehicles with pre-selection clock (=>Page 82-61) – Check operation of remote control and receiver -R64 (=>Page 82-50) Encode receiver -R64 for corresponding remote control unit (=>Page 82-47)

Continued on next page

Continued from Page 01-187

Voltage tester V.A.G 1527 – Adapter cable V.A.G 1598/11 connected					
Test step	**V.A.G 1598 socket**	**Testing of**	**● Test conditions – Additional work**	**Specification**	**Remedies if specification not attained**
				Diode in voltage tester lights	– Use current flow diagram to locate and eliminate open circuit in wiring
			– Press remote control "Stop" button	– Lamp in remote control stops flashing Diode in voltage tester no longer lights	– Check operation of remote control and receiver -R64 (=>Page 82-50)

Notes:

- "Auxiliary heating" or "auxiliary ventilation" mode is determined by setting on pre-selection clock -E111 and cannot be altered with remote control.
- 2 different settings can be made on pre-selection clock -E111 (=> Page 82-29, setting pre-selection clock -E111):

– In basic setting (as-delivered condition, setting "T60"), pre-selection clock recognises by way of positive signal (from auxiliary heating radio wave receiver -R64) at contact 7, that auxiliary heater is to be switched on. Switch off takes place immediately if positive signal is no longer applied.

– In modified basic setting (setting "T62"), pre-selection clock expects a data telegram (square-wave signals). In this setting, it is therefore not possible to switch on auxiliary heater via remote control.

- Auxiliary heating/auxiliary ventilation time is determined by remote control on activation (cut-in signal contains a time module). This time module is permanently stored in the remote control and cannot be altered. There are different versions for vehicles with and without pre-selection clock.

=> Parts List

- Lamp on remote control starts to flash when "START" button is pressed. By way of a check, this lamp flashes:

  In the case of the version with 30 min. operating time (for vehicles with pre-selection clock) until auxiliary heating/auxiliary ventilation is switched off by pressing "OFF" button or until 30 min. running time has elapsed

  In the case of the version with 60 min. operating time (for vehicles with no pre-selection clock) for approx. 30 s after pressing "START" button

- The remote control is a transmitter. Switch-on and switch-off of auxiliary heating/auxiliary ventilation via pre-selection clock -E111 (or dash panel insert) is thus not recognised.

Functional description of auxiliary heater

Notes on auxiliary heating and auxiliary ventilation:

- Pre-selection clock -E111 was discontinued in Model Year 2000 and auxiliary heater is actuated by dash panel insert (modified version). "Auxiliary heating/auxiliary ventilation" function must be entered in dash panel insert by way of "Adaption" function.

=> Parts List

=> Electrical System; Repair Group 01 =>

- Auxiliary heater can be switched at any time from auxiliary ventilation to auxiliary heating by pressing buttons on pre-selection clock -E111 (for heating/ventilation mode) or by altering setting in dash panel insert (by way of rotary knob/pushbutton with ignition switched on).
- To achieve maximum possible warming of the passenger compartment in auxiliary heating mode, it is appropriate to preselect "HI" temperature setting on operating and display unit of air conditioner/Climatronic -E87 before switching off ignition.
- Operating and display unit for air conditioner/Climatronic -E87/fresh-air blower -V2 are switched on immediately in auxiliary ventilation mode. In auxiliary heating mode, this is only the case when the coolant temperature in the auxiliary heater exceeds 30°C.

– The operating and display unit for air conditioner/Climatronic -E87 starts up (specified temperature at least 20°C) and the fresh-air blower -V2 is actuated (voltage between 3.7 and 6 V).

– The two temperature flaps of the air conditioner unit are opened/closed as a function of actual and specified temperature.

=> Current Flow Diagrams, Electrical Fault-finding and Fitting Locations binder

♦ Thermotronic control unit -J214 and fresh-air blower -V2 are switched on immediately in auxiliary ventilation mode. In auxiliary heating mode, this is only the case when the coolant temperature in the auxiliary heater exceeds 30°C.

– Air flow is routed to windscreen (control motors are actuated).

– Fresh-air blower -V2 is operated at a voltage stipulated by series resistor -N6.

– Position of temperature flaps cannot be altered by control unit (Bowden cables instead of control motors).

=> Current Flow Diagrams, Electrical Fault-finding and Fitting Locations binder

♦ Depending on the amount of heat supplied by the heat exchangers of the air conditioner unit/heater, the auxiliary heater may remain for a lengthy period in the full load, part load or control interval operating statuses.

Notes for vehicles with pre-selection clock -E111

♦ With auxiliary heater switched on and cut-in time activated, heater warning lamp -K11 (in door trim flap) and background illumination in button for chosen pre-selection clock mode (pre-selection clock activated) light or flash.

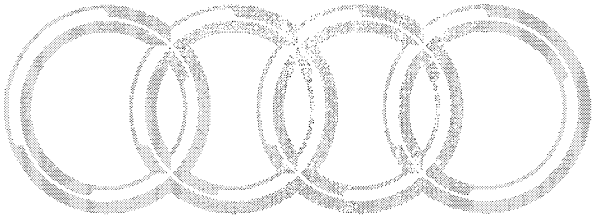
♦ Auxiliary heating/auxiliary ventilation can be switched off at any time by pressing button on pre-selection clock (for heating/ventilation mode).

♦ Auxiliary heating/auxiliary ventilation is switched off automatically on completion of specified opeating time.

– An operating time of between 30 and 60 min. can be set on pre-selection clock -E111 (=> Page 82-29, setting pre-selection clock -E111).

– Operating time with auxiliary heating radio wave receiver -R64 is 30 min.

♦ Pre-selection clock -E111 can be set such that auxiliary heating/auxiliary ventilation is always switched off on switching off ignition irrespective of running time (=>Page 82-29 , setting pre-selection clock -E111).



Notes for vehicles with no pre-selection clock -E111

♦ Auxiliary heating/auxiliary ventilation can be switched off at any time by actuating rotary knob/pushbutton (with ignition switched on).

♦ Dash panel insert can be set such that auxiliary heating/auxiliary ventilation is always switched off on switching off ignition irrespective of running time.

=> Electrical System; Repair Group 01 =>

♦ Operating time can be set between 30 and 60 min. in dash panel insert. Auxiliary heating/auxiliary ventilation is switched off automatically on completion of specified operating time (=> Page 82-35).

♦ On vehicles where auxiliary ventilation is actuated by way of dash panel insert, operating time can be set between 30 and 60 minutes => Page 82-35. If auxiliary heating/auxiliary ventilation is switched on via remote control, operating time is between 30 and 60 minutes. Mode of operation (auxiliary heating or auxiliary ventilation) and operating time are governed by setting in dash panel insert. It should be noted that these vehicles are provided with a remote control system, the signal of which contains a time module for an operating period of 60 min. (as opposed to 30 min. with version for vehicles with pre-selection clock).

Notes for vehicles with 6-cyl. diesel engine on which auxiliary heater is also used as additional heater

♦ Auxiliary heater is used as additional heater on vehicles with no electric additional heater.

♦ It is switched in by engine control unit and can be switched off by pressing "Econ" button on operating and display unit for air conditioner/Climatronic -E87 or heater controls if no additional heat output is required.