Audi A2 2001 ➢

Additional heater

Edition 05.2002

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

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Additional heater

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Repair Group

01 - Self-diagnosis, Electrical check

82 - Auxiliary heating

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

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01 - Self-diagnosis, Electrical check

1 - Additional heater self-diagnosis

1.1 - Additional heater self-diagnosis

Notes:

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- The additional heater is available in various versions.
- Note the precise assignment when replacing an additional heater:

=> Parts List

- -> The heater model can be seen from the rating plate.
  - Type "Z/C-D" without or with recirculating pump -V55 = additional heater (only for vehicles with diesel engines)
  - Type "Z/C-B" = auxiliary heater (only for vehicles with petrol engines, not currently installed on the Audi A2)
- Additional heater control is maintained during self-diagnosis.

Type "Z/C-D" heaters without recirculating pumps -V55 are fitted in vehicles with TDI engine as an additional heater. In its function as an additional heater, the heater is currently not equipped with a recirculating pump -V55.

The additional heater is switched on by the engine control as soon as the specified switch-on conditions have been satisfied.

Notes:

- Depending on the country version of the vehicle and the engine, an electrical or fuel-powered additional heater is installed.

=> Audi sales range

=> Heating, Air Conditioner; Repair group 01

- On vehicles with an electrical additional heater, the air is supplied with heat energy immediately after it exits from air-conditioner / heater heat exchanger.
- On vehicles with 1.2 litre TDI engine with exhaust emissions standard "D4" (3 litre Öko for Germany) no additional heater is provided at this time.
- On vehicles with 1.4 litre TDI engine for "cold countries" (e.g. Austria, Switzerland and all more northerly countries) no electric additional heater is currently installed. On these vehicles, a fuel-powered additional heater was or is installed, which supplies additional heat energy to the coolant.

=> Audi sales range

- On vehicles with 1.4 litre TDI engine for "cold countries" an electric additional heater rated at approx. 1500 Watt will be installed as a running change starting from model year 2003. The fuel-powered additional heater will no longer be used on these vehicles once this fuel-powered additional heater is implemented.

=> Audi sales range

=> Heating, Air Conditioner; Repair group 01

- On vehicles with a petrol engine, no additional heater is currently being provided.
- Checking actuation of additional heater

=> Relevant Workshop Manual, Diesel Direct Injection and Glow Plug System; Repair group 01

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

- The operating and display unit -E87 / the heater control electronics actuates the engine control unit, which then decides whether the additional heater will be switched on. Depending on the engine control unit version, it is displayed in different measured value blocks of the engine control unit why the additional heater is not switched on or that it is being actuated.

=> Relevant Workshop Manual, Diesel Direct Injection and Glow Plug System; Repair group 01

- The engine control unit receives an additional heater request:
  - Via the data bus system on vehicles with air conditioner (convenience data bus and drive data bus).
  - On vehicles with heater via wiring from the heater control electronics to the engine control unit (the input in the heater control electronics is switched to earth).

=> Relevant Workshop Manual, Diesel Direct Injection and Glow Plug System; Repair group 01

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

- The fuel-powered additional heater is activated by the control unit for the diesel direct injection and glow plug system when certain conditions occur at the same time:

=> Relevant Workshop Manual, Diesel Direct Injection and Glow Plug System; Repair group 01

- The engine control unit will switch on the additional heater if the following conditions exist:
  - The operating and display unit -E87 transmits a request via the convenience data bus or the heater control electronics has switched input to earth (ECON button not pressed).
  - Engine speed is greater than 600 rpm.
  - The ambient temperature measured by the engine control unit is below 6°C (only on vehicles without air conditioner).
  - The coolant temperature is less than 70 °C (or less than 80°C at very low ambient temperatures).
  - Capacity utilisation of alternator -C is less than 60% (with electric additional heater only).

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=> Heating, Air Conditioner; Repair group 01

=> Relevant Workshop Manual, Diesel Direct Injection and Glow Plug System; Repair group 01

1.2 - Technical data of self-diagnosis

Features

- The fault memory is a non-volatile memory and thus independent of the power supply.
- The data transfer between the control unit -J162 and the vehicle diagnostic, testing and information system VAS 5051, the fault reader V.A.G 1551 or the vehicle system tester V.A.G 1552 takes place in "Rapid data transfer" mode.

1.3 - Function

The control unit for the additional heater -J162 is equipped with a fault memory.

After evaluating the information, the control unit of the additional heater -J162 differentiates between different faults => Fault table on Page 11 and stores them until the fault memory is erased after interrogation of the fault memory.

1.4 - Fault recognition

The additional heater control unit -J162 receives information from electrical and electronic components (transmitters) which is then processed in line with the specified values.

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

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The control unit -J162 is equipped with a fault memory so that the fault cause can be traced quickly in the event of component failure or an open circuit.

If faults occur in the monitored sensors and components, these are stored in the fault memory together with an indication of type of fault.

Always commence fault finding by starting self-diagnosis and interrogating the stored faults. The following units are available for interrogation of the stored data:

- Vehicle diagnostic, testing and information system VAS 5051
- Fault reader V.A.G 1551
- Vehicle system tester V.A.G 1552

The fault information which is displayed indicates specific repair measures via a fault table.

Notes on fault remedy:

- If a fault situation exists for longer than a certain period, the fault is stored as a static fault. If the fault is no longer present after a specified period, it becomes a sporadic fault. This process is constantly repeated. Sporadic faults are also identified as such (the additional letters /SP appear on the display).
- If a sporadic fault ceases to occur for a specific period, it is automatically erased.

The possibilities offered by self-diagnosis can only be utilised with the vehicle diagnostic, testing and information system VAS 5051, the fault reader V.A.G 1551 or the vehicle system tester V.A.G 1552, mode -1- "Rapid data transfer".

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

Mode -2- (flash code output) is not provided for the additional heater. Operating modes -3- (self-test) and -4- (dealership identification) only apply to fault reader V.A.G 1551 and the vehicle system tester V.A.G 1552 and are described in the relevant operating instructions.

1.5 - 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:

- Fitting locations of the components => Page 62
- There are a number of different encoding versions provided in the additional heater control unit (undervoltage cut-off by means of the learned characteristic battery voltage curve, undervoltage cut-off at a fixed specified battery voltage value). For the additional heater, only the undervoltage cut-off may be coded at a fixed value => Page 25 Encoding control unit.
- During the functions:

- Perform final control diagnosis

- Perform basic setting (battery adaption).

The additional heater will not work.

- If the air conditioning operating and display unit -E87 continues to function after the ignition has been switched off, test for a short circuit to positive in the wiring to the -E87 (connector -D-, contact -10-) using the current flow diagram.

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

- On vehicles with auxiliary heater, operating and display unit -E87 is switched on by applying voltage (at connector -D-, contact -10-) with the ignition switched off.At present, installation of an auxiliary heater in the Audi A2 is not envisaged.
- If a fault occurs several times in a row (e.g. fault "loss of flame") the additional heater is locked after a fault has occurred 6 times and switching it on is only possible after erasing the fault memory.

- Due to the possibility of adjusting the CO2-content in the exhaust, the auxiliary/additional heaters with the control unit as of software version "D49" which are designed for the Audi A6 or A8) may be installed on the Audi A2 as an additional heater.

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- Auxiliary/additional heater part number 4D0 265 105 as of index "H" (vehicles with diesel engines)

- Auxiliary/additional heater part number 4B0 265 105 as of index "E" (vehicles with diesel engines)

- Additional heater with part number 4D0 265 071 as of index "B"

=> Parts List

1.6 - Self-diagnosis test prerequisites

- All fuses OK in accordance with current flow diagram.
- Battery voltage OK
- Battery -A is sufficiently charged.

1.7 - Safety precautions

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

Important
- **Always install testers and measuring instruments on the rear seat and have a second person operate them from there.**
- **If test equipment is operated from the front passenger seat, the person sitting there could be injured if the front passenger airbag were triggered in the event of an accident.**

2 - Performing self-diagnosis

2.1 - Performing self-diagnosis

2.2 - Connecting vehicle diagnostic, testing and information system VAS 5051 and selecting functions

Test requirements:

- Supply voltage of vehicle electrical system OK
- Fuses OK.

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

Notes:

- The various vehicle diagnostic, testing and information system VAS 5051 functions are described in the relevant operating instructions.
- The structure and function of the vehicle diagnostic, testing and information system VAS 5051 are described in self-study program no. 202. This also contains some examples of the correct application of this system.

- Self-diagnosis can also be performed with fault reader V.A.G 1551 or vehicle system tester V.A.G 1552 in mode -1- "Rapid Data Transfer". The various functions are described in the relevant operating instructions.

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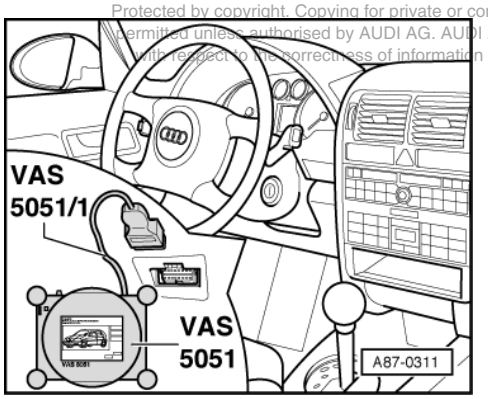


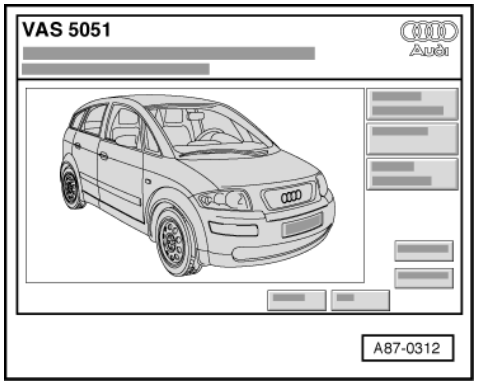
- -> Connect the vehicle diagnostic, testing and information system VAS 5051 to the vehicle's 16-pin diagnostic connector using diagnostic cable VAS 5051/1, with the ignition switched off.
- Switch the ignition on.

or

- Start the engine.

Note:

Observe the notes for final control diagnosis on Page 15 .



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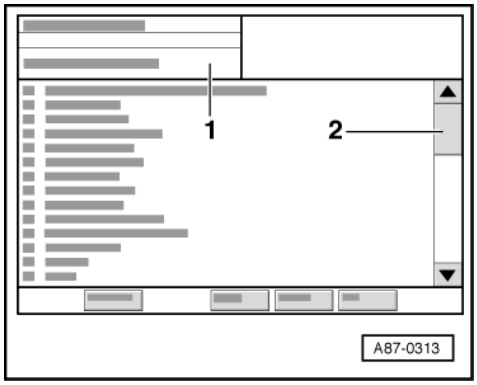
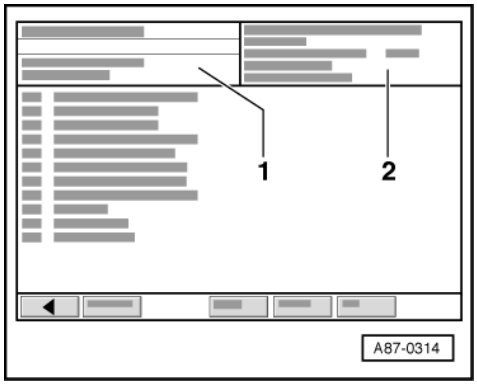
- -> Select function "Vehicle self-diagnosis" on VAS 5051.



- -> Select vehicle system "18 - additional/auxiliary heater".

Notes:

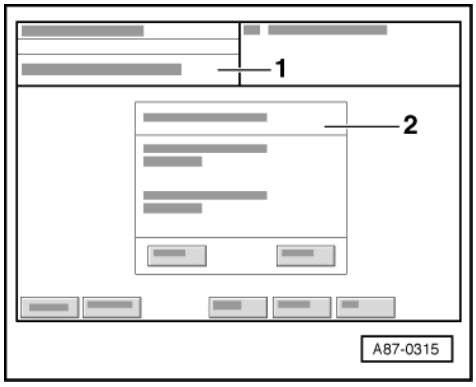
- The prompt to select a vehicle system appears in display zone -1-.
- Vehicle systems (for all vehicle models and equipment) which are intended for self-diagnosis but at the moment cannot be displayed on the screen, can be displayed by "rolling " the screen display with scroll bar -2-.



- -> Wait until "Select diagnostic function" appears in display zone -1-on the VAS 5051 display.

Notes:

- The control unit identification now appears in display zone -2- of VAS 5051 =>Page 8 .



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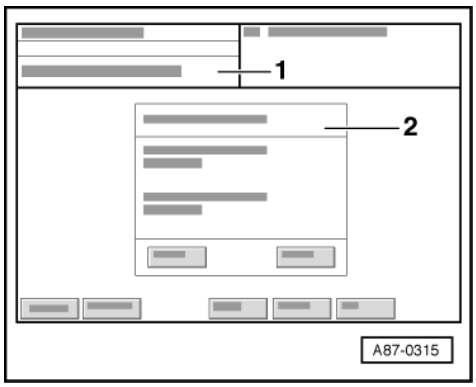
- ◆ -> If the message "Vehicle system not available" appears in display zone -1-of the VAS 5051 display, check:

- The voltage supply to the -J162 control unit of the additional heater using current flow diagram.

=> Current Flow Diagrams, Electrical Fault-finding and Fitting Locations binder
- The wiring from the 16-pin diagnostic connector to the -J162 additional heater control unit.

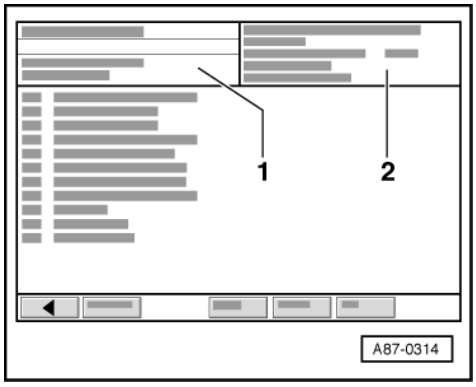


- ◆ -> If an additional display zone -2- appears with the text "Diagnostic bus faulty" with reference to the possible cause on the VAS 5051 display, check:

- Power supply to 16-pin diagnostic socket according to current flow diagram

=> Current Flow Diagrams, Electrical Fault-finding and Fitting Locations binder
- The voltage and the state of the vehicle battery

=> Electrical System; Repair group 01
- ◆ The message "Diagnostic bus faulty"with reference to the possible cause on the VAS 5051 display also appears, if during the self-diagnosisa fault occurred or the data exchange between the VAS 5051 and the -J162 control unit for additional heater was interrupted.
- ◆ By selecting the "Print" function on the VAS 5051 display, you can print out the current screenshot.
- ◆ By selecting the "Help" function on the VAS 5051 display, you can display possible fault causes.



- By pressing the keys depicted in the VAS 5051 display, you can skip back and forth in the program (arrow keys) or change the functions.

- -> Using the VAS 5051 display, you can now start the desired function => Table "Available functions", Page 8

Control unit identification (in display zone -2-, example)

- 18 - Additional/auxiliary heater	Selected vehicle system
- 8Z0 815.069 X - or - 4D0 815 071 X	Part-No.; assignment => Parts List
- Diesel additional heater	Additional heater for a vehicle with diesel engine
- XXXX	Data level (hardware and software version) of control unit
- Code XXXXX:	Encode control unit =>Page 25
- WSC XXXXX:	Workshop code with which the last encoding / adaption took place.

Notes:

- Due to the possibility to adjust the CO2-content in the exhaust, the auxiliary/additional heaters with the control unit as of software version "D49" which are designed for the Audi A6 or A8) may also be installed on the Audi A2 as additional heater.

=> Parts List

- Auxiliary/additional heater with part number 4D0 265 105 as of index "H"
- Auxiliary/additional heater with part number 4B0 265 105 as of index "E"
- Additional heater with part number 4D0 265 071 as of index "B"

- The control unit identification is dependent on the vehicle equipment; the exact assignment can be found in:

=> Parts List

- The additional heater is only intended for vehicles with diesel engine; activation takes place automatically via the engine control unit, and only if the "Econ" mode is selected on the operating and display unit of the air conditioner / heater controls.
- The auxiliary heater can only be switched on with the engine running; shut-off on account of undervoltage is therefore unnecessary.

Available functions

Vehicle diagnostic, testing and information system VAS 5051		Ignition on, engine stopped	Engine idling	Vehicle running	Page
Address words					
18	Additional/auxiliary heater	yes	yes	yes	5
00	Automatic test sequence	yes	yes	yes	5
Functions					
01	Interrogating control unit version	yes 1)	yes 1)	yes 1)	5
02	Interrogating fault memory	yes	yes	yes	9
03	Final control diagnosis	yes	yes	yes	15

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04	Performing basic setting	yes	yes	no 2)	18
05	Erasing fault memory	yes	yes	yes	23
06	End of output	yes	yes	yes	23
07	Encoding control unit	yes	yes	no 2)	25
08	Reading measured value block	yes	yes	yes	27
10	Adaption	yes	yes	no 2)	36

1) The control unit version is displayed constantly during self-diagnosis with VAS 5051.

2) It is possible, but inadvisable, to carry out these functions while driving.

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Notes:

- Self-diagnosis with vehicle diagnostic, testing and information system VAS 5051 is described in this workshop manual.
- Self-diagnosis can be performed in the same manner with fault reader V.A.G 1551 or vehicle system tester V.A.G 1552. In order to be able to furnish proof of faults in the event of subsequent queries it is appropriate, before erasing the fault memory, to connect up to vehicle diagnostic, testing and information system VAS 5051 or fault reader V.A.G 1551 and print out the faults found (V.A.G 1552 has no printer).
- Only the functions listed here can be used for additional heater self-diagnosis.

Encoding table

Encoding of additional heater:

Code	Significance
0 0 0 0 2	- Recirculating pump -V55 not installed. Cut-off due to undervoltage is performed with the voltage value entered in adaption function.
0 0 0 1 2	- Recirculating pump -V55 installed Cut-off due to undervoltage is performed with the voltage value entered in adaption function.

Notes:

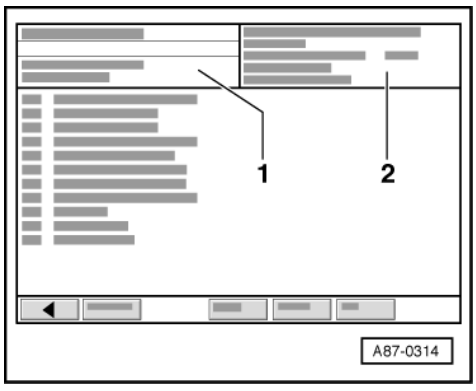
- Currently no -V55 recirculating pump is installed on the Audi A2, for this reason the coding "00002" must always be entered for heater units operated only as additional heaters.
- Additional encoding options for the -J162 control unit are currently not provided for on the Audi A2. Additional encoding options for the control unit are provided for on e.g. the Audi A8.

=> Audi A8 auxiliary/additional heater

=> Audi A6 auxiliary heater

3 - Interrogating fault memory

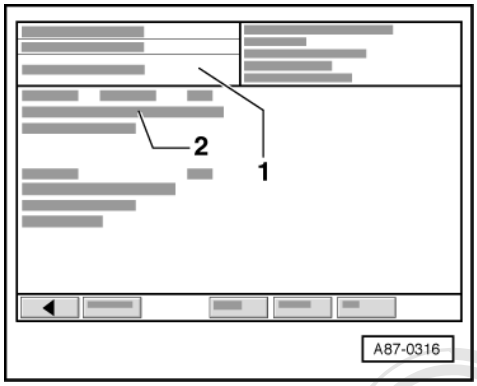
3.1 - Interrogating fault memory



- Connect the vehicle diagnostic, testing and information system VAS 5051 to the vehicle's 16-pin diagnostic socket using the diagnostic cable VAS 5051/1, with ignition switched off and select the control unit of the additional heater -J162 => Page 5 using "address word" 18.

-> Display on VAS 5051:

- Select function "02 - Interrogate fault memory".



-> Display on VAS 5051:

- The number of faults stored appears in display zone -1-.
- The fault code, the fault location and the type of fault stored appear in display zone -2-.

Notes:

- By pressing the ←key you will return to the selection program.

- If a fault was detected:
  - 1. Rectify fault.
  - 2. Interrogate fault memory (function 02).
  - 3. Erase fault memory (function 05).
  - 4. Check code (function 01) or encode control unit (function 07).
  - 5. End output (function 06).

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- If no fault was detected but the additional heater is not working properly (e.g. additional heater does not start, insufficient heat output):
  - 1. Read measured value block (function 08)=>Page 27 .
  - 2. Perform final control diagnosis (function 03)=> Page 15 .
  - 3. Check additional heater function =>Page 51 .

Notes:

- As of model year 2001 additional heaters with a -J162 heater control unit and a software version starting from "D50" are used.
- If on additional heaters with a -J162 heater control unit and a software version as of "D50", the additional heater does not begin to operate if contact "3" of the 6-pin connector is connected to earth (additional heater actuation) check the adaption in the -J162 control unit adaption channel "10" and correct it as necessary =>Page 36 .

- On control units with software version "D50" or "D51" only the adaption "0" must have been entered.
- On control units as of software version "D50" the adaption "0" or "2" must have been entered.

-> Display on VAS 5051:

- End output (function 06) =>Page 23 .
- Switch off ignition and detach diagnostic connector.

4 - Additional heater fault table

4.1 - Additional heater fault table

Notes:

- Listed below on the basis of fault codes are all the faults which can be detected by the -J162 additional heater control unit and displayed on VAS 5051.
- The fault memory can store a maximum of 3 faults. If a further fault occurs the fault that occurred first is erased. The ambient conditions under which each fault occurred are stored and can be interrogated using the "Read measured value block 08, display group 005 to 007" function => Page 27 .
- If faults only occur sporadically or if the fault memory is not erased after fault remedy, these faults are displayed as "sporadic faults" (display "/SP"). (The content of the fault memory is retained until it is erased, "non-volatile memory").
- An indication of the type of fault may also appear in the fault table (a display marked * appears, as well as the component concerned or the "info" display).
- Once repairs have been completed, the fault memory must always be interrogated again with fault reader VAS 5051 and erased.
- Before replacing components, always use the current flow diagram to check the relevant positive and earth connections (terminals 30 and 31) and all connectors (between -J162 and the component indicated as being faulty).
- With all sporadic faults, it is particularly important to check the connectors for possible loose contacts.
- After replacing an additional heater component, always read out the fault memory, rectifying any faults that are indicated and erase them from the memory (functions 02 and 05).

- If no fault is detected despite complaints about the additional heater, the functions "Final control diagnosis 03" and "Read measured block 08" should be performed.
- If a fault occurs several times in a row (e.g. fault "loss of flame") the additional heater is locked after a fault has occurred 6 times and switching it on is only possible after erasing the fault memory.
- Check additional heater function =>Page 51

Display on VAS 5051 and output at printer	Possible causes of fault	Fault remedy
00000 No faults detected	Self-diagnosis is complete when "No fault detected" appears after repairs have been made and additional heater functionality has been checked.	
00532 Power supply *Signal too high /SP	- Vehicle voltage too high with engine running. Battery charged using charging unit with excessively high charging voltage.	- Check alternator and voltage regulator. => Electrical System; Repair group 01 Delete fault memory. Check or replace battery.
01044 Control unit incorrectly encoded	- A newly installed additional heater has not been encoded.	- Encode additional heater =>Page 25 Delete fault memory.

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Display on VAS 5051 and output at printer	Possible causes of fault	Fault remedy
01406 No flame formation	- Constriction or leakage in air intake or in exhaust system. Fault in fuel supply to additional heater. Combustion air blower -V6 defective. Glow plug with flame detector -Q8 defective. Metering pump -V54 defective. Leak in additional heater. Deposits on burner element (only when running additional heater on vegetable oil methyl ester)	- Check additional heater air intake and exhaust system. Check fuel delivery =>Page 80

Display on VAS 5051 and output at printer	Possible causes of fault	Fault remedy
01407 Loss of flame	- Constriction or leakage in air intake or in exhaust system. Fault in fuel supply to additional heater. Combustion air blower -V6 defective. Glow plug with flame detector -Q8 defective. Metering pump -V54 defective. Leak in additional heater. Deposits on burner element (only when running additional heater on vegetable oil methyl ester)	- Check additional heater air intake and exhaust system. Check fuel delivery =>Page 80

Display on VAS 5051 and output at printer	Possible causes of fault	Fault remedy
01408 Undervoltage cut-off (fixed value)	- Voltage falling below specified minimum voltage during additional heater operation. Contact resistance in wiring to -J162. Battery not sufficiently charged or defective. Fixed value for undervoltage cut-off was entered too high.	- Check alternator and voltage regulator. => Electrical System; Repair group 01 36

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Notes:

- The fixed value for undervoltage cut-off is active with code "00002" or "00012". It can be entered or altered in the "Adaption" function => Page 27 .
- The fixed value for the undervoltage cut-off is also active with coding "00001" or "00011" but is not displayed. If the voltage value was altered in a control unit encoded to "00002" or "00012" and the control unit is then recoded to "00001" or "00011" this fault can also be displayed in control units that are coded to automatic undervoltage cut-off. The automatic undervoltage cut-off is not provided for the additional heater.
- This fault can only be displayed for vehicles with additional heater in the event of e.g. contact resistance in the connection between additional heater and vehicle battery (the additional heater only operates with the engine running).

Display on VAS 5051 and output at printer	Possible causes of fault	Fault remedy
01409 Repeated loss of flame	- Constriction or leakage in air intake or in exhaust system. Fault in fuel supply to additional heater. Combustion air blower -V6 defective. Glow plug with flame detector -Q8 defective. Metering pump -V54 defective. Leak in additional heater.	- Check additional heater air intake and exhaust system. Check fuel delivery =>Page 45 Dismantle additional heater and check gaskets.

Display on VAS 5051 and output at printer	Possible causes of fault	Fault remedy
01410 Heater overheating	- Air in coolant circuit Constriction in coolant circuit Engine coolant pump displacement insufficient -V55 recirculating pump is not running (only additional heaters with recirculating pump). Fault at temperature sensor in additional heater control unit -J162.	- Bleed coolant circuit as specified. Eliminate constriction in coolant circuit. Check displacement and coolant circuit. Perform final control diagnosis => Page 45 Replace additional heater.

Notes:

- The Audi A2 currently has no -V55 recirculating pump for the additional heater installed.
- On vehicles without the recirculating pump for the additional heater, the coolant flow through the additional heater is determined by the engine coolant pump displacement. If this is too low e.g. during engine idling, then this fault may be stored.

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Display on VAS 5051 and output at printer	Possible causes of fault	Fault remedy
01411 Temperature sensor -G18 *Defective	- Fault in additional heater control unit -J162.	- Replace additional heater.
01412 Glow plug with flame detector -Q8. *Implausible signal *Open circuit *Short to positive *Short to earth	- Fault in wiring between heater control unit -J162 and glow plug with flame detector -Q8. Glow plug with flame detector -Q8 defective. Fault in additional heater control unit -J162.	- Perform final control diagnosis =>Page 45 Replace additional heater.

Notes:

- If a -Q8 glow plug with flame detector fault is displayed together with the faults "misfire" or "repeated misfire", then first eliminate the cause for these faults.
- Should this fault be displayed also check the connector between control unit -J162 and the glow plug -Q8 for contact resistance (the glow plug is also the flame detector). As a very low current is flowing during interrogation of the flame monitor even a low contact resistance (e.g. due to contact pressure too low) can cause the storing of this fault.

Display on VAS 5051 and output at printer	Possible causes of fault	Fault remedy
01413 Metering pump -V54 *Short to earth *Open circuit *Short to positive	- Fault in wiring between heater control unit -J162 and metering pump -V54. Metering pump -V54 defective. Fault in additional heater control unit -J162.	- Locate and eliminate fault in wiring between -J162, engine control unit, and -V54. Perform final control diagnosis =>Page 45 Replace additional heater.
01414 Combustion air blower -V6 *Open circuit *Short to positive	- Fault in wiring between heater control unit -J162 and combustion air blower -V6. Combustion air blower -V6 defective. Fault in additional heater control unit -J162.	- Locate and eliminate fault in wiring between -J162 and -V6. Perform final control diagnosis =>Page 45 Replace additional heater.

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Note:

Contact 6 of connector B is also connected to the engine control unit on the Audi A2 with diesel engine. Engine control unit uses clock signal to metering pump to incorporate fuel consumption of additional heater into consumption signal when engine is running.

=> Relevant Workshop Manual, Diesel Direct Injection and Glow Plug System; Repair group 01

Display on VAS 5051 and output at printer	Possible causes of fault	Fault remedy
01415 Recirculating pump -V55 *Open circuit *Short to positive	- -J162 additional heater control unit incorrectly encoded. Fault in wiring between heater control unit -J162 and recirculating pump -V55. Recirculating pump -V55 defective. Fault in additional heater control unit -J162.	- Check -J162 control unit encoding =>Page 45 Replace additional heater.

Notes:

- The Audi A2 currently has no -V55 recirculating pump for the additional heater installed.
- If on a vehicle without -V55 recirculating pump the -J162 control unit is encoded for a version with recirculating pump, then this fault is displayed.

Display on VAS 5051 and output at printer	Possible causes of fault	Fault remedy
01416 Fresh air blower actuation signal *Short to earth *Open circuit *Short to positive	- -J162 additional heater control unit incorrectly encoded. Fault in wiring to -J162 control unit Fault in additional heater control unit -J162.	- Check -J162 control unit encoding =>Page 45 Replace additional heater.
01443 Not adapted to battery.	- -J162 additional heater control unit incorrectly encoded. The basic setting was not performed for auxiliary/additional heater with code "00001" or "00011" after the last coding (currently not provided for on the Audi A2).	- Check -J162 control unit encoding =>Page 25

Notes:

- The signal for fresh air blower actuation is intended for the version with auxiliary heater. At present, installation of an auxiliary heater in the Audi A2 is not envisaged.

- The fault "not adapted to battery" is provided for the auxiliary heater version of the -J162 control unit. At present, installation of an auxiliary heater in the Audi A2 is not envisaged.
- The battery voltage drop during auxiliary heater operation is learned and stored in memory via battery adaption.

Display on VAS 5051 and output at printer	Possible causes of fault	Fault remedy
01444 Undervoltage cut-off (automatic)	- -J162 additional heater control unit incorrectly encoded. Voltage falling below specified minimum voltage during additional heater operation. Contact resistance in wiring to -J162. Battery not sufficiently charged or defective.	- Check -J162 auxiliary heater control unit encoding => Page 25 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 cut-off due to undervoltage (Automatic) is intended for the version as auxiliary heater. At present, installation of an auxiliary heater in the Audi A2 is not envisaged.
- The "automatic" value for undervoltage cut-off is active with code "00001" or "00011". It is adapted in function "Basic setting" => Page 27 .
- If further faults are displayed together with the fault "cut-off due to undervoltage (automatic)" first eliminate the cause for fault "cut-off due to undervoltage (automatic)".

Display on VAS 5051 and output at printer	Possible causes of fault	Fault remedy
65535 Control unit defective (-J162)	- Open circuit, contact resistance or loose contact in wiring (terminal 30 or 31) to -J162. Fault in additional heater control unit -J162.	- Use current flow diagram to determine and rectify fault in wiring to -J162. Replace additional heater.

5 - Additional heater final control diagnosis

5.1 - Additional heater final control diagnosis

Notes:

- Fitting locations of components actuated =>Page 62
- If final control diagnosis is to be repeated, terminate and re-start self-diagnosis.
- Each component is actuated for a specific time. This can be prematurely terminated using the ⇒key. At the same time this causes the next component to be selected.
- After the allowed time limit has expired, the next component must be selected using the ⇒key.

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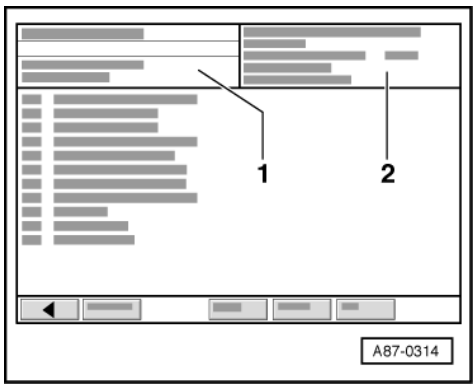
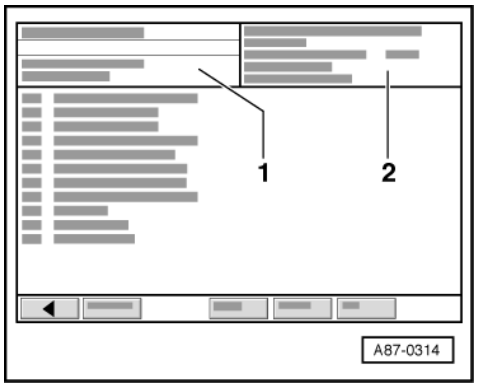
Starting final control diagnosis



- Connect the vehicle diagnostic, testing and information system VAS 5051 to the vehicle's 16-pin diagnostic socket using the diagnostic cable VAS 5051/1, with ignition switched off and select the control unit of the additional heater -J162 => Page 5 using "address word" 18.

-> Display on VAS 5051:



- Switch off the ignition and all electrical consumers.
- With the "Address word" 18 select the additional heater => Page 5
- Interrogate fault memory => Page 9 .

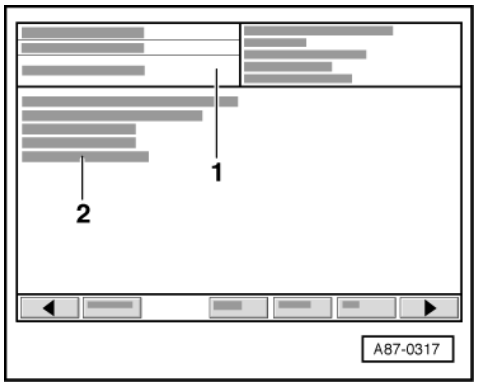
-> Display on VAS 5051:

Notes:

To measure the current consumption of -Q8 glow plug with flame detector

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

- Select function "03 - Final control diagnosis".



-> Display on VAS 5051:

- Display zone -1- displays which control element is currently being actuated (e.g. 1st control element in the test).
- The control elements which are currently actuated or have been actuated are listed in display zone -2-. The control element which is currently actuated is in the bottom line.

- Press the ⇒key to switch to the next component. Function and sequence =>Table of final controls actuated, Page 17

Notes:

- By pressing the ←key you will return to the selection program.
- Final control diagnosis can be terminated by pressing the C key.
- Interrogating fault memory on completion of final control diagnosis => Page 9

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- On termination of the final control diagnosis, interrogate the fault memory => Page 27

Final controls actuated

Indicated on display	Desired function	Fault remedy
Glow plug with flame detector -Q8	Glow plug actuated for 60 seconds. Reading on multimeter V.A.G 1715 increases by 4 to 10 A during actuation of -Q8.	- Check wiring between -Q8 and -J162. Check additional heater electrical components =>Page 45
Press⇒key		

Notes:

- Any fault at the glow plug with flame detector -Q8 is stored in the fault memory.
- The current consumed by the glow plug is restricted by the control unit such that the power at the glow plug is approx. 96 W (current level varies with battery voltage).

Indicated on display	Desired function	Fault remedy
Metering pump -V54	Metering pump actuated for 10 seconds. Clocking can be heard in the vicinity of metering pump.	- Check wiring between -V54 and -J162. Check additional heater electrical components =>Page 45
Press⇒key		

Notes:

- The metering pump is installed on the floor panel in the right rear wheel area.
- On vehicles with diesel engines, allowance is made in the on-board computer consumption display for the fuel consumption to the additional heater. This function is implemented by the engine control unit, however, only when the engine is running (metering pump -V54 and engine control unit are connected by a wire).
- During actuation of the -V54 metering pump, approx. 4 cm3 of fuel are pumped into the additional heater. If the final control diagnosis is performed several times in sequence, then smoke may develop upon initial operation.

Indicated on display	Desired function	Fault remedy
Combustion air blower -V6	Combustion air blower -V6 actuated for 30 seconds. Running noise can be heard in vicinity of additional heater.	- Check wiring between -V6 and -J162. Check additional heater electrical components =>Page 45
Press ⇒key		
Final control diagnosis is completed (for additional heaters without recirculating pump).		

Notes:

- On vehicles without -V55 recirculating pump the control element "-V55 recirculating pump" is displayed, check the coding of the additional heater=> Page 25
- On vehicles with additional heater without recirculating pump -V55 actuation of -V6 combustion air blower terminates final control diagnosis.
- The Audi A2 currently has no -V55 recirculating pump for the additional heater installed.

Indicated on display	Desired function	Fault remedy
Recirculating pump -V55 At present, installation of a recirculating pump is not envisaged	Recirculating pump -V55 actuated for 30 seconds. Running noise can be heard in vicinity of additional heater.	- Check wiring between -V55 and -J162. Check additional heater electrical components =>Page 45
Press ⇒key		

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Indicated on display	Desired function	Fault remedy
Control element test is completed		

Notes:

- If on vehicles without -V55 recirculating pump, the control element "-V55 recirculating pump" is displayed, check the coding of the additional heater=> Page 25
- On vehicles with additional heater with -V55 recirculating pump actuation of the -V55 recirculating pump terminates final control diagnosis.
- The Audi A2 currently has no -V55 recirculating pump for the additional heater installed.

Indicated on display	Desired function	Fault remedy
Fresh air blower actuation signal Provided for the auxiliary/additional heater version	Air conditioner operating and display unit -E87 starts up for 30 seconds. Fresh-air blower -V2 is actuated for 30 seconds by -E87.	- Check wiring between -E87 and -J162. Check additional heater electrical components =>Page 45
Press ⇒key		
Control element test is completed		

Notes:

- If on the Audi A2 the control element "Fresh air blower actuation signal" is displayed, check the coding of the additional heater=> Page 25
- For the additional heater the signal for actuating the fresh-air blower is not output (additional heater only operates when engine is running).
- The signal for fresh air blower actuation is intended for the version with auxiliary heater. At present, it installation of an auxiliary heater in the Audi A2 is not envisaged.

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6 - Additional heater basic setting

6.1 - Additional heater basic setting

The following sequences can be switched in the "Basic setting" function.

- Pipe filling(display group number 055)

- This function can be used to check the fuel delivery of the metering pump -V54 =>Page 69

- Heater on (display group number 022) =>Page 19

- With additional heater, start engine before selecting this display group.

Notes:

- If the link to the fault reader is lost with the additional heater switched on, the additional heater automatically switches itself off.
- The additional heater can be operated via this function up to a coolant temperature of 115 °C, starting from control interval is possible. The operating time is limited to a maximum of 8 minutes.

- Heater off (display group number 033) =>Page 19
- Battery adaption of auxiliary heater (display group number 066 and 099).

- Not provided for on the Audi A2
- Intended for version as auxiliary heater which have been encoded for automatic undervoltage cut-off =>Page 25 . At present, installation of an auxiliary heater on the Audi A2 is not envisaged.

Note:

The functions "pipe filling" (display group number 044) and "Battery adaption of auxiliary heater" (display group numbers 066 and 099) are intended for the Audi A6 or Audi A8 and are not to be used with the Audi A2.

=> Audi A8 auxiliary/additional heater

=> Audi A6 auxiliary heater

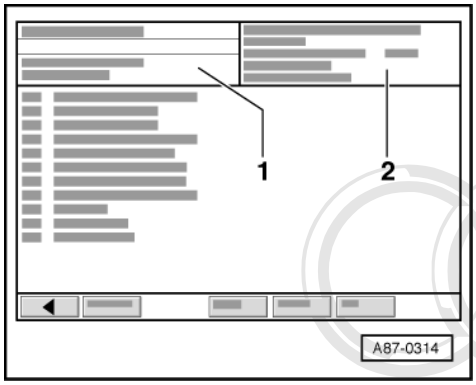
6.2 - Additional heater basic setting (switching on and off)

Requirements

- Battery is fully charged.
- The ignition is switched off (for vehicles with additional heater with -V55 recirculating pump)

- Engine running (for vehicles with additional heater without -V55 recirculating pump).

Performing basic setting



- Connect the vehicle diagnostic, testing and information system VAS 5051 to the vehicle's 16-pin diagnostic socket using the diagnostic cable VAS 5051/1, with ignition switched off and select the control unit of the additional heater -J162 => Page 5 using "address word" 18.

-> Display on VAS 5051:

- Interrogate the fault memory =>Page 9 and eliminate any faults displayed.
- Check the additional heater coding and correct if necessary =>Page 5

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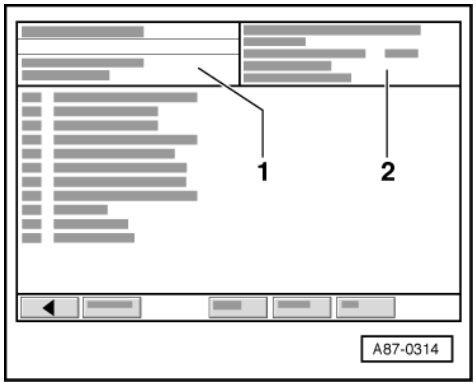
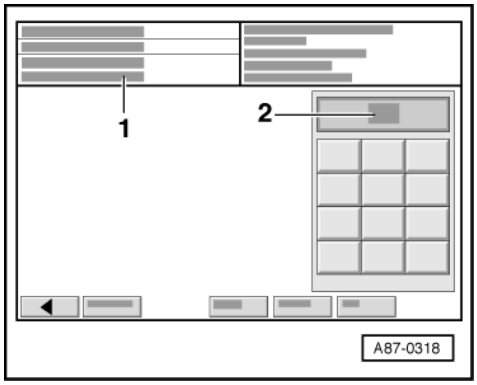


- Erase the fault memory if necessary =>Page 23
- -> Select function "04 - Basic setting".

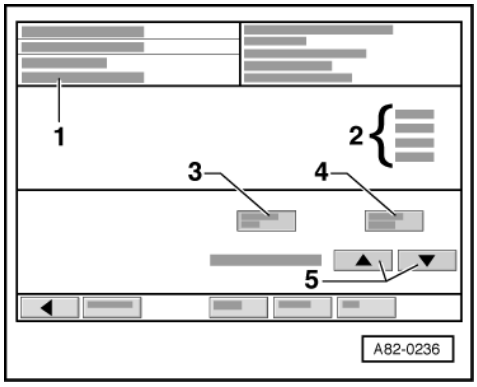
Switching on additional heater



-> Display on VAS 5051:

- The prompt to enter a display group is given in display zone -1-.
- An input keyboard is displayed in display zone -2-.

- Enter "022" for "display group number 22" using the input keyboard in display zone -2- and confirm entry with "Q key".



Notes:

- -> If the message "Function unknown or cannot be executed at present" appears in display zone -1- this may have the following cause:

- The additional heater was switched on and is currently in "run-on" operating status.
- A fault is stored in the auxiliary heater which does not permit switching on.

- To switch off heater press ← key and enter basic setting (display group number 033) =>Page 22
- If a fault occurs during the "Basic setting, heating on" function, the heater cannot be operated again until it has first been switched off using the "Basic setting, heating off" function.
- To permit observation of its functioning, the additional heater can be switched to the "Read measured value block" function by pressing the key -3-, you return to the "Basic setting" function by pressing the key -4-.
- If the link to the fault reader is lost with the additional heater switched on, the additional heater automatically switches itself off.

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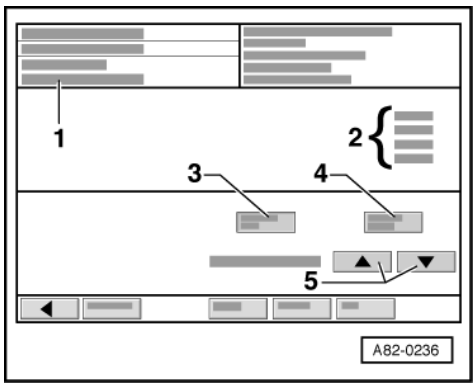
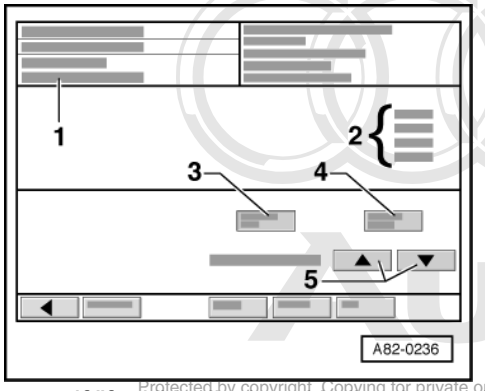


- The additional heater can be operated via the "Basic setting" function up to a coolant temperature of 115 ° C, starting from control interval is possible. The operating time is limited to a maximum of 8 minutes.

-> Display on VAS 5051:

Display in display zone 2		
Lines	Text	Significance
1	Test ON	Basic setting
2	- (Fault)	The additional heater is in an operating status which does not permit switching on.
3	Additional heating (Heater OFF) (Heater ON)	Actuation
4	Heating (Ventilation)	Mode

Notes:



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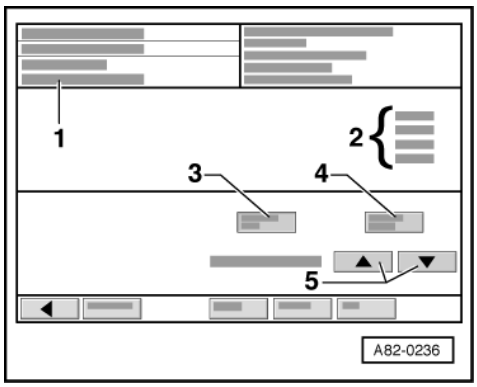
- -> If "fault" is displayed in line 2 it could have the following causes:

- The additional heater was switched on and is currently in "run-on" operating status.
- A fault is stored in the auxiliary heater which does not permit switching on.

- If line 3 displays "Heater ON", check the additional heater coding
- If line 4 displays "Ventilation", check the additional heater coding and perform the electrical test (due to short to earth in connector to -J162 control unit).
- Only "Heating" mode is possible with the additional heater (display in line 4).
- By pressing the ← key you will return to the selection program.

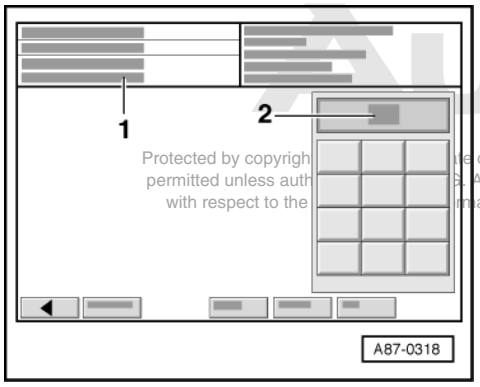
- Change to a different display group by pressing the -5- keys.
- Change to a different function (e.g. from "Basic setting" to "Read measured value block") by pressing the -3- key (you return to the "Basic setting" by pressing the -4- key).



Switching off additional heater

-> Display on VAS 5051:

- Press the ← key



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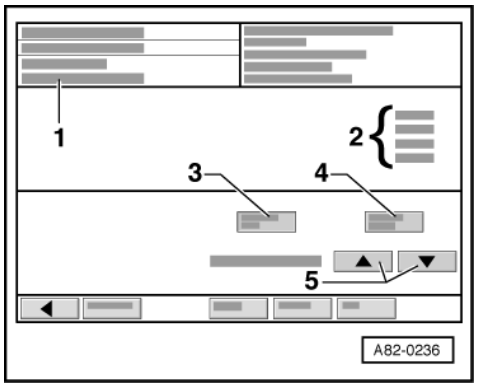
-> Display on VAS 5051:

- Enter "033" for "display group number 33" using the input keyboard in display zone -2- and confirm entry with "Q key".



-> Display on VAS 5051:

Display in display zone 2		
Lines	Text	Significance
1	Test OFF	Basic setting

Display in display zone 2		
Lines	Text	Significance
2	- (Fault)	The additional heater is in an operating status which does not permit switching on.
3	Heating OFF Additional heating (Heater ON)	Actuation
4	Heating (Ventilation)	Mode

Notes:

- After the end of the run-on time, the combustion air blower of the additional heater remains at a standstill, the additional heater is switched off.
- The run-on time is between 15 and 180 seconds, depending on the additional heater's operating status when switched off.

7 - Erasing fault memory, ending output

7.1 - Erasing fault memory, ending output

- Connect the vehicle diagnostic, testing and information system VAS 5051 to the vehicle's 16-pin diagnostic socket using the diagnostic cable VAS 5051/1, with ignition switched off and select the additional heater => Page 5 using "address word" 18.

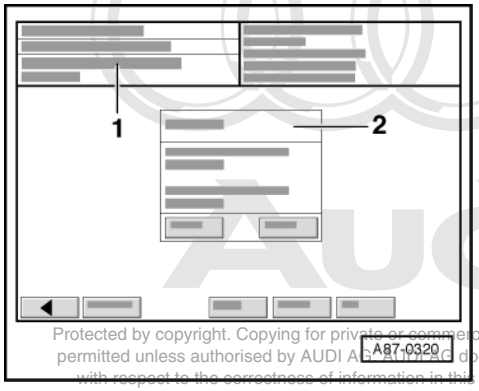
Erasing fault memory

Preconditions:

- The fault memory has been interrogated => Page 9 and all faults displayed, if any, have been rectified.

-> Display on VAS 5051:

- Select function "05 - Erase fault memory".



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-> Display on VAS 5051:

- There is no display in display zone -1-.
- A field with the information that on pressing the "OK" key data will be erased and the question as to whether the function should be executed appears in display zone -2- (the fault memory).

Notes:

- "Fault memory has not yet been interrogated" appears in display zone -1-.

- Interrogate fault memory.
- Rectify any faults.

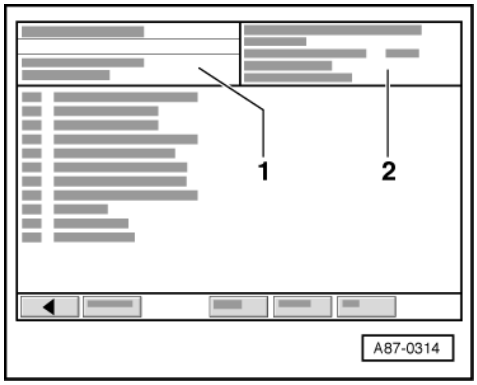
- If e.g. the self-diagnosis is interrupted while interrogating the fault memory, the fault memory is not erased.

- In the display of VAS 5051, press the zone with "OK" in display zone -2-.

As soon as the fault memory has been erased "Fault memory erased" appears in display zone -1-.

- In the display of VAS 5051, press the zone with the ←key.

End of output

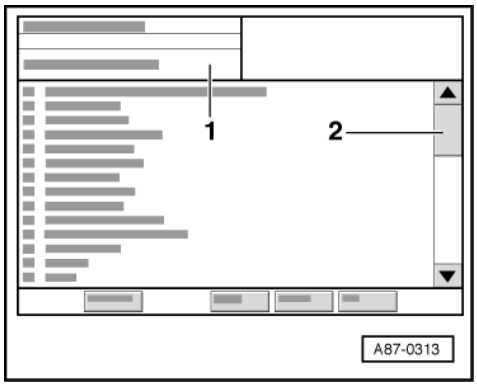


Preconditions:

- The fault memory has been interrogated and erased and the coding has been checked=>Page 5 .

-> Display on VAS 5051:

- Select function "06 - End output".



- -> Wait until this (the start menu) appears in the VAS 5051 display.
- Switch off ignition, as required, and Unplug diagnostic connector.

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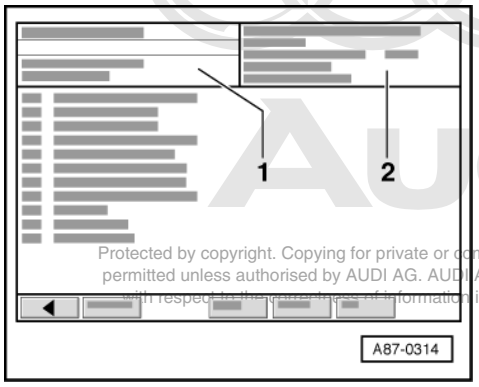
8 - Encoding additional heater

8.1 - Encoding additional heater

- Connect the vehicle diagnostic, testing and information system VAS 5051 to the vehicle's 16-pin diagnostic socket using the diagnostic cable VAS 5051/1, with ignition switched off and select the control unit of the additional heater -J162 => Page 5 using "address word" 18.



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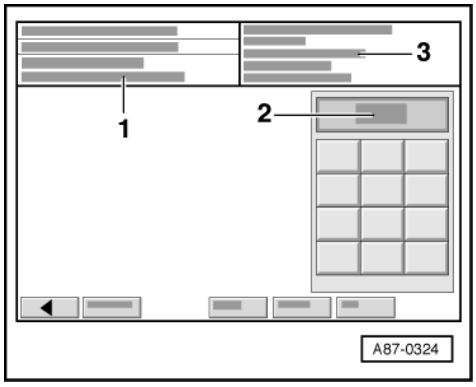
Preconditions:

- The fault memory has been interrogated =>Page 23 .
- Additional heater is switched off.

-> Display on VAS 5051:

- Select function "07 - Encode control unit".



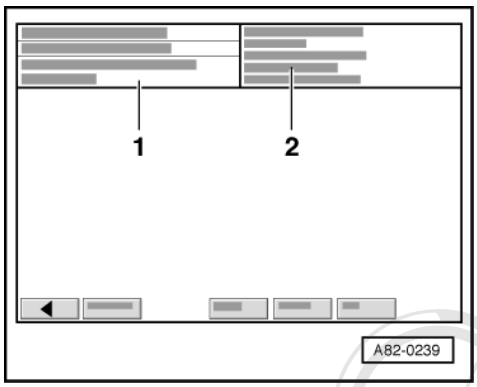
-> Display on VAS 5051:

- The prompt to enter the code is given in display zone -1-.
- An input keyboard is displayed in display zone -2-.
- The instantaneously valid and, in parentheses, the previously valid code is given in the fourth line in display zone -3-.
- The workshop code, which is entered in your VAS 5051, is given in the fifth line of display zone -3-.

- Encode control unit -J162 of the additional heater according to version and the required undervoltage cut-off.

  Coding table =>Page 27

- Enter the code from the coding table via zone -2-.
- Confirm entry by pressing the "Q key" in display zone -2-.



-> Appears on display of VAS 5051 after a short time

- The message "Encoding in vehicle system carried out" appears in the display zone -1-.
- The control unit identification with the new code and the old code, in parentheses, is displayed in display zone -2-.

- After entering the code, the cut-off voltage must be checked and, if necessary, re-entered via the "Adaption" function =>Page 36

Notes:

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- By pressing the ←key you will return to the selection program.

- The following versions may have been fitted, depending on the vehicle equipment:
  - Additional heater without recirculating pump -V55
  - Additional heater with recirculating pump -V55 (not provided for in the Audi A2 at present).

- Due to the possibility of adjusting the CO2-content in the exhaust gas, the auxiliary/additional heaters with the control unit as of software version "D49" which are designed for the Audi A6 or A8) may also be installed on the Audi A2 as additional heater.

=> Parts List

- Auxiliary/additional heater with part number 4D0 265 105 as of index "H"
- Auxiliary/additional heater with part number 4B0 265 105 as of index "E"
- Additional heater with part number 4D0 265 071 as of index "B"

- The control unit identification is dependent on the vehicle equipment; the exact assignment can be found in:

=> Parts List

- The additional heater control unit -J162 provides for different encoding versions. However, currently only the coding "00002" is permissible for versions with additional heater in the Audi A2.
- As of model year 2001 additional heaters with a -J162 heater control unit and a software version starting from "D50" are used.

- If on additional heaters with a -J162 heater control unit and a software version as of "D50", the additional heater does not begin to operate if contact "3" of the 6-pin connector is connected to earth (additional heater actuation) check the adaption in the -J162 control unit adaption channel "10" and correct it as necessary.

- On control units with software version "D50" or "D51" only the adaption "0" must have been entered.
- On control units as of software version "D50" the adaption "0" or "2" must have been entered.

Main differences between the two additional heater coding versions

- With code "00002" or "00012" the cut-off takes place at the voltage value entered in the "Adaption" function =>Page 36
- Code "00001" or "00011" makes allowances for battery voltage changes at different temperatures. The voltage drop calculated during basic setting is also included in the calculation. This encoding is not envisaged

for this version as auxiliary heater. At present, installation of an auxiliary heater in the Audi A2 is not envisaged.

=> Audi A8 auxiliary/additional heater

=> Audi A6 auxiliary heater

Encoding table

Encoding of additional heater:

Code	Significance
0 0 0 0 2	- Recirculating pump -V55 not installed. Cut-off due to undervoltage is performed with the voltage value entered in adaption function.
0 0 0 1 2	- Recirculating pump -V55 installed. Cut-off due to undervoltage is performed with the voltage value entered in adaption function.

Notes:

- For additional heaters with recirculating pump, always enter encoding "00002"
- The coding "00012" is only to be entered on vehicles where a -V55 recirculating pump has been fitted (not provided for in the Audi A2 at present).

9 - Reading measured value block

9.1 - Reading measured value block

Notes:

- 8 measured value blocks with 4 measured values each are provided for the additional heater.
- The additional heater function remains active during self-diagnosis (function "Read measured block value") and the current measured values are displayed.
- If the printer is switched on, the current display will be recorded in the form of a printout.

Starting "Reading measured value block"

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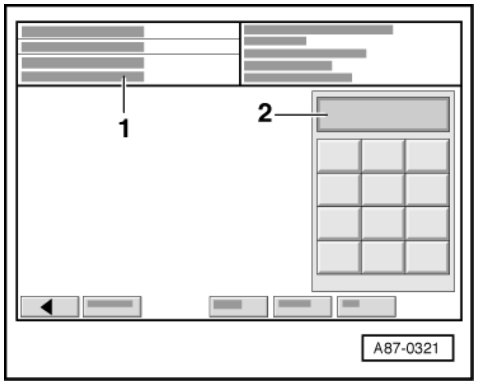
- Start engine (for additional heaters without -V55 recirculating pump, if the additional heater function is to be checked while in operation).
- Switch of ignition (if no functional check is to be made and for additional heaters with recirculating pump).
- Connect the vehicle diagnostic, testing and information system VAS 5051 to the vehicle's 16-pin diagnostic socket using the diagnostic cable VAS 5051/1, with ignition switched off and select the control unit of the additional heater -J162 => Page 5 using "address word" 18.

-> Display on VAS 5051:

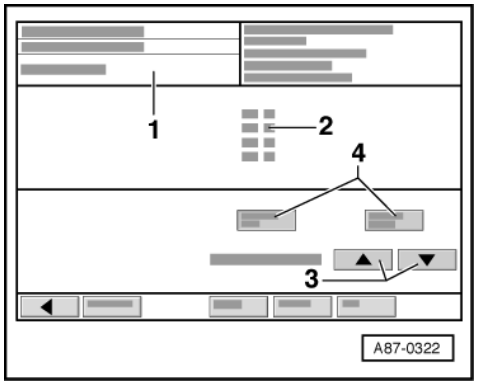
- Interrogate fault memory => Page 9
- Select function "08 - Reading measured value block".



-> Display on VAS 5051:

- The prompt to enter a display group is given in display zone -1-.
- An input keyboard is displayed in display zone -2-.

- Enter the desired display group (e.g. "001" or "01" for "Display group number 001") via the input keyboard in display zone -2- =>List of available display group numbers Page 29 and confirm by pressing the Q key.



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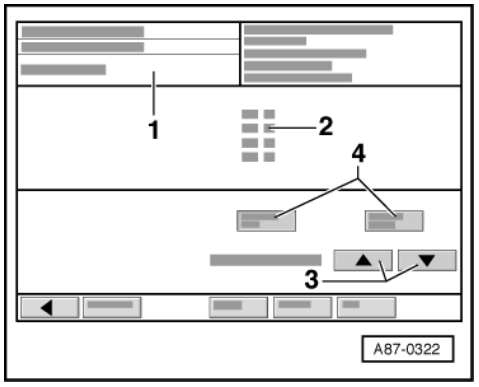
-> Display on VAS 5051:

- The selected display group is displayed in display zone -1-.
- The values of the four display zones are displayed in display zone -2-:
  - The value for display zone "1" is displayed in the first line.
  - The display of the value of the respective display zones appears in the second, third and fourth lines.
  - If a display zone is not assigned, nothing is displayed in this line.

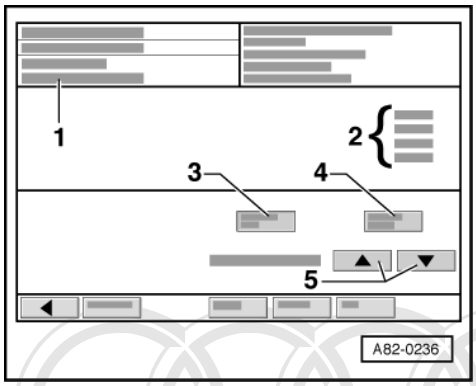


- -> Change to a different display group by pressing the -3- keys.
- Change to a different function (e.g. from "Read measured value block" to "Basic setting" and back again) by pressing the -4- keys.

- Switch on additional heater with =>Page 19 , (only if additional heater function is to be checked).
- Enter the desired display group number =>List of available display group numbers, Page 29

Notes:

- As the additional heater is only switched on in normal operation by the engine control unit, it must be activated with the "Basic setting" function.



- -> If the operation of the additional heater is to be monitored, it can be switched from the "Basic setting" function to the "Read measured value block" function by pressing thekeys -3-, return to the "Basic setting" function is by pressing thekey -4-.
- If there is a fault in the additional heater, the measured value blocks should be read out with the additional heater switched off.

List of available display group numbers

Display group no.	Display zone	Designation	Details on page
001	1-4	Current operating voltage (in V). Current coolant temperature (in °C). Current operating status of additional heater.	30
002	1-4	Power factors of actuated components (-V6, -Q8, -V54 and -V55).	31
003	1-4	Specified cut-off voltage for additional heater. Type of undervoltage cut-off Desired operating status of additional heater. Operating mode set is "heating/ventilation" (intended for a version as auxiliary/additional heater).	31
004	1	Not of significance for the Audi A2 additional heater Provided for the voltage drop detected for an auxiliary heater.	34
	2	Burning time of additional heater	
	3	Operating time of additional heater	
	4	Number of preglow cycles (starting procedures) of additional heater	

Display group no.	Display zone	Designation	Details on page
005	1-4	Conditions under which last fault occurred.	35
006	1-4	Conditions under which last but one fault occurred.	35
007	1-4	Conditions under which third last fault occurred.	35

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Display group no.	Display zone	Designation	Details on page
008	1	Number of switch-offs of the additional heater due to a fault in the burning operation.	35
	2...4	Display zone not used.	

Display group 001

Current operating voltage, current coolant temperature, current operating status

Display zone	Display
1	Current additional heater voltage in Volts. If the value displayed with additional heater off and ignition off is less than the battery nominal voltage: - Check battery (charge and battery condition). - Check wiring between battery and heater (positive and earth) for contact resistance. If value displayed with additional heater on and engine running is less than voltage currently generated by the alternator: - Check wiring between battery and heater (positive and earth) for contact resistance.
2	Current coolant temperature in additional heater in °C.

Display zone	Display
3	Current operating status of additional heater. Off No cut-in signal. Start Heater in starting sequence Part load Heater operating in part load mode (coolant temperature in heater between 69 °C and 77 °C) Full throttle Heater operating in full-load mode (coolant temperature in heater less than 71 °C) Run-on Heater switched off or coolant temperature more than 77 °C (heater control interval) and heater running on. Control interval Heater control interval (coolant temperature had exceeded 77 °C) and is still higher than 73 °C). Ventilation (not provided for on the Audi A2, provided for auxiliary/additional heater) Short to earth on connector to additional heater (auxiliary ventilation operation, output of additional heater switched to earth). Fault The heater was switched off, and a fault has occurred that impairs the operation of the additional heater (=> display groups 005 to 007).

Note on display zone 3:

If the additional heater remains switched on via the "Basic setting" function it remains in full load operation up to a coolant temperature of 115 °C; starting from control interval is possible. The operating time is limited to a maximum of 8 minutes.

Display zone	Display
4	▪ Additional heater Display field not used (additional heater only operates with engine running). Intended for output of -E87 actuating operating and display unit or heater controls for an auxiliary heater.

Notes:

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- The display in display zone 4 is intended for the version as auxiliary heater. The switch status of the output for -E87 actuating operating and display unit / heater controls is displayed. The output remains switched off even during auxiliary heater operation until the coolant temperature has exceeded 30 °C.

- As the "Additional heater" function is only possible with the engine running, the output is not actuated for an auxiliary heater in "Additional heater" mode.

Display group 002

Performance factor of actuated components

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

Notes:

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

Display zone	Display
4	Intended for the signal for actuating the -V55 recirculating pump. ▪ Additional heater without recirculating pump -V55 Ignore display ▪ Additional heater with -V55 recirculating pump Off = recirculating pump not actuated. On = recirculating pump is actuated at maximum voltage.

Notes:

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- The additional heater on the Audi A2 currently has no recirculating pump because the "Additional heater" function is only possible with the engine running.
- If a -V55 recirculating pump is installed and the additional heater is encoded as a version with recirculating heater, the -V55 recirculating pump is switched on during the "Additional heater" function.
- A recirculating pump may be necessary for vehicles with certain engines, if the coolant flow through the additional heater e.g. during engine idling is too low. However, the Audi A2 currently has no recirculating pump installed.

Display group 003

Specified values for undervoltage cut-off, type of undervoltage cut-off, desired operating status of additional heater (and set auxiliary/additional heater mode)

Display zone	Display
1	Voltage value for cut-off due to undervoltage (in V). ▪ Additional heater For coding "00002" or "00012" Voltage specified by manufacturer or entered in "Adaption" function; 9.5 V (or higher, but less than 10.0 V).

Notes:

- If displayed voltage value is not reached for a certain time, this leads to cut-off due to undervoltage .
- On vehicles with additional heater, the voltage value can be modified within the specified limits (=> Page 36). The voltage value entered should not, however, be too high, so as not to jeopardise the heater function..As the additional heateronly operates when the engine is running, the cut-off voltage is of secondary importance.
- The coding "00011" or "00001" applies to the version as auxiliary/additional heater. Given that for the Audi A2 the installation of an auxiliary/additional heater is currently not provided for, this coding must not be used, correct coding to additional heater =>Page 25 . The coding "00011" and "00001" is used e.g. for the Audi A6 and A8.

=> Audi A8 auxiliary/additional heater

=> Audi A6 auxiliary heater

Display zone	Display
2	Type of undervoltage cut-off ▪ Additional heater Manual (The coding "00002" or "00012" is entered)

Notes:

- If the undervoltage cut-off "Automat" is displayed, the additional heater is encoded as an auxiliary/additional heater. Given that for the Audi A2 the installation of an auxiliary/additional heater is currently not provided for, this coding must not be used, correct coding to additional heater =>Page 25 .
- Given that for the Audi A2 the installation of an auxiliary/additional heater is currently not provided for, the coding "00001" or "00011" must not be used. The coding "00011" and "00001" is used e.g. for the Audi A6 and A8.

=> Audi A8 auxiliary/additional heater

=> Audi A6 auxiliary heater

- If the auxiliary/additional heater is coded with "00001" or "00011" the following is valid:
  - If the auxiliary/additional heater is operated as auxiliary heater the automatic undervoltage cut-off is effective.
  - If the auxiliary/additional heater is operated as additional heater the manual undervoltage cut-off is effective.
- Dependent on the last actuated setting "auxiliary heating" or "additional heating" the type of undervoltage cut-off is displayed with coding "00001" or "00011" in display zone "1", the relevant voltage value can be seen in display zone "1".

Display zone	Display
3	Desired operating status of additional heater. ▪ Additional heater Heating Off No cut-in signal from engine control unit (voltage less than 5V, input of engine control unit switched to earth). Additional heating Cut-in signal from engine control unit (voltage at output of additional heater less than 5V, input of engine control unit switched to earth).

Notes:

- The auxiliary heater is activated by the engine control unit (control unit for the diesel direct injection and glow plug system) as soon as certain preconditions are met:

=> Relevant Workshop Manual, Diesel Direct Injection and Glow Plug System

- The following values relating to the additional heater can be read out from the measured value block of the engine control unit for vehicles with diesel engines:
  - Ambient temperature (less than +5 °C, is transmitted by control unit in dash panel insert)

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- Additional heater fuel consumption
- The additional heater is switched on or off ("Econ" mode not switched on and "heat output" requested with air conditioner)
- Refrigerant temperature

=> Relevant Workshop Manual, Diesel Direct Injection and Glow Plug System; Repair group 01

- The additional heater actuation may also be checked at higher ambient temperatures e.g. as follows:

- With the engine cold, spray the ambient temperature sender -G17 with ice spray until the display in the dash panel insert indicates and ambient temperature of less than 0 °C (spray several times as necessary).

=> Heating, Air Conditioning; Repair group 87

- Set the system to maximum on the heater controls or the -E87 operating and display unit Heat output ("Econ" button not pressed, temperature preselector knob at stop "heating" or temperature preselection "Hi").

=> Heating, Air Conditioning; Repair group 87

- Start the engine, in the additional heater display group "003" in the display zone "3" the display changes from "Heating off" to "Additional heating" after 10 seconds.

If the additional heater is not actuated, read out the display group with additional heater shut-off criteria in the engine control unit measured value block.

=> Relevant Workshop Manual, Diesel Direct Injection and Glow Plug System; Repair group 01

- If the operating status "Heater on" is displayed. If the additional heater control unit is encoded as auxiliary heater (Encoding "00011" or "00001").Given that for the Audi A2 the installation of an auxiliary/additional heater is currently not provided for, this coding must not be used, correct coding to additional heater =>Page 25 . The coding "00011" and "00001" is used e.g. for the Audi A6 and A8.

=> Audi A8 auxiliary/additional heater

=> Audi A6 auxiliary heater

- If on additional heaters with a -J162 heater control unit and a software version as of "D50", the additional heater does not begin to operate if contact "3" of the 6-pin connector is connected to earth (additional heater actuation) check the adaption in the -J162 control unit adaption channel "10" and correct it as necessary.

- On control units with software version "D50" or "D51" only the adaption "0" must have been entered.

- On control units as of software version "D50" the adaption "0" or "2" must have been entered.

Display zone	Display
4	Not to be observed on the Audi A2 Provided for switching over between the functions "auxiliary heater" and "auxiliary ventilation" for an auxiliary/additional heater. ▪ Additional heater Display zone not used.

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Notes:

- The "Heating" and "Ventilation" functions are only possible in the auxiliary/additional heater version (the additional heater control unit is encoded as auxiliary heater, encoding "00011" or "00001").Given that for the Audi A2 the installation of an auxiliary/additional heater is currently not provided for, this coding must

not be used, correct coding to additional heater =>Page 25 . The coding "00011" and "00001" is used e.g. for the Audi A6 and A8.

=> Audi A8 auxiliary/additional heater

=> Audi A6 auxiliary heater

- If the "Ventilation" function is displayed, then not merely an incorrect additional heater coding is at hand. In addition, there is a short circuit to earth in the additional heater connector.

Display group 004

Voltage drop determined in basic setting (of no significance for the additional heater),

Burning time, on-time, and preglow cycles

Display zone	Display
1	Disregard on the Audi A2 ▪ Additional heater Ignore display. Provided for the auxiliary/additional heater version for the voltage drop determined during the "Basic setting" function.

Notes:

- The voltage drop is only provided for in the auxiliary/additional heater version (the additional heater control unit is encoded as auxiliary /additional heater, encoding "00011" or "00001"). Given that for the Audi A2 the installation of an auxiliary/additional heater is currently not provided for, this coding must not be used, correct coding to additional heater =>Page 25 . The coding "00011" and "00001" is used e.g. for the Audi A6 and A8.

=> Audi A8 auxiliary/additional heater

=> Audi A6 auxiliary heater

- The voltage drop displayed for the auxiliary heater version is measured during basic setting "Adaption of battery".

=> Audi A8 auxiliary/additional heater

=> Audi A6 auxiliary heater

Display zone	Display
2	Burning time of additional heater in hours. Display: 0 to XXXXX
3	Operating time (switch-on time) of additional heater in hours. Display: 0 to XXXXX
4	Number of preglow cycles (starting procedures) of additional heater Display: 0 to XXXXX

Notes:

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- The values displayed in display zones 2 to 4 refer to the entire usage time of the additional heater. The counter starts at zero when the heating unit is produced and cannot be erased.
- The time during which the burning operation has actually taken place is shown in display zone 2 (additional heater).
- The time during which a switch-on signal (from engine control unit) was present at the control unit of the additional heater is displayed in display zone 3 (additional heater or control interval).

- The number of starting procedures (preglow cycles) of the additional heater is displayed in display zone 4. If no flame is produced during the first starting attempt and the repeat of the start is necessary this is considered as a Preglow cycle (the display is not counted up by one but by two).

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	Code (type of fault and fault location => Page 11) for this fault.
2	With error code "1408" (cut-off due to undervoltage). Coolant temperature in heater when starting additional heater where the fault occurred. If the additional heater is switched on several times within the space of 5 hours, the value from the first start should be used (cold start = least favourable condition). Other fault code Coolant temperature in heater when fault occurred.
3	Operating status when fault occurred.
4	Additional heater voltage when fault occurred.

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Notes on display zones 2 and 4:

- During start-up (first 5 minutes after switching on) undervoltage cut-off only occurs if the voltage drops below 9.5V. (an input voltage value greater than 9.5V is suppressed for the undervoltage cut-off). Therefore, a voltage value may be displayed in display zone 4 that is less than the value appearing in display group 003 in display zone 1.

- If in display zone 1, the fault code "1444" (undervoltage cut-off "Automatic") is displayed, check the coding of the -J162 control unit for additional heater =>Page 25 .
- Given that the additional heater can only be switched on with the engine running, check particularly the wiring connections to the additional heater for contact resistance if error code "1408" is present (cut-off due to undervoltage "Manual").

Display group 008

Number of switch-offs of the additional heater due to a fault in burning operation

Display zone	Display
1	Number of switch-offs due to malfunction in burning operation. Display: "0" to "5" Number of malfunctions since last erasing the fault memory. "0" if the additional heater was locked after 6 malfunctions in a row have occurred in additional heater mode without an OK sequence having taken place (this is stored as a fault in the fault memory).
2	Display zone vacant (disregard display)
3	Display zone vacant (disregard display)
4	Display zone vacant (disregard display)

Notes:

- Number of switch-offs of additional heater due to a fault in the burning operation in display zone "1". The malfunction type is stored in the fault memory. The faults "no flame build-up" or "misfire" are malfunctions during burning operation.

- If no fault is displayed in the display zone "1", interrogate the fault memory.

10 - Adaption of auxiliary/additional heater

10.1 - Adaption of auxiliary/additional heater

The following adaption channels are provided for the auxiliary/additional heater

- Adaption channel "01"

- For adaption of the fixed value of the undervoltage cut-off for coding "00XX2" => Page 36

- Adaption channel "02"

- For adaption (adjustment) of the CO2-content in the additional heater exhaust gas => Page 73

- Adaption channel "10"

- Only for additional heaters with a control unit as of software version "D50"
- For adaption of the additional heater (only if when connecting contact "3" to earth of the additional heater 6-pin connector the heater does not operate and no other fault is present) => Page 40

Notes:

- Perform the "adaption" function in order to:

- Set the CO2 content in the exhaust gas (channel number "02") => Page 73
- To check, enter or alter the value for the manual undervoltage cut-off (cut-off occurs at a fixed voltage value, channel number "01") => Page 36

- The additional heater control unit -J162 allows only the adaption described here. No additional adaption options for the Audi A2 additional heater must be employed (e.g. for the version as auxiliary/additional heater).

=> Audi A8 auxiliary/additional heater

=> Audi A6 auxiliary heater

- On vehicles with additional heater, the voltage value can be modified within the specified limits. However, the voltage value entered should not be too high, so as not to jeopardise the heater function => Page 36

- The cut-off voltage of 9.5V that was set by the manufacturer can be varied within the specified limits.

- As the additional heateronly operates when the engine is running, the cut-off voltage is of secondary importance. No voltage higher than 10.0 Volts should be entered in order not to adversely affect additional heater operation.

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

- Connect the vehicle diagnostic, testing and information system VAS 5051 to the vehicle's 16-pin diagnostic socket using the diagnostic cable VAS 5051/1, with ignition switched off and select the control unit of the additional heater -J162 => Page 5 using "address word" 18.

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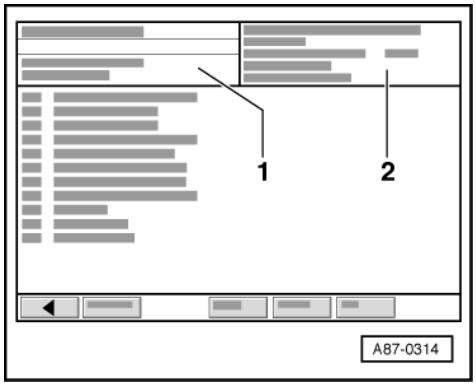
Requirements

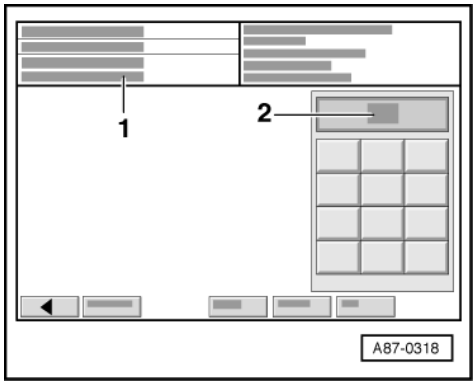


- Battery is fully charged.
- "02" or "12" for the coding "00002" or "00012"is displayed in display zone -2- (correct if necessary =>Page 25)

-> Display on VAS 5051:

- Interrogate the fault memory =>Page 9 and eliminate any faults displayed.

- Check the additional heater coding and correct if necessary =>Page 25
- Erase the fault memory if necessary =>Page 23



- Select function "10 - Adaption".

-> Display on VAS 5051:

- The prompt to enter a channel number is given in display zone -1-.
- An input keyboard is displayed in display zone -2-.

- Enter "01" for "Channel 1" using the input keyboard in display zone -2- and confirm entry with "Q key".

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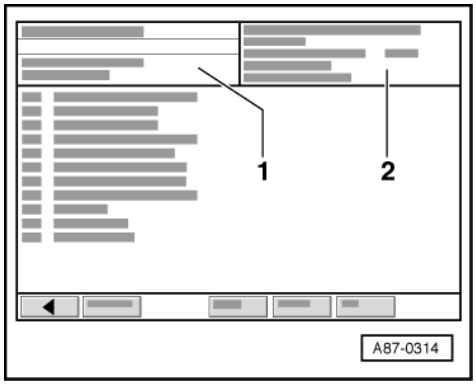
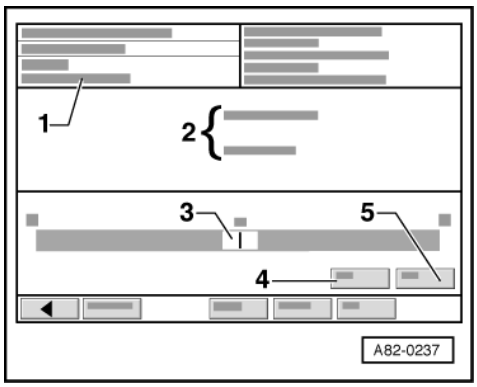


Note:

- -> If the message "Function unknown or cannot be executed at present" appears in display zone -1- this may have the following cause:

- The additional heater was switched on and is currently in "run-on" operating status.
- A fault is stored in the auxiliary heater which does not permit switching on.



-> Display on VAS 5051:

- The message "Read and test channel 1" appears in display zone -1-.
- "Undervoltage cut-off" appears in area -2-.
- A scroll bar appears in area -3- with the encoded value of the currently valid voltage cut-off setting (e.g. "00" = adjustment at the factory).

Display in display zone -3-	Assignment of cut-off voltages
00	9.5 V
02	9.65 V
05	9.85 V
07	10.0 V
10	10.20 V

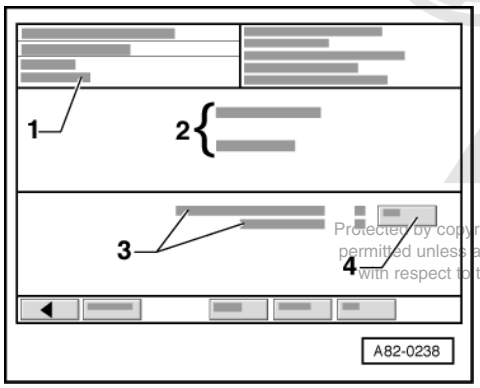
- The cut-off voltage may be changed using the scroll bar -3-.

- "New value" and the newly adjusted cut-off voltage is displayed in Volts in area -2-.

Note:

After pressing key -4- the desired cut-off voltage may also be entered directly via the keyboard => Page 39

- Adjust the cut-off voltage to lower than 10.0 Volts (e.g. 9.5 Volts).
- Save your entry by pressing the key -5-.



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-> Display on VAS 5051:
- The message "Save channel 1" appears in display zone -1-.
- "New value" and the appropriate newly valid cut-off voltage is displayed in Volts in area -2-.
- The original and the new value for the cut-off voltage are displayed encoded in area -3-.

- Accept and save your entry by pressing the key -4-.

- The message "Save channel 1, value 1 saved" appears in display zone -1-.

Notes:
- By pressing the ← key you will return to the selection program.

Display in display zone -3-	Assignment of cut-off voltages
00	9.5 V
02	9.65 V
05	9.85 V
07	10.0 V
10	10.20 V

Notes:
- The adaption value that is entered can be between "00" and "45".
- The actual cut-off voltage may deviate slightly from the value in the table due to conversion factors.
- On vehicles with additional heater, the voltage value can be modified within the specified limits. The voltage value entered should not, however, be too high, so as not to jeopardise the heater function. As the additional heateronly operates when the engine is running, the cut-off voltage is of secondary importance.

Audi
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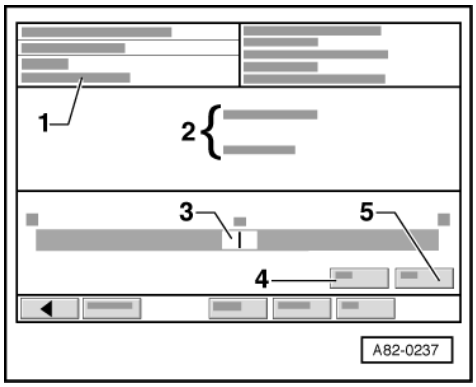
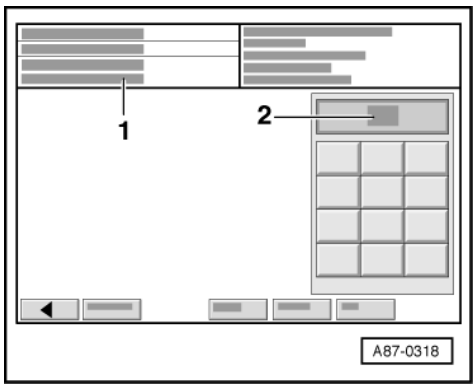


- The current value for the undervoltage cut-off can be read in the function "Read measured value block, display group 003"=>Page 27

Enter cut-off voltage via keypad

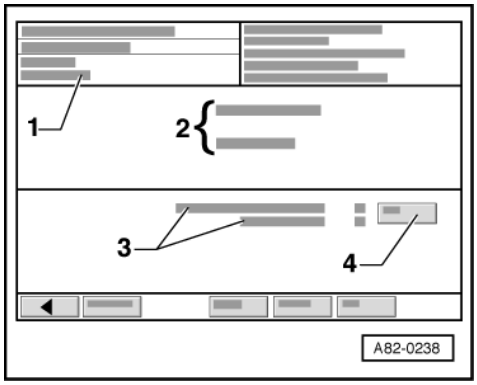
-> Display on VAS 5051:
- Press the -4- key.



-> Display on VAS 5051:

- The message "Enter adaption value" appears in display zone -1-. 0...XXXXX".
- An input keyboard is displayed in display zone -2-.

- Enter the desired cut-off voltage value (e.g."00") in display zone -2- using the input keyboard and confirm entry with "Q key".



-> Display on VAS 5051:

- The message "Save channel 1" appears in display zone -1-.
- "New value" and the appropriate newly valid cut-off voltage is displayed in Volts in area -2-.
- The original and the new value for the cut-off voltage appear encoded in area -3-.

- Accept and save your entry by pressing the key -4-.

- The message "Save channel 1, value 1 saved" appears in display zone -1-.

Note:

By pressing the ← key you will return to the selection program.

10.3 - Performing adaption (adaption channel "10", actuation as additional heater)

Notes:

- Adaption of the additional heater actuation is only possible for additional heaters with software version starting from "D50" (introduced as running change in model year 2001).
- For additional heaters with a control unit as of software version "D52" which have been modified as an auxiliary heater, the recirculating pump actuation may be changed by means of adaption.

Requirements

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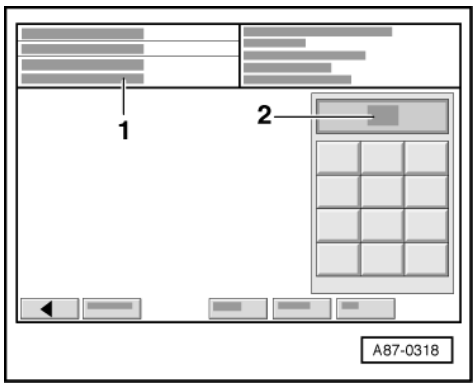
- Battery is fully charged.
- "02" or "12" for the coding "00002" or "00012"is displayed in display zone -2- (correct if necessary =>Page 25)

-> Display on VAS 5051:

- Interrogate the fault memory =>Page 9 and eliminate any faults displayed.

- Check the additional heater coding and correct if necessary =>Page 25 .

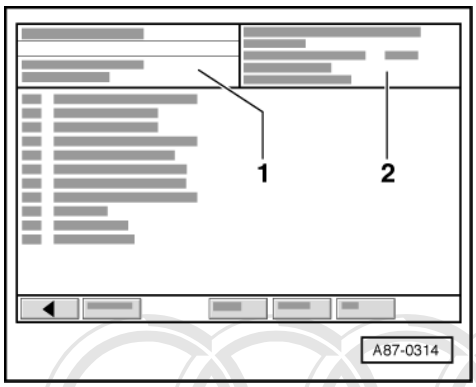


- Erase the fault memory if necessary =>Page 23 .
- Select function "10 - Adaption".

-> Display on VAS 5051:

- The prompt to enter a channel number is given in display zone -1-.
- An input keyboard is displayed in display zone -2-.

- Enter "10" for "Channel 10" using the input keyboard in display zone -2- and confirm entry with "Q key".



Note:

- -> If the message "Function unknown or cannot be executed at present" appears in display zone -1- this may have the following cause:

- The additional heater was switched on and is currently in "run-on" operating status.
- A fault is stored in the additional heater which does not permit adaption.

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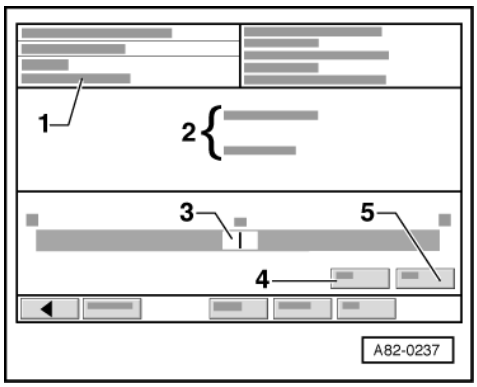


-> Display on VAS 5051:

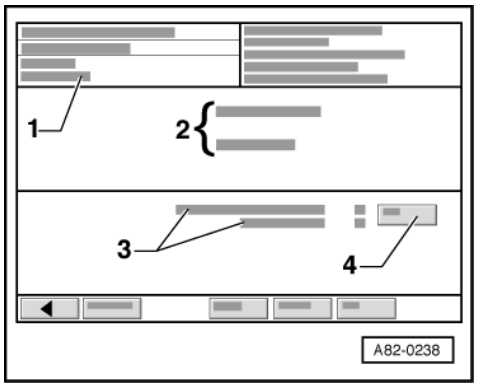
- The message "Read and test channel 10" appears in display zone -1-.
- A scroll bar appears in area -3- with the encoded value of the currently valid voltage cut-off setting (e.g. "00" = factory setting).

Note:

After pressing key -4- the desired cut-off voltage may also be entered directly via the keyboard.

- Enter the adaption value provided for this vehicle:

  Adaption value for a control unit with software version "D50" and "D51" =>Page 43
  Adaption value for a control unit with software version "D52" =>Page 43



-> Display on VAS 5051:

- The message "Save channel 1" appears in display zone -1-.
- "New value" and the appropriate newly valid adaption is displayed in area -2-.
- The original and the new value for the adaption appear in area -3-.

- Accept and save your entry by pressing the key -4-.

- The message "Save channel 10, value "XX" saved" appears in display zone -1-.

Notes:

- By pressing the ← key you will return to the selection program.

- If necessary, check the additional heater function.

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Adaption value in the adaption channel for a control unit with software version "D50" and "D51"

Adaption value (Input value)	Intended for vehicles with	Significance
0 (00000)	- This adaption value is intended for vehicles with diesel engine Adaption for vehicles with diesel engine at the factory	- The auxiliary heater operates as an additional heater, as soon as contact "3" of the 6-pin connector is connected to earth.
1 (00001)	- This adaption value is currently not assigned	- The auxiliary heater recirculating pump begins to operate, as soon as contact "3" of the 6-pin connector is connected to earth. The additional heater does not begin to operate with this adaption.

Notes:

- Contact "3" of the 6-pin connector on the additional heater is connected to the engine control unit on vehicles with diesel engines.

=> Relevant Workshop Manual, Diesel Direct Injection and Glow Plug System; Repair group 01

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

- On additional heaters with a control unit with software version "D50" or "D51" only the adaption "0" or "1" is provided for in adaption channel "10".

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

Adaption value (Input value)	Intended for vehicles with	Significance
0 (00000)	- This adaption value is currently not assigned The adaption value is equivalent to the adaption value "2" upon actuation of the additional heater	- The additional heater begins to operate, as soon as contact "3" of the 6-pin connector on the additional heater is connected to earth. If the additional heater is switched on as an auxiliary heater (possible only after retrofitting a recirculating pump), the displacement of the additional heater recirculating pump is not controlled for auxiliary heater operation.
1 (00001)	- This adaption value is currently not assigned	- The recirculating pump of an additional heater retrofitted to function as an auxiliary heater begins to operate, as soon as contact "3" of the 6-pin connector is connected to earth. - If an additional heater retrofitted to function as an auxiliary heater is switched on, there is no control of the recirculating pump displacement in auxiliary heater operation. The additional heater does not begin to operate with this adaption.

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Adaption value (Input value)	Intended for vehicles with	Significance
2 (00002)	- This adaption value is intended for vehicles with diesel engine Adaption for vehicles with diesel engine at the factory	- The additional heater begins to operate, as soon as contact "3" of the 6-pin connector on the auxiliary heater is connected to earth. If the additional heater is switched on as an auxiliary heater (possible only after retrofitting a recirculating pump), the additional heater control unit controls the displacement of the -V55 recirculating pump depending on the coolant temperature in the additional heater (the -V55 is clocked).
3 (00003)	- This adaption value is currently not assigned	- The recirculating pump of an additional heater retrofitted to function as an auxiliary heater begins to operate, as soon as contact "3" of the 6-pin connector is connected to earth. - If the additional heater is switched on as an auxiliary heater, the additional heater control unit controls the displacement of the -V55 recirculating pump in auxiliary heater operation depending on the coolant temperature in the additional heater (the -V55 is clocked). The additional heater does not begin to operate with this adaption.

Adaption value (Input value)	Intended for vehicles with	Significance
4 (00004)	- This adaption value is currently not assigned	- Equivalent to adaption "2" with the following deviation The -V55 recirculating pump is actuated in auxiliary heater operation with cold coolant for at least 35% of the time (instead of 25% with adaption "2").
5 (00005)	- This adaption value is currently not assigned	- Equivalent to adaption "3" with the following deviation The -V55 recirculating pump is actuated in auxiliary heater operation with cold coolant for at least 35% of the time (instead of 25% for the adaption "3").

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Notes:

- Contact "3" of the 6-pin connector on the auxiliary heater is connected to the engine control unit on vehicles with diesel engines.

=> Relevant Workshop Manual, Diesel Direct Injection and Glow Plug System; Repair group 01

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

- On additional heaters with a control unit as of software version "D52" only the adaption "0" or "5" can be entered in adaption channel "10". However, the adaptions "0", "1", "3", "4" and "5" are currently not provided for. From the factory, the adaption "2" is entered for the vehicle version.

11 - Electrical check of additional heater

11.1 - Electrical check of additional heater

Required measuring and testing equipment:

- Vehicle diagnostic, testing and information system VAS 5051 with test leads VAS 5051/7, the DOS measuring cable VAS 5051/8, 50A current probe VAS 5051/9
- Voltage tester V.A.G 1527 B
- Measuring tool set V.A.G 1594 A

Test requirements

- All fuses OK in accordance with current flow diagram.
- Battery -A is sufficiently charged.
- The fault memory was interrogated =>Page 9 and any displayed faults rectified.

Check additional heater actuation and electrical connections

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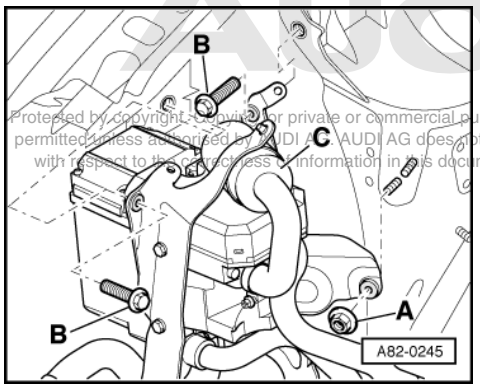
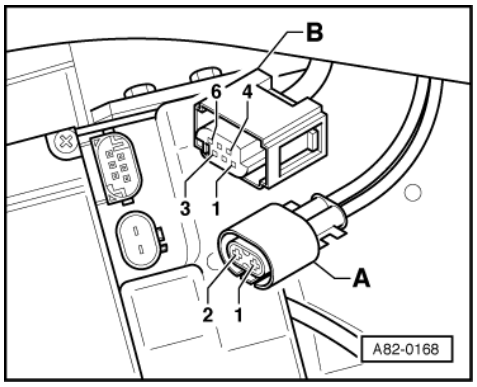


- Switch ignition off.
- Remove the engine air intake pipe if necessary.

=> Relevant Workshop Manual, Engine, Mechanical Components

- -> Remove the additional heater from the vehicle by removing the hexagon nut -A- and the bolts -B-.
- Remove the intake silencer -C-.
- Carefully pull the additional heater towards the engine.



- -> Detach connectors -A- and -B- from the heater unit.

List of electrical tests

Test step	Component tested	Page
1	Power supply and earth connection To additional heater	46
2	Actuation of additional heater By engine control unit	47
3	Connection from additional heater To metering pump -V54	47
4	Connections not connected on the additional heater (provided for the auxiliary/additional heater version) Input for actuation as auxiliary heater Output for actuating operating and display unit -E87 or heater controls Input for switching over to auxiliary ventilation	48

Test step 1

Power supply and earth connection

VAS 5051, Measurement technique mode: Multimeter, voltage measurement (20V =)					
Test step	Heater connection	Testing of	▪ Test conditions - Additional operations	Specified value	Remedies if specified value not attained
1.1	Connector A, contact 1 and connector A, contact 2	Terminal 30 and earth connection at -J162	▪ Ignition switched off.	- Approx. battery voltage	- Use current flow diagram to check and repair power supply and earth connection.

Notes:

- Depending on the last operating condition and the coolant temperature in the additional heater, the current consumption of the additional heater at rest may amount to a maximum of 60 mA for a period of 5 hours after switching off. In this period of time, the coolant cooldown is calculated by the -J162 control module for the time after switching off.
- The -J162 additional heater control unit at-rest current consumption is smaller than 2 mA after a maximum of 5 hours have elapsed.

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Test step 2

Actuation of additional heater

Voltage tester V.A.G 1527					
Test step	Heater connection	Testing of	▪ Test conditions - Additional operations	Specified value	Remedies if specified value not attained
2.1	Connector B, contact 3 and connector A, contact 1	-J162 actuation by engine control unit.	▪ Ignition on. ▪ Engine does not run Select final control diagnosis for engine and select control element "Additional heater". => Relevant Workshop Manual Diesel Direct Injection and Preglow System	▪ Diode in voltage tester not lit. ▪ LED in voltage tester lights up.	- Use current flow diagram to check wiring and rectify short circuit. Use current flow diagram to check and repair wiring. Check engine control unit. => Relevant Workshop Manual Diesel Direct Injection and Preglow System

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Notes:

- Contact 3 of the 6-pin connector on the additional heater is connected to the engine control unit on vehicles with diesel engines.

=> Relevant Workshop Manual, Diesel Direct Injection and Glow Plug System; Repair group 01

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

- If in "diesel" type additional heaters, contact 3 in connector B is connected to earth, the additional heater is switched on.
- If the additional heater does not switch on for vehicles with diesel engine, check the adaption in adaption channel "10" => Page 36

Test step 3

Connection from additional heater to the metering pump

VAS 5051, Measurement technique mode: Multimeter, resistance measurement (200 ω)					
Test step	Heater connection	Testing of	▪ Test conditions - Additional operations	Specified value	Remedies if specified value not attained
3.1	Connector B, contact 6 and connector A, contact 2	Wiring to metering pump -V54	▪ Ignition switched off.	- Less than 3 and greater than 20 ω).	- Use current flow diagram to check and repair wiring. Replace metering pump

Notes:

- Contact 6 of plug B is also connected to the engine control unit on vehicles with diesel engines. Engine control unit uses clock signal to metering pump to incorporate fuel consumption of additional heater into consumption signal when engine is running.

=> Relevant Workshop Manual, Diesel Direct Injection and Preglow System

- Internal resistance of metering pump is 4.1 ω+/- 0.2ω

Test step 4

Connections not connected on the additional heater (provided for the auxiliary/additional heater version)

VAS 5051, Measurement technique mode: Multimeter, voltage measurement (20 V =)					
Test step	**Heater connection**	**Testing of**	**▪ Test conditions - Additional operations**	**Specified value**	**Remedies if specified value not attained**
4.1	Connector B, contact 1 and connector A, contact 2	Actuation of -J162 as an auxiliary heater (not provided for in the Audi A2)	▪ Ignition on.	- Less than 2 V	- Use current flow diagram to check wiring and rectify short circuit.

Note:

For auxiliary/additional heater, the function "auxiliary heater" is switched on and off via this input (e.g. by a preselector).

=> Audi A8 auxiliary/additional heater

=> Audi A6 auxiliary heater

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Voltage tester V.A.G 1527					
Test step	**Heater connection**	**Testing of**	**▪ Test conditions - Additional operations**	**Specified value**	**Remedies if specified value not attained**
4.2	Connector B, contact 5 and connector A, contact 1	- Output to the switch for auxiliary ventilation operation of the auxiliary heater (not provided for in the Audi A2)	▪ Ignition switched off.	▪ Diode in voltage tester not lit.	- Use current flow diagram to check wiring and rectify short circuit.

Note:

If contact 5 of connector B is connected to earth, the auxiliary/additional heater is not switched on as auxiliary heater once voltage is applied to contact 1 of connector B, only the output to the actuation of the -E87 operating and display unit / the heater controls is switched on (auxiliary ventilation).

=> Audi A8 auxiliary/additional heater

=> Audi A6 auxiliary heater

VAS 5051, Measurement technique mode: Multimeter, current measurement (10 A =)					
Test step	**Heater connection**	**Testing of**	**▪ Test conditions - Additional operations**	**Specified value**	**Remedies if specified value not attained**
4.3	Connector B, contact 4 and connector A, contact 1	Output for actuating -E87 operating and display unit / heater controls (not provided for on the Audi A2).	▪ Ignition switched off.	- Less than 50 mA	- Use current flow diagram to check wiring and rectify short circuit.

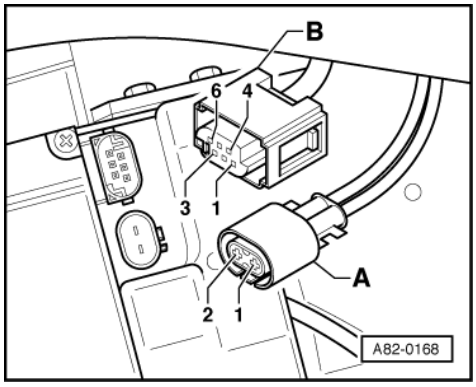
Note:

Using this output, the -E87 operating and display unit / heater controls is actuated for an auxiliary / additional heater as soon as the specified coolant temperature in the auxiliary / additional heater is reached while in the auxiliary heater operation, or at all times if in auxiliary ventilation operation.

=> Audi A8 auxiliary/additional heater

=> Audi A6 auxiliary heater

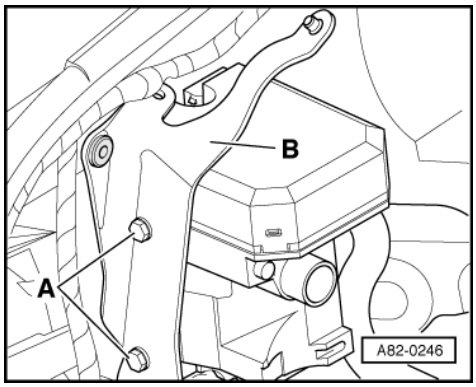
Checking additional heater components



- Switch ignition off.
- Remove the engine air intake pipe if necessary.

=> Relevant Engine Workshop Manual, Mechanical Components

- Detach the additional heater from the vehicle =>Page 45
- -> Detach connectors -A- and -B- from the heater unit.



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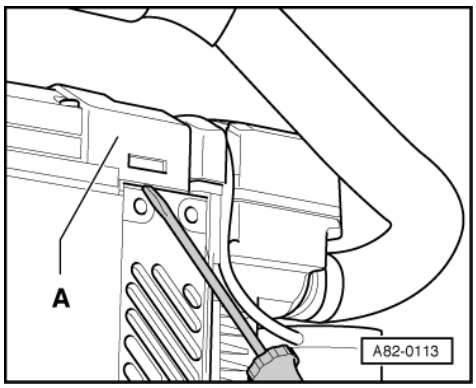
- -> Detach the bracket from the additional heater by removing bolts -A- and -B-.

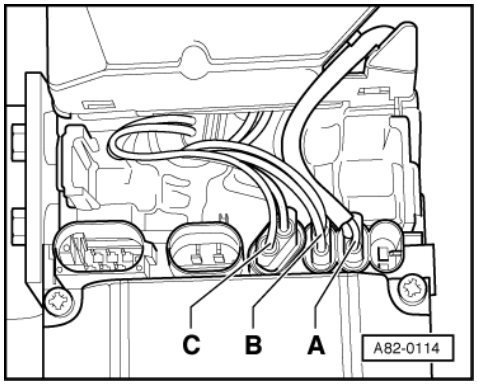


- -> Lever off the cover -A- using a screwdriver.

List of electrical tests

Test step	Component tested	Page
1	Glow plug with flame detector -Q8	50
2	Combustion air blower -V6	50
3	Recirculating pump -V55 (not installed in the Audi A2 at present)	51

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



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

Specified value:

∞ω

- Measure the resistance between contacts "1" and "2" on connector -C-

Specified value:

Less than 1 ω

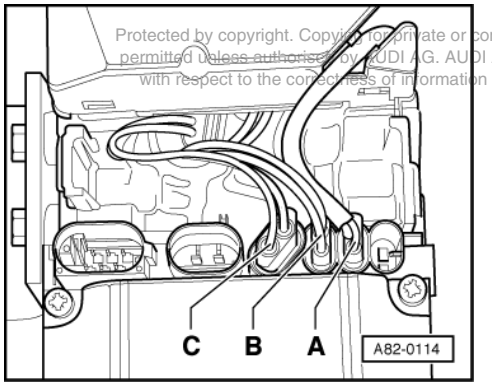
Rated value:

0.236 ω +/- 0.033 ω(at 25 °C)

Notes:

- Resistances of less than 1 ωcan no longer be measured with the required degree of accuracy using workshop equipment. This test therefore only permits detection of serious component damage.
- The heater control unit -J162 detects whether or not a flame has formed in the heater using the characteristic resistance curve of -Q8.
- If a voltage of 9 V is applied to the glow plug with flame detector, the current input is between 9 and 12 A.

Test step 2 (combustion air blower -V6)



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

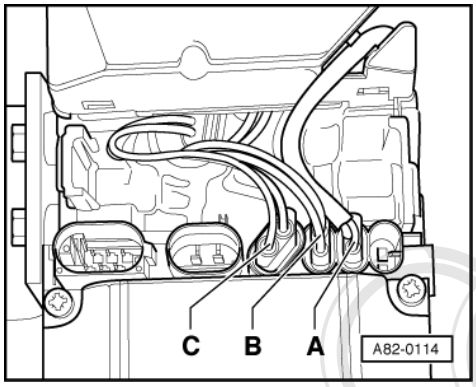
Specified value:

∞ω

Notes:

- If a voltage of 12 V is applied to the combustion air blower -V6 the current input is between 2 and 3 A.
- The combustion air blower -V6 internal impedance is between 3 and 6ω (40 ω if the combustion air blower has not been running for some time) Since resistances of less than 10ωcan no longer be measured with the required degree of accuracy using workshop equipment, internal impedance testing can only be used to detect serious component damage.

Test step 3 (recirculating pump -V55)



Note:

The Audi A2 currently uses no recirculating pump.

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

Specified value:

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∞ω

Notes:

- If a voltage of 12 V is applied to the recirculating pump -V55 the current input is between 1 and 1.5 A.
- Internal impedance cannot be measured at the recirculating pump -V55 (this is prevented by the electronics in the recirculating pump).

12 - Additional heater functional sequence

12.1 - Additional heater functional sequence

Notes:

- The additional heater is cut in by the engine control unit and can be switched off by pressing the "Econ" button on the -E87 AC operating and display unit or on the heater controls, if additional heating output is not desired.
- A -V55 recirculating pump is currently not installed, given that the additional heater can only be switched on with the engine running.

- Depending on the amount of heat generated by the engine, supplied by the AC heat exchangers, and generated by the heater, the heater unit may remain in the full load, part load or control interval operating statuses for a lengthy period => Page 58 .
- As the additional heater only operates when the engine is running, it is scarcely perceptible in heating mode. Run-on of the heater can be heard if the engine is switched off, if it was operating when the engine was switched off.
- The temperature sensor (for the coolant temperature in the heater) is permanently installed (in the heater control unit -J162) and can neither be checked nor removed.
- The glow plug with flame detector -Q8 is actuated with a regulated voltage to prevent overheating.
- To ensure that combustion in the heater is always in the optimum range, the metering pump -V54 (clock frequency) and combustion air blower -V6 (voltage) are regulated over the entire sequence.
- The temperatures given in the functional sequence and function chart are approximate.
- Contact 3 of the 6-pin connector on the additional heater is connected to the engine control unit on vehicles with diesel engines.

=> Relevant Workshop Manual, Diesel Direct Injection and Glow Plug System; Repair group 01

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

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- If in "diesel" type additional heaters, contact 3 in connector B is connected to earth, the additional heater is switched on.
- If the additional heater does not switch on for vehicles with diesel engine, check the adaption in adaption channel "10" for additional heaters with a control unit as of software version "D50"=> Page 36
- If the heater has been locked due to a malfunction (e.g. misfire or overheating) (completely switched off) it cannot be switched on again until the fault memory has been read out and the content of the fault memory erased.
- If the heater is to be switched off during the start procedure, the instantaneous position reached in the start sequence governs whether the heater is switched off immediately or whether run-on is necessary(burning off, cooling down).
- The heater switches to control interval if the coolant temperature exceeds 77 °C before reaching full-load mode (e.g. withahot engine).
- Various additional heater functions are monitored constantly during operation (the additional heater is switched off if a fault occurs):

- Cut-off due to undervoltage if supply voltage drops below specified cut-off voltage (e.g. due to a transition resistance in the power supply)

-Cut-off due to overvoltage if the supply voltage is greater than 15.5 V for longer than 6 seconds.

-Cut-off due to loss of flame if resistance of -Q8 glow plug with flame detector drops below specified value (e.g. loss of flame due to fault in fuel supply).

- Cut-off due to overheating if coolant temperature in heater exceeds 125 °C (e.g. due to lack of coolant, due to a fault in the coolant circuit).

- The -J162 additional heater control unit also has the auxiliary heater and auxiliary ventilation modes stored. However, an actuation is not provided for on the Audi A2 (no recirculating pump is installed and the required connections are not present).

=> Audi A8 auxiliary/additional heater

=> Audi A6 auxiliary heater

Prerequisites for the sequence described on the following pages (when switching on heater):

Coolant circuit is bled and coolant temperature is less than 20 °C.
Battery -A is sufficiently charged.
Sufficient fuel in tank.
No faults stored in heater fault memory.
Engine running (heater with no recirculating pump -V55, additional heater).

Notes:

- Only the main items in the function sequence are presented on the following pages. Sequences taking place in the background are marked with a "-"and perceptible sequences (which can be heard or measured with. "**.**"

- As the additional heater is only switched on at outside temperatures of less than +6 °C, Using the vehicle diagnostic, testing and information system VAS 5051 ("Basic setting" function), the additional heater may also be switched on at higher ambient temperatures. This, however, results in deviations for e.g. the various additional heater switching temperatures.

No.	Control sequence	Possible cause of deviation	Continuation of sequence following deviation
1	Switch-on signal		
	Additional heater ▪ From engine control unit (from VAS 5051)		
2	Initiation of start procedure		
	- Interrogation of fault memory Interrogation of heater voltage Monitoring of all electrical components and input signals. Interrogation of glow plug with flame detector -Q8 Interrogation of coolant temperature in heater (less than 77 °C)	- Fault interlock entered Voltage is or becomes lower than specified cut-off voltage Fault detected Resistance of glow plug with flame detector -Q8 outside specified range. Coolant temperature (higher than 77 °C)	- Termination of starting procedure/fault/off Termination of starting procedure (entry in fault memory)/fault/off see above see above Switchover to control interval (No. 7)

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Note:

If the additional heater remains switched on via the "Basic setting" function it remains in full load operation up to a coolant temperature of 115 °C, starting from control interval is possible. The operating time is limited to a maximum of 8 minutes.

No.	Control sequence	Possible cause of deviation	Continuation of sequence following deviation
3	Start		
	- Monitoring as for No. 2	=>No. 2	=>No. 2
	▪ -V55 recirculating pump on (for auxiliary heater only if installed). ▪ Actuation of -Q8 (controlled) ▪ Actuation of combustion air blower -V6 (controlled) ▪ Actuation of metering pump -V54 (controlled)		
Continued on next page			

Note:

The "starting" sequence is described on Pages 56 .

No.	Control sequence	Possible cause of deviation	Continuation of sequence following deviation
3	Starting (continued)		
	Stabilisation time ▪ Start of full-load combustion ▪ Switching of -Q8 from glow plug to flame detector Interrogation of resistance of -Q8 (remains hot)	Resistance of glow plug with flame detector -Q8 outside specified range. Resistance of glow plug with flame detector -Q8 still outside specified range after repeated starting.	Termination of starting procedure (1x repeated starting) =>No. 2 Termination of starting procedure (entry in fault memory)/fault/off
Continued on next page			

Note:

The "starting" sequence is described on Pages 56 .

No.	Control sequence	Possible cause of deviation	Continuation of sequence following deviation
4	Full load combustion (maximum heat output)		
	- Monitoring as for No. 2	=>No. 2	=>No. 2
	- Voltage at heater remains greater than required No interruption of combustion Coolant temperature increases and reaches 71 °C	- Voltage becomes lower than specified cut-off voltage Flame goes out Coolant temperature less than 71 °C	- Burn-off (entry in fault memory)/ fault/off Burn-off and re-start =>No. 2 Heater remains in full-load operation until switched off
Continued on next page			

Note:

The "full load and part load" sequence is described on Pages 56 .

No.	Control sequence	Possible cause of deviation	Continuation of sequence following deviation
5	Part load combustion (approx. 50% of heat output)		
	- Monitoring as for No. 4	=>No. 4	=>No. 4
	▪ Actuation of metering pump -V54 with reduced clock frequency ▪ Actuation of combustion air blower -V6 with reduced voltage Coolant temperature increases and reaches 77 °C	- Coolant temperature remains between 69 and 77 °C Coolant temperature drops below 69 °C	- Heater remains in part load operation until switched off Heater switches from part load to full load operation =>No. 4
Continued on next page			

Note:

The "full load and part load" sequence is described on Pages 56 .

No.	Control sequence	Possible cause of deviation	Continuation of sequence following deviation
6	Burn-off/run-on		
	- Monitoring as for No. 2	=>No. 2	=>No. 2
	▪ Metering pump -V54 off ▪ Actuation of combustion air blower -V6 with regulated voltage ▪ Actuation of -Q8 (post-heating, regulated) ▪ Actuation of -Q8 off Interrogation of resistance of -Q8 (becomes colder)	Resistance of glow plug with flame detector -Q8 outside specified range	Burn-off (entry in fault memory)/ fault/off
Continued on next page			

Note:

The "burn-off/run-on/" sequence is described on Page 57.

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No.	Control sequence	Possible cause of deviation	Continuation of sequence following deviation
7	Control interval		
	- Monitoring as for No. 2	=>No. 2	=>No. 2
	- Coolant temperature drops below 73 °C	- Coolant temperature continues to increase (engine runs and heats up coolant) Coolant temperature remains between 73 and 77 °C Coolant temperature drops below 125 °C	- Heater remains in control interval until switched off Fault (entry in fault memory)/off/ fault interlock
Continued on next page			

No.	Control sequence	Possible cause of deviation	Continuation of sequence following deviation
8	Start from control interval		
	- Monitoring as for No. 2	=>No. 2	=>No. 2
	▪ Actuation of -Q8 (controlled) ▪ Actuation of combustion air blower -V6 (controlled) ▪ Actuation of metering pump -V54 (controlled)		
	Stabilisation time ▪ Start of full load or part load combustion (depending on coolant temperature) ▪ Switching of -Q8 from glow plug to flame detector Interrogation of resistance of -Q8 (remains hot)	Resistance of glow plug with flame detector -Q8 outside specified range. Resistance of glow plug with flame detector -Q8 still outside specified range after repeated starting.	Termination of starting procedure (1x repeated starting) =>No. 2 Termination of starting procedure (entry in fault memory)/fault/off
Continued on next page			

Audi
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Note:

Starting from control interval takes place as described on Page 56 but because the heater is at operating temperature, the times for the various sequences differ from those for a fresh start (e.g. preheating 20 instead of 40 seconds, fuel supply 30 instead of 56 seconds).

No.	Control sequence	Possible cause of deviation	Continuation of sequence following deviation
9	Switch off		
	Additional heater ▪ No further signal from engine control unit (from fault reader)		
Continued on next page			

Notes:

- If heater is in control interval when switched off, it cuts out without burn-off and run-on.
- The "burn-off/run-on/" sequence is described on Page 57 .

No.	Control sequence	Possible cause of deviation	Continuation of sequence following deviation
10	Burn-off		
	- Monitoring as for No. 2	=>No. 2	=>No. 2

No.	Control sequence	Possible cause of deviation	Continuation of sequence following deviation
	▪ Metering pump -V54 off ▪ Recirculating pump -V55 off ▪ Actuation of combustion air blower -V6 with regulated voltage ▪ Actuation of -Q8 (post-heating, regulated) ▪ Actuation of -Q8 off Interrogation of resistance of -Q8 (becomes colder) ▪ Off	Resistance of glow plug with flame detector -Q8 outside specified range.	Burn-off (entry in fault memory)/ fault/off

"Heater starting" sequence

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Sequence	Duration approx.	Actuation			Resistance measurement
		-V6 with	-V54 with	-Q8 with	-Q8
- Commence starting sequence	-	0 V	0 Hz	0 V	no
- Flame detector interrogation	1 second	8 V	0 Hz	0 V	yes
▪ Preheating	40 seconds	8 V	0 Hz	10 V	no
▪ Fuel pre-supply	3 seconds	0 V	2 Hz	9 V	no
▪ Fuel supply	56 seconds	2 to 5 V	1 Hz	9 V	no
- Stabilisation time	15 seconds	5 V	1 Hz	9 V	no
▪ Fuel supply	50 seconds	4 to 12 V	1 to 3 Hz	9 V	no
- Flame detector interrogation	45 seconds	12 V	3 Hz	0 V	yes
- End of starting sequence Start of "full load" combustion (=>Page 56)					

Notes:

- 1 Hertz (Hz) corresponds to 1 pulse per second
- The voltages, times and frequencies given in the table are approximate values regulated by the control unit on the basis of measured values (voltage, temperature, etc.).

"Heater full load/partial load combustion" sequence

Sequence	Duration approx.	Actuation			Resistance measurement
		-V6 with	-V54 with	-Q8 with	-Q8
- End of starting sequence	-	12 V	3 Hz	0 V	yes
- Full load combustion	Until coolant temperature in heater reaches 71 °C)	12 V	3 Hz	0 V	yes
▪ Switching from full load to part load operation	5 seconds	from 12 V to 7 V	from 3 Hz to 1.5 Hz	0 V	yes
▪ Part load combustion	Until coolant temperature in heater drops below 69 °C or reaches 77 °C	7 V	1.5 Hz	0 V	yes
Continued on next page					

Sequence	Duration approx.	Actuation			Resistance measurement
		-V6 with	-V54 with	-Q8 with	-Q8
▪ Switching from part load to full load operation (if coolant temperature drops below 69 °C Full load combustion =>Page 56	Up to 50 sec.	from 7 V to 12 V	from 1.5 Hz to 3 Hz	0 V	yes
- Switching from part load operation to control interval (if coolant temperature drops below 77 °C ▪ Burn-off/run-on (=>Page 57)	-	7 V	1.5 Hz	0 V	yes

Notes:

- 1 Hertz (Hz) corresponds to 1 pulse per second
- The voltages, times and frequencies given in the table are approximate values regulated by the control unit on the basis of measured values (voltage, temperature, etc.).

"Burn-off, run-on" sequence

Sequence	Duration approx.	Actuation			Resistance measurement
		-V6 with	-V54 with	-Q8 with	-Q8
- Switching from partial load operation to control interval Switch-off of heater during full load or partial load operation Starting procedure terminated because of fault	-	7 or 12 V	1.5 or 3 Hz	0 V	yes
▪ Burn-off (of heater)	15 to 60 sec.	4 to 12 V	0 Hz	6 to 8 V	no
▪ Cooling down (of heater)	0 to 120 sec.	8 to 12 V	0 Hz	0 V	no
▪ Switching to control interval ▪ OFF	-	0 V	0 Hz	0 V	no

Notes:

- 1 Hertz (Hz) corresponds to 1 pulse per second
- The voltages, times and frequencies given in the table are approximate values regulated by the control unit on the basis of measured values (voltage, temperature, etc.) and the last operating status.

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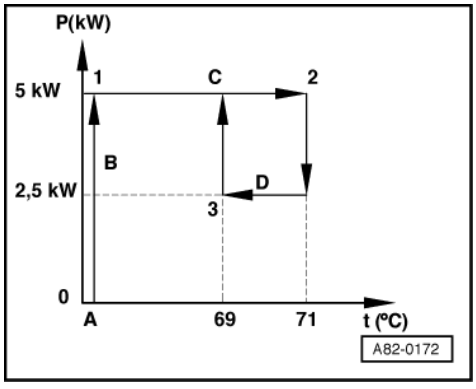
12.2 - Heat output requirement between 50 and 100%



-> P (kW) = Heat output in kilowatts

t (°C) = Temperature of coolant in heater

A = Commence starting procedure (coolant temperature in heater must be less than 73 °C)

B = Starting procedure

C = Full load operation

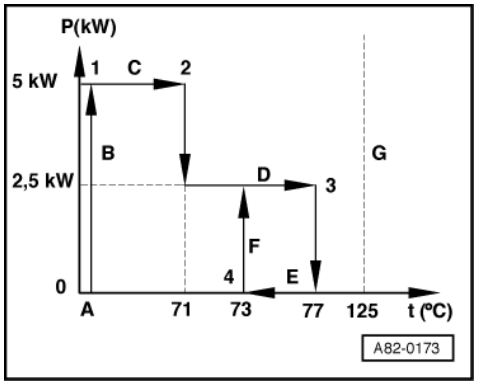
D = Partial load operation

1 = Start of full load operation

2 = Switch from full load to partial load operation

3 = Switch from partial load to full load operation

12.3 - Heat output requirement less than 50%



-> P (kW) = Heat output in kilowatts

t (°C) = Temperature of coolant in heater

A = Commence starting procedure (coolant temperature in heater must be less than 73 °C)

B = Starting procedure

C = Full load operation

D = Partial load operation

E = Control interval

F = Start from control interval

G = Switch-off due to overheating

1 = Start of full load operation

2 = Switch from full load to partial load operation

3 = Switch from part load operation to control interval

4 = End of control interval

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82 - Auxiliary heating

1 - Servicing additional heater

1.1 - Servicing additional heater

1.2 - Contact corrosion

Contact corrosion can occur if use is made of unsuitable connecting elements (bolts, nuts, washers), rivets, plugs, sockets, adhesives etc.

For this reason, all the connecting elements fitted have been subjected to special surface treatment by the manufacturer. This can be seen from the greenish colour of such elements. Use is also made of rubber and plastic parts as well as adhesives which are not electrically conductive.

These tested, aluminium-compatible components are also available as replacement parts.

Always use genuine parts!

In case of doubt concerning the re-usability of parts, always fit new ones.

Accessories must be approved by AUDI AG.

Damage resulting from contact corrosion is not covered by the warranty.

1.3 - Notes on additional heater

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Problems may be encountered with additional heater operation in cold weather in vehicles with diesel engines if vegetable-oil methyl ester is the main fuel that is used.

Reason:
Because of the physical properties thereof, deposits may form on the evaporation fabric in the burner element. These deposits could affect combustion if vegetable-oil methyl ester fuel is used for long periods

Notes:

- The Audi A2 currently only has an additional heater without -V55 recirculating pump installed. However, the -J162 is currently structured so that the electrical functions required for the operation as an auxiliary heater are included.
- However, if the additional heater is to be modified to become an auxiliary heater, supplementary parts and electrical connections become necessary .

=> Audi A8 auxiliary/additional heater

=> Audi A6 auxiliary heater

- -> The heater model can be seen from the rating plate.
  - Type "Z/C-D" without (or with) -V55 recirculating pump = additional heater for vehicles with diesel engines
  - Type "Z/C-B" = auxiliary heater for vehicles with petrol engine (currently not installed on the Audi A2 at the moment)
- Further information on the additional heater =>Page 1 (additional heater self-diagnosis) and

=> Audi sales range

=> Heating, Air Conditioner; Repair group 01

2 - Safety measures during work on vehicles with additional heater

2.1 - Safety measures during work on vehicles with additional heater

- The additional heater must not be operated or switched on in areas where there is a risk of fire and explosion (switch off additional heater e.g. by pressing the "Econ" button on the operating on display unit or on the heater controls).
- The additional heater must not be operated or switched on in closed quarters without provision for exhausting of fumes (switch off additional heater e.g. by pressing the "Econ" button on the operating on display unit or on the heater controls).
- Always observe the relevant safety regulations when working on the fuel system.

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=> Relevant Fuel Supply Workshop Manual; Repair group 20

- If components of the fuel system (e.g. metering pump, fuel line, fuel gauge sender) are removed or opened, the vehicle engine may not be started.

- Before commencing repair work on the additional heater:
  - Dissipate pressure in cooling system by opening the plug on the coolant expansion tank
  - Disconnect the voltage and fuel supply to the additional heater (e.g. by removing additional heater fuse).

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

- After completing repair work on the additional heater or the fuel system, check the operation of the additional heater.
- Perform additional heater self-diagnosis after completing repair work.

3 - Notes on general repairs to vehicles with additional heaters

3.1 - Notes on general repairs to vehicles with additional heaters

- Before carrying out welding work on the vehicle, disconnect the positive and negative battery terminals.
- If the coolant has been drained, bleed the additional heater after filling the cooling system (=>Page 83).
- If parts of the fuel system have been removed or replaced, please ensure that all components for diverting fuel to the additional heater have been correctly installed.
- Depending on the last operating condition and the coolant temperature in the additional heater, the current consumption of the additional heater at rest may amount to a maximum of 60 mA for a period of 5 hours after switching off. In this period of time, the coolant cooldown is calculated by the -J162 control module for the time after switching off. The -J162 additional heater control unit at-rest current consumption will be lower than 2 mA after a maximum of 5 hours have elapsed.

- After carrying out repair work in the additional heater fuel pipe area, check the following:
  - that the fuel pipes are flush with the floor of the vehicle, and are routed so as to protect them from mechanical damage.
  - the fuel line to the additional heater must be protected from heat generation that could impair operation.
  - the fuel pipe must not touch hot vehicle components.

4 - Cleanliness rules for work on additional heater and fuel system

4.1 - Cleanliness rules for work on additional heater and fuel system

- Thoroughly clean all unions and the adjacent areas before disconnecting.
- Place dismantled components on a clean surface (use plastic sheeting or paper, lint-free cloths) and cover over.
- Carefully cover over or seal open components if repairs cannot be performed immediately.
- Only install clean components:
  - Do not remove replacement parts from their wrapping until immediately prior to installation.
  - Do not use parts that have been stored without their packaging (e.g. in tool boxes etc.).

- When the fuel system is open:
  - Do not work with compressed air.
  - Do not move the vehicle.
  - Do not start the engine.
  - Do not switch on additional heater (not even via the "Basic setting" function of the self-diagnosis).

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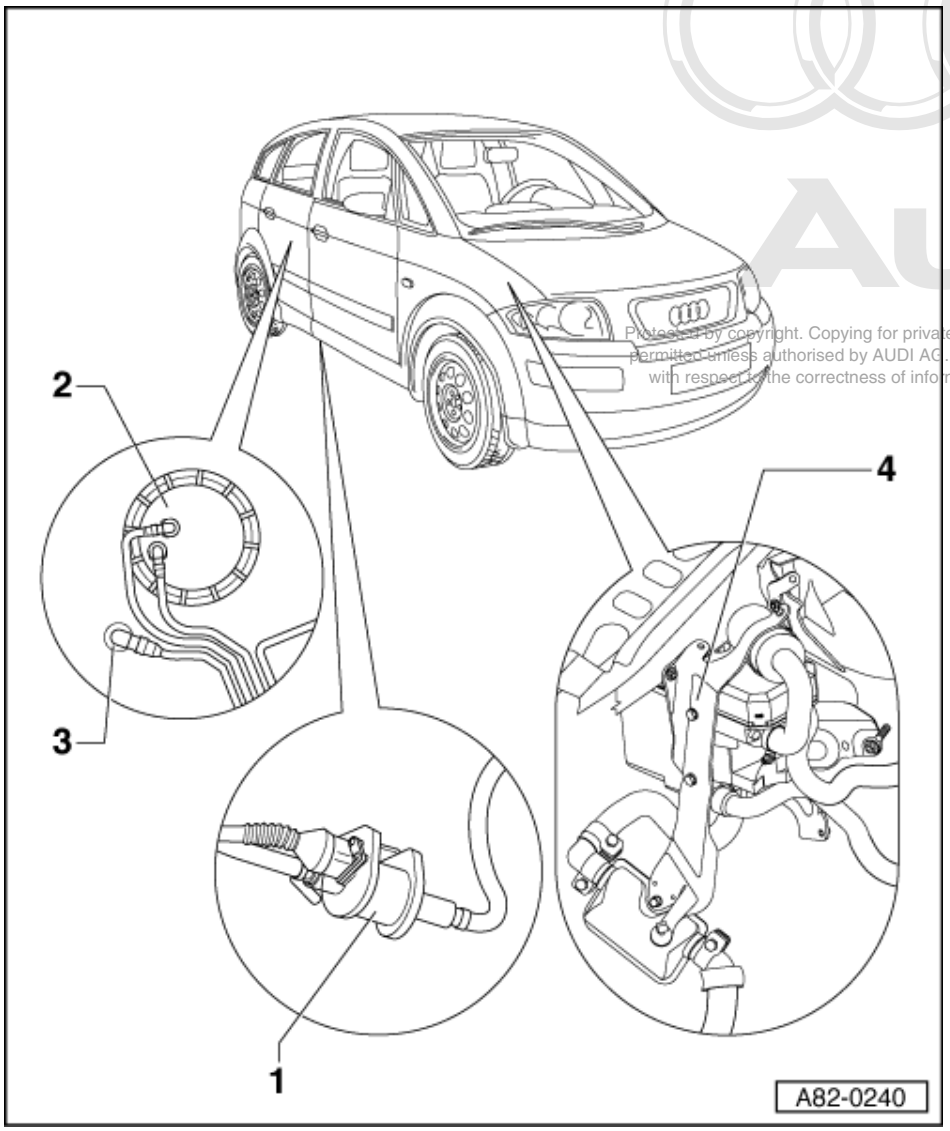
5 - Component arrangement for additional heater in vehicle

5.1 - Component arrangement for additional heater in vehicle



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Notes:

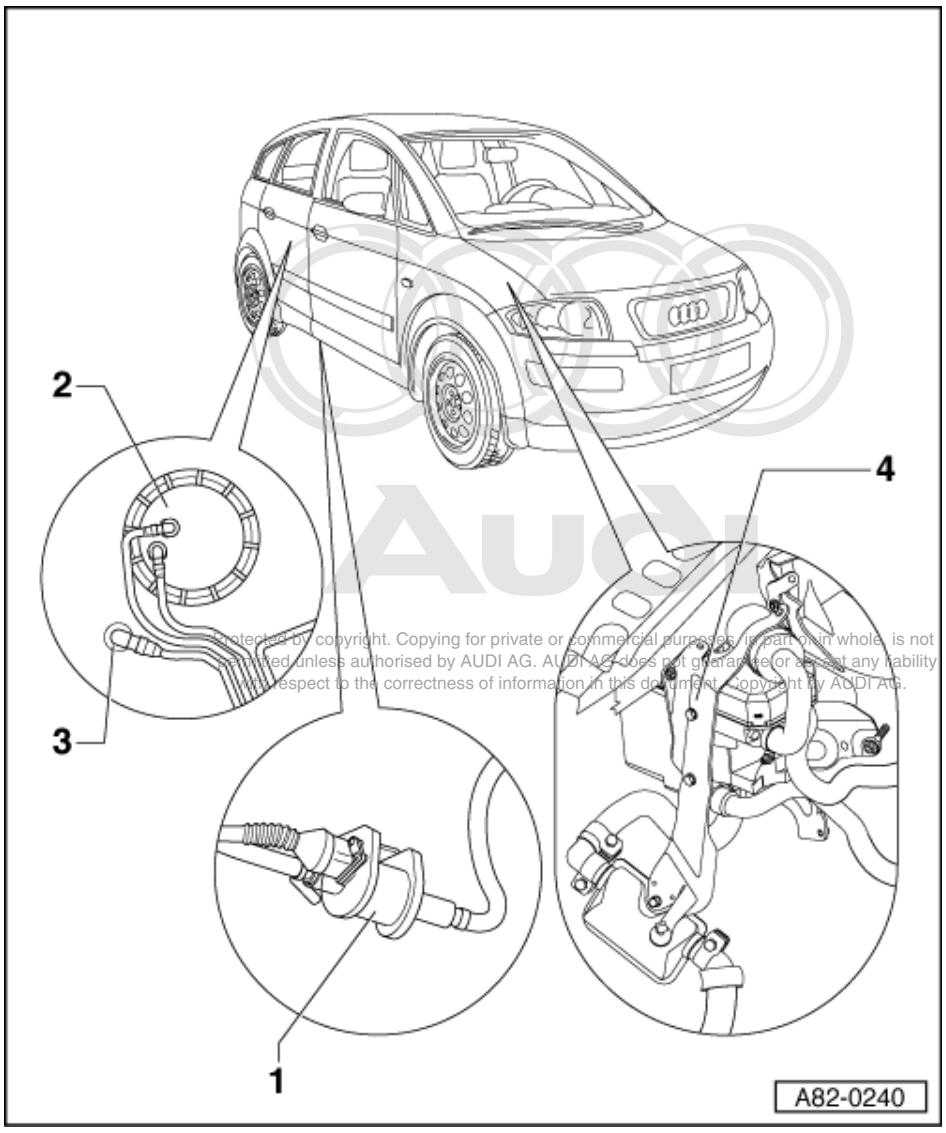
- Fitting locations of the various relays and fuses for the additional heater.

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

- Perform additional heater self-diagnosis => Page 1

1 Metering pump -V54

- Removing and installing =>Page 72
- Diversion of fuel for additional heater =>Page 66
- Check fuel delivery => Page 69
- Checking actuation =>Page 15



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2 Fuel tank

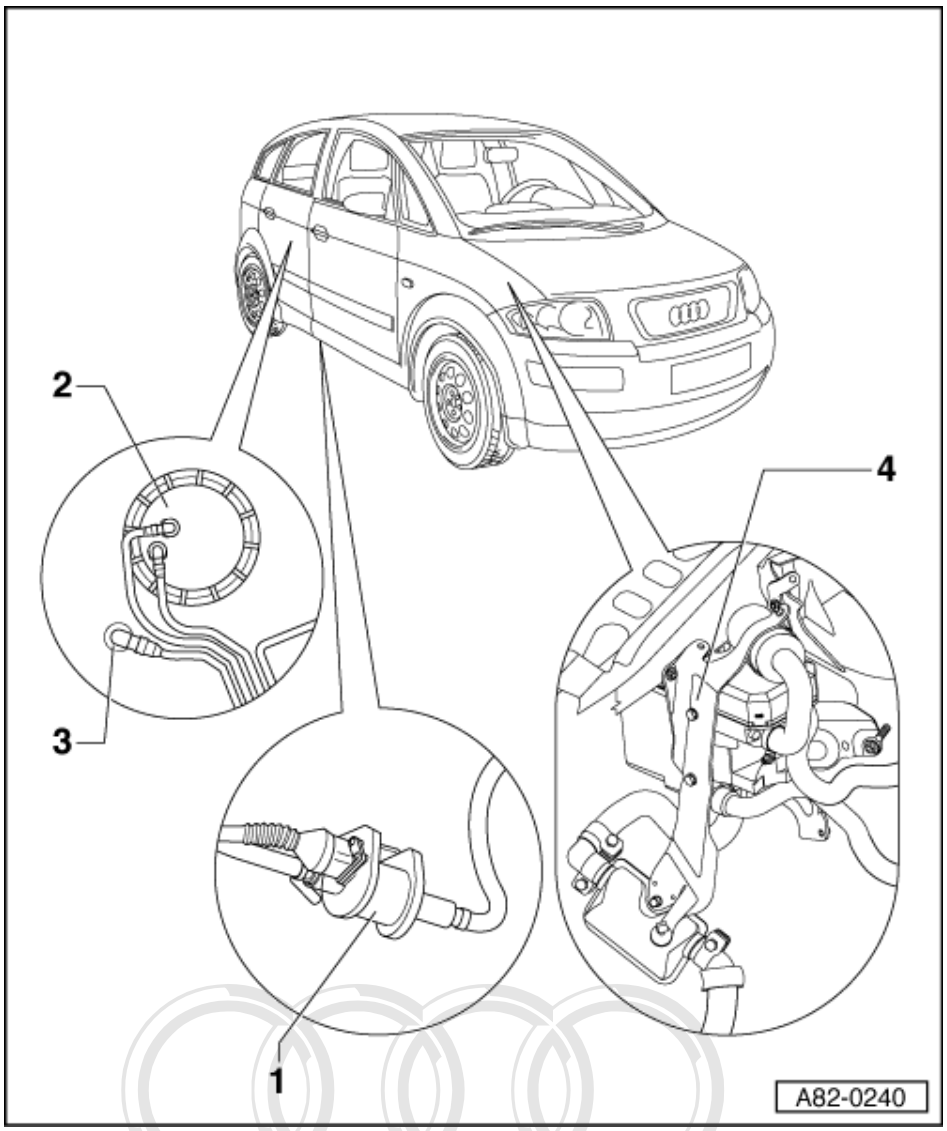
- Varying fuel tank designs for vehicles equipped with an electrical vs. a fuel-powered additional heater.
- With connection for diverting fuel for the additional heater only for vehicles with a fuel-powered additional heater.

=> Relevant Workshop Manual, Fuel Supply

- Diversion of fuel for additional heater =>Page 66

3 Fuel diverter for additional heater

- Diversion of fuel for additional heater =>Page 66



4 Additional heater

- Removing and installing =>Page 84
- Incorporation into coolant circuit =>Page 82
- Dismantling and assembling =>Page 88
- Check additional heater electrical components =>Page 45
- Additional heater block diagram =>Page 101

Notes:

- The following electrical components are installed in the additional heater:
  - Heater control unit -J162.
  - Combustion air blower -V6
  - Glow plug with flame detector -Q8
- For the Audi A2 no -V55 recirculating pump is currently provided.

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5.2 - Checking electric additional heater actuation by the engine control unit

Notes:

- The auxiliary heater is activated by the engine control unit (control unit for the diesel direct injection and glow plug system) as soon as certain preconditions are met:

=> Relevant Workshop Manual, Diesel Direct Injection and Glow Plug System

- The following values relating to the additional heater can be read out from the measured value block of the engine control unit for vehicles with diesel engines:
  - The ambient temperature is less than +5 °C (as transmitted by control unit in dash panel insert)
  - The additional heater fuel consumption
  - The auxiliary heater is switched on or off ("Econ" mode not switched on and "heat output" requested with air conditioner)
  - Current coolant temperature

=> Relevant Workshop Manual, Diesel Direct Injection and Glow Plug System; Repair group 01

The additional heater actuation may also be checked at higher ambient temperatures e.g. as follows:

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- With the engine cold, spray the -G17 ambient temperature sender with ice spray until the display in the dash panel insert displays a temperature below 0 °C (perform several times as necessary).

=> Heating, Air Conditioning; Repair group 87

- Set the maximum heat output on the heater control or the operating and display unit -E87 ("Econ" button not pressed, rotary switch for temperature preselection at "heat" stop or temperature preselection "Hi").

=> Heating, Air Conditioning; Repair group 87

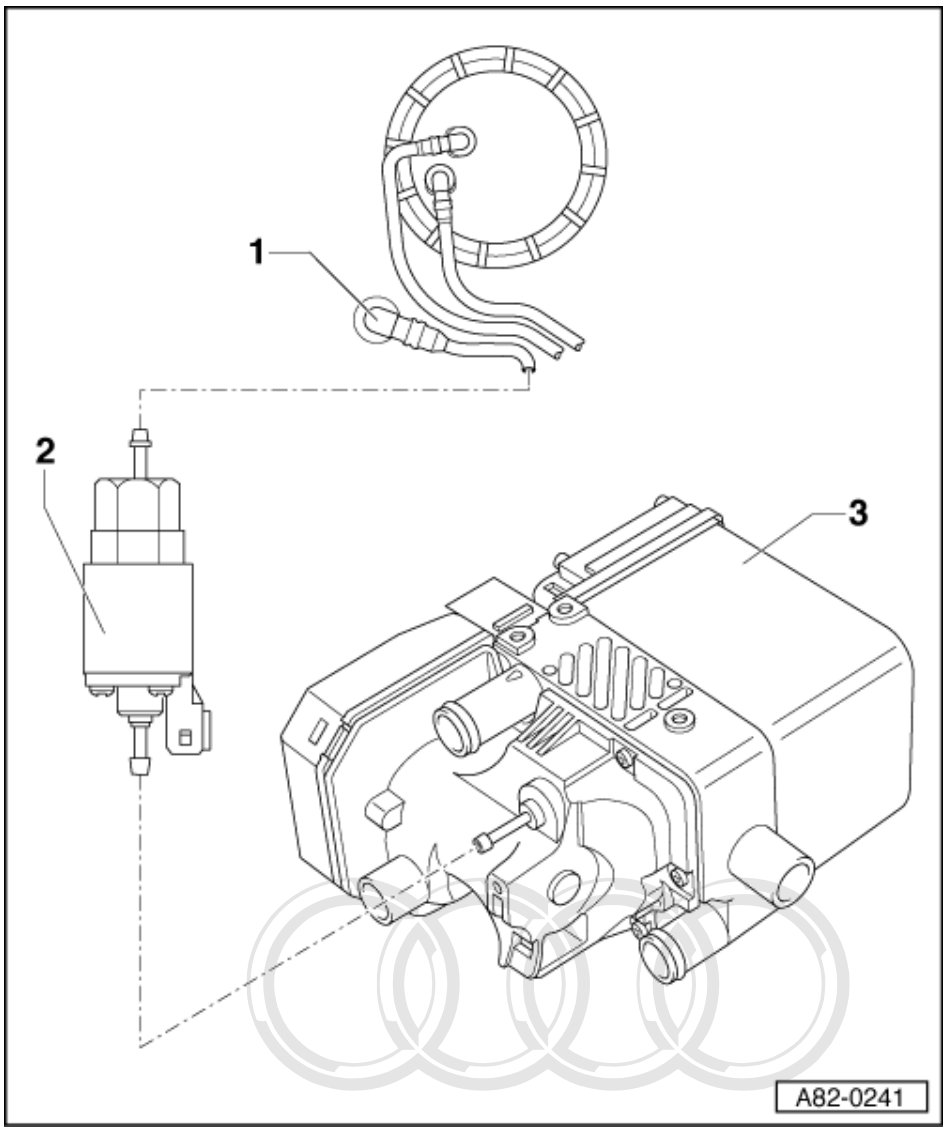
- Start the engine, in the additional heater display group "003" in the display zone "3" of the additional heater measured value block the display changes after approx. 10 seconds from "Heating off" to "Additional heating" => Page 31

If the additional heater is not actuated, read out the display group with additional heater shut-off criteria in the engine control unit measured value block.

=> Relevant Workshop Manual, Diesel Direct Injection and Glow Plug System; Repair group 01

6 - Diversion of fuel for additional heater

6.1 - Diversion of fuel for additional heater



Notes:

- For the operation of the additional heater it is necessary:
  - the fuel line must be flush with the bottom of the vehicle, and routed so that they are protected from mechanical damage.
  - for the fuel line to the additional heater to be protected from heat generation that could impair operation.
  - the fuel line must not touch hot vehicle components.

Audi
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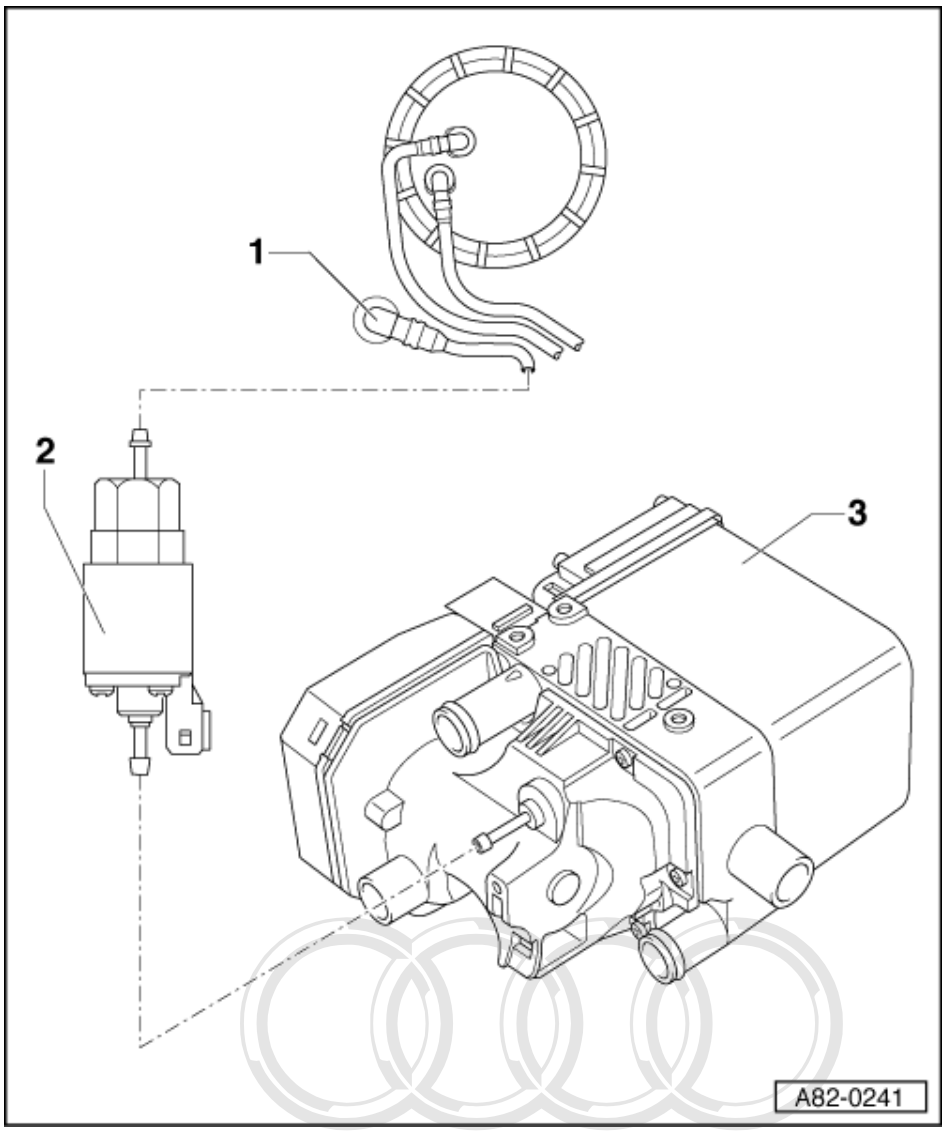

1 Connection for diversion of fuel for additional heater

- Fuel diversion from the fuel tank =>Page 69

Notes:

- Varying fuel tank designs for vehicles equipped with an electrical vs. a fuel-powered additional heater
- The connection for diverting fuel for the additional heater is only present on vehicles with a diesel engine and a fuel-powered additional heater.

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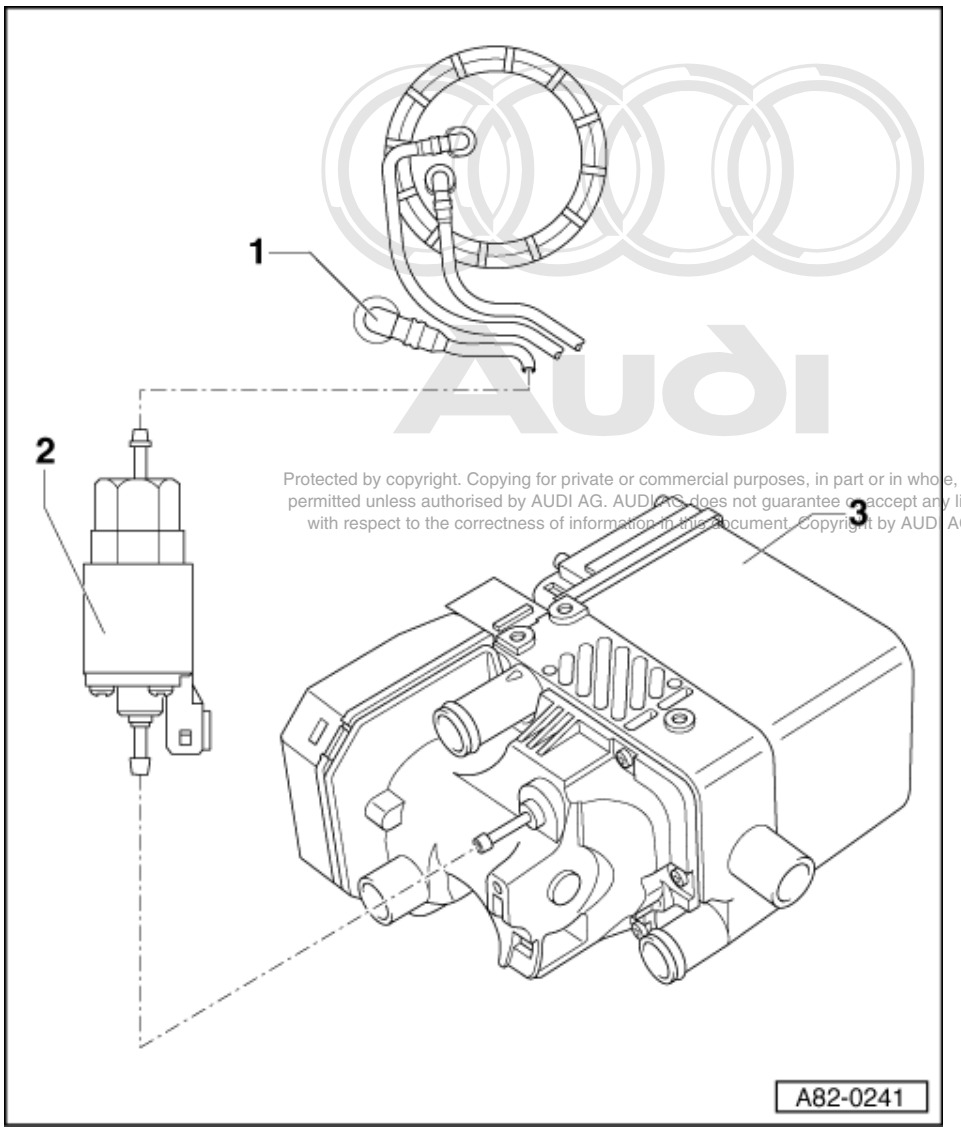
=> Relevant Workshop Manual, Fuel Supply



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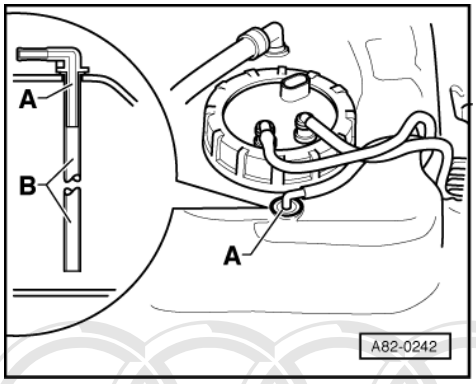
2 Metering pump -V54

- Removing and installing =>Page 72
- Check fuel delivery => Page 69
- Check actuation => Page 15

3 Additional heater

6.2 - Diversion of fuel (for the additional heater) from the fuel tank



- -> Fuel diverter for the additional heater -A-
- Ascending pipe (in the fuel tank) for fuel diversion -B-

Notes:

- If the additional heater fault memory displays the fault "Loss of flame" or "No flame formation" the cause for this may be an ascending pipe that was installed improperly or pinched upon installation of the fuel pump. The correct installation position of the ascending pipe may be checked as follows:
  - By checking the -V54 metering pump displacement using a fuel container with a capacity of approx. 6 litres of fuel.
  - Following removal of the fuel pump unit and visual inspection of the ascending pipe. The ascending pipe must be routed straight downwards

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=> Relevant Workshop Manual, Fuel Supply

- The connection for diverting fuel for the additional heater is welded into the fuel tank and only present on vehicles with a diesel engine and a fuel-powered additional heater.

=> Relevant Workshop Manual, Fuel Supply

6.3 - Checking fuel delivery rate of metering pump -V54

Test requirements:

- Coolant temperature less than 30 °C.
- Ambient temperature less than 20 °C.
- If the fault memory was interrogated =>Page 9 and any displayed faults rectified.

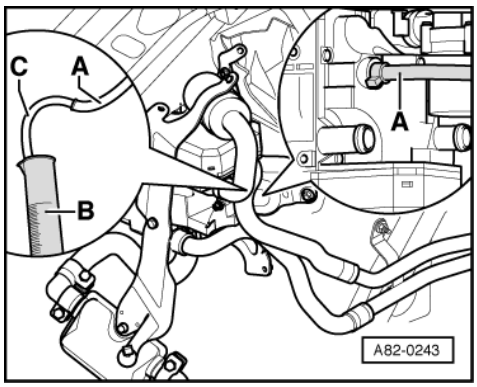
Note:

A higher ambient temperature can lead to errors in the measured fuel quantity due to fuel evaporation.

- The battery -A- is OK and adequately charged.
- Sufficient fuel in tank (fuel gauge in dash panel insert is not in red zone).

Checking:

- Switch ignition off.

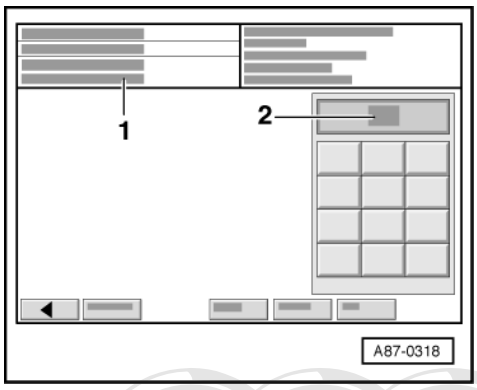


- -> Remove the fuel pipe -A- from the additional heater.
- Attach a graduated beaker -B- near fuel line using e.g. wire and route the fuel line into the graduated beaker.

Note:

If necessary, extend fuel line using a plastic tube -C-.

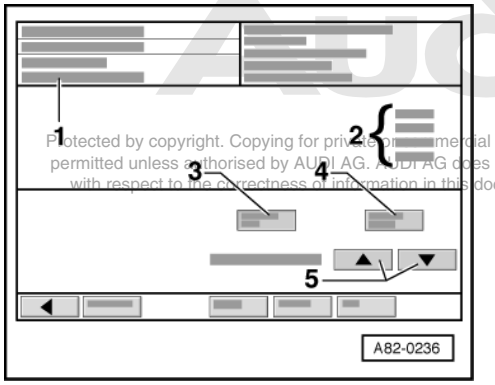
- Initiate self-diagnosis for the additional heater and select the function "Basic setting" => Page 18



-> Display on VAS 5051:

- The prompt to enter a display group is given in display zone -1-.
- An input keyboard is displayed in display zone -2-.

- Enter "055" for "display group number 55" using the input keyboard in display zone -2- and confirm entry with "Q key".



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-> Display on VAS 5051:

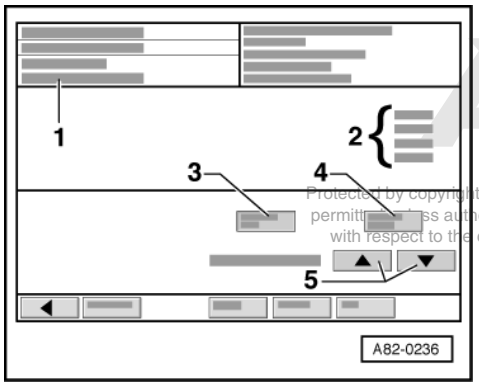
- The function "display group 55, System in basic setting" is displayed in display zone -1-.

- The "Pipe filling" function is displayed in area -2-.

The metering pump -V54 is actuated at a fixed clock frequency

Notes:

- The metering pump -V54 is now activated for 50 sec. "first run" (clock frequency 5 Hz).
- If the "Pipe filling" function has been initiated, the function cannot be interrupted, it is carried out in its entirety by the control unit regardless of any input via the test unit.
- The function "line filling" must be performed 3 times. If the line is filled completely after 1st run the quantity is measured during the 2nd and 3rd run (due to the low delivery rate 2 runs of 50 seconds each are necessary to increase accuracy of the measurement).



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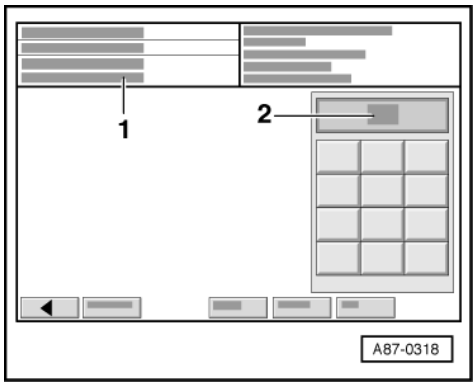
- -> If the message "Function unknown or cannot be executed at present" appears in display zone -1- this may have the following cause:

- The additional heater was switched on and is currently in "run-on" operating status.
- A fault is stored in the additional heater which does not permit switching on.

- Change to a different function (e.g. from "Basic setting" to "Read measured value block") by pressing the -3- key (you return to the "Basic setting" by pressing the -4- key).

- Wait until the display in area -2- changes from "Pipe filling" to "End".



- Empty graduated beaker and reattach it.
- Press the ←keyin the display of the VAS 5051.

-> Display on VAS 5051:

- Enter "055" for "display group number 55" using the input keyboard in display zone -2- and confirm entry with "Q key".

- Wait until the display in area -2- changes from "Pipe filling" to "End".

Note:

The metering pump -V54 is now activated for 50 sec. "second run" (clock frequency 5 Hz).

- Press the ←keyin the display of the VAS 5051.
- Perform the "Pipe filling" function again.

Note:

The metering pump -V54 is now actuated for 50 seconds, "third run" (clock frequency 5 Hz).

- Wait until the display in area -2- changes from "Pipe filling" to "End".

Note:

The metering pump -V54 should be activated for 100 sec. in order to obtain an accurate measurement (2 "pipe filling" procedures).

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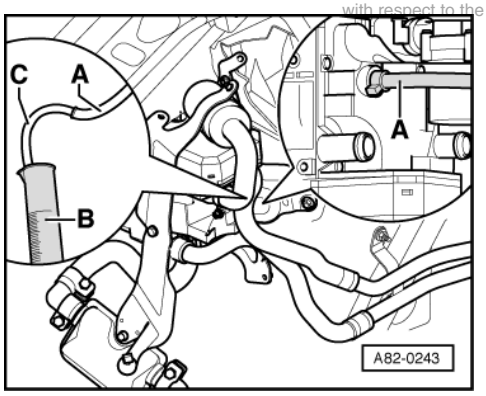


- After the third pipe filling procedure has been completed, measure metering pump fuel delivery rate.

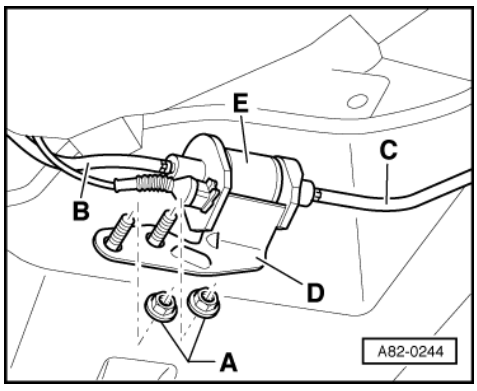
Specified value:

29 to 35 cm3 (millilitres)

Notes:

- The fuel delivery rate during this test is independent of the current battery voltage (the delivery rate is stabilised by the control unit -J162).
- Bubbles of vapour should not be present.
- If the fuel delivery rate is outside the tolerance range:
  - Check fuel line for damage and proper routing => Page 66
  - If no fault can be found, replace -V54 metering pump =>Page 72
- If the additional heater has starting difficulties although the fuel delivery rate is OK, check of CO2-content in exhaust gas => Page 73

6.4 - Removing and installing metering pump -V54



Removing

- Switch ignition off.
- Remove the cover under the fuel filter.

=> Relevant Workshop Manual, Fuel System

- -> Remove the hexagon nuts (or hexagon bolts) -A-.
- Unplug connector from the metering pump.
- Detach the fuel lines -B- and -C- from the metering pump and seal them.

Notes:

- Bolts (M6 x 10 mm) may be installed instead of nuts -A-. On the version with bolts observe the bolt length (the pull-in nut installed is sealed and allows only for a certain thread length).

- The metering pump -E- is attached to bracket -D- with the rubber elements.
- Ensure that metering pumps and associated fuel lines do not touch other components (noise).
- The metering pump is installed under the right rear seat on the heel panel on the exterior of the vehicle floor panel outside the passenger compartment.

Installing

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

- Replace the hose clamps on the fuel lines and secure them using suitable pliers.
- Ensure that the fuel lines are not twisted.
- Secure the fuel lines at the fastening points provided.

7 - Checking and adjusting CO2-content in additional heater exhaust gas

7.1 - Checking and adjusting CO2-content in additional heater exhaust gas

Notes:

- The CO2-content in the exhaust gas can be adjusted in the "10 Adaption" function via the channel number "02".
- The actuation curve for the combustion air blower -V6 (and thus the delivery performance) is changed via the adaption via the control unit.

Test requirements

- The coolant temperature is lower than 30 °C. at the start of the test
- The ambient temperature is less than 20 °C.
- Battery -A is sufficiently charged.
- If the fault memory was interrogated =>Page 9 and any displayed faults rectified.
- The fuel tank is sufficiently full (fuel gauge in the dash panel insert is not in the red area).

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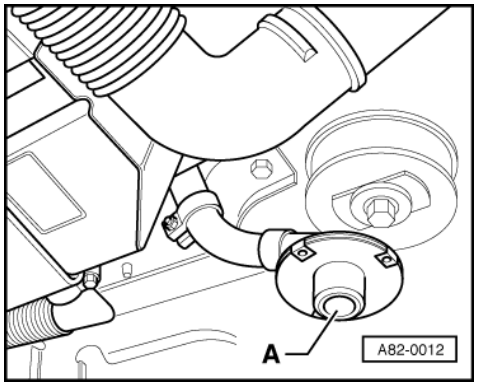
7.2 - Checking CO2-content of additional heater exhaust gas

Notes:

- The additional heater is switched on via the function "Basic setting, display group number 022" =>Page 19
- The additional heater can be operated via the function "Basic setting" up to a coolant temperature of 115 ° C. Starting from control interval is possible. The operating time is limited to a maximum of 8 minutes.

- Observe the test requirements =>Page 73

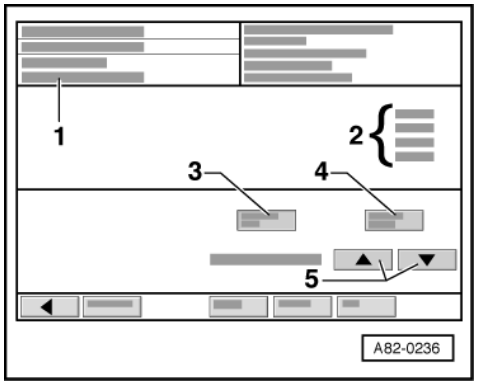


- -> Switch on exhaust analyser V.A.G 1788 and insert relevant exhaust probe hose into auxiliary heater exhaust pipe -A-.

Note:

Exhaust probe should not impede flow of exhaust gas from exhaust pipe during test.

- Connect the vehicle diagnostic, testing and information system VAS 5051 to the vehicle's 16-pin diagnostic connector using diagnostic cable VAS 5051/1, with the ignition switched off => Page 5
- Start the engine.
- Use the "address word" 18 to select the -J162 additional heater electronics control unit
- Set the air conditioner or heater to maximum heating output (e.g. rotary knob up to "Warm" stop and blower to stage 4).
- Switch on the additional heater via the function "Basic setting, display group number 22" => Page 18



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-> Display on VAS 5051:

- The following display appears in area -2-:
  - Basic setting
  - Additional heating
  - Heating

Note:

If another or an additional display appears in the area -2-, eliminate the cause of the fault => Page 18

- Wait until the additional heater has been switched from start to full load operation (approx. 3 min).

Note:

The current operating status of the additional heater can be seen in the measured value block "display group 001" => Read measured value block Page 27

- After the additional heater has switched to full load operation, wait at least another 1 minute

- Read off the measured value for the CO2 (carbon dioxide) content in the exhaust gas from the CO2-measuring instrument (starting approx. 5 minutes after switching on, the additional heater must be in full load operation).

Note:

Exhaust probe should not impede flow of exhaust gas from exhaust pipe during test.

Specified value:

- Diesel engine
  8 to 13 % CO2 by volume.

Notes:

- If the measurement is outside the permitted range:
  - Check the intake area for the combustion air blower and the exhaust system of the additional heater for dirt and clean, if necessary.
  - Check the fuel delivery rate of the metering pump => Page 69
- If CO2 level in exhaust gas and metering pump delivery rate are within the lower permitted range:
  - Replace the metering pump -V54 => Page 72
- If CO2 level in exhaust gas is not OK, but fuel delivery rate is OK:

- Check the air intake area (with intake silencer) and the exhaust system of the additional heater and repair, if necessary.

- If no fault is found:
  - Check the combustion air blower -V6.
  - Set the CO2-content in the exhaust gas => Page 75
  - If the CO2-content in the exhaust gas cannot be set, replace the combustion air blower -V6 => Page 97

- If the additional heater has starting difficulties although the fuel delivery rate and the CO2-content in the exhaust gas are OK:
  - Check the -Q8 glow plug with flame detector => Page 45
  - Remove any deposits from the burner element of the additional heater (only when running on vegetable oil methyl ester) => Page 80
  - Replace the burner element => Page 93 .

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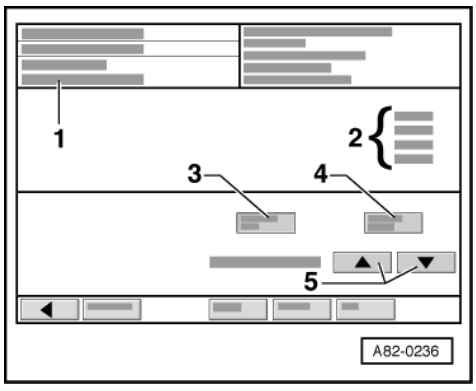
7.3 - Adjusting CO2-content in additional heater exhaust gas

- Check the CO2 (carbon dioxide) content in the additional heater exhaust gas => Page 73

Note:

For the adjusting of the CO2-content in the exhaust gas:

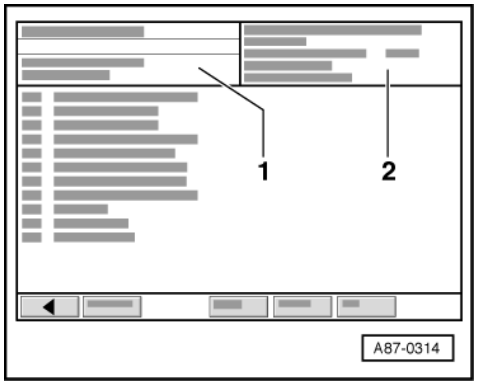
- the additional heater must operate under full load.
- is the vehicle diagnostic, testing and information system VAS 5051 connected and the additional heater self-diagnosis initiated.
- if the CO2-measuring unit is ready for operation and the exhaust measuring probe is attached to the exhaust pipe of the additional heater in such a way that the exhaust outlet is not obstructed.



-> Display on VAS 5051:

- The following display appears in area -2-:
  - Basic setting
  - Additional heating
  - Heating

Notes:

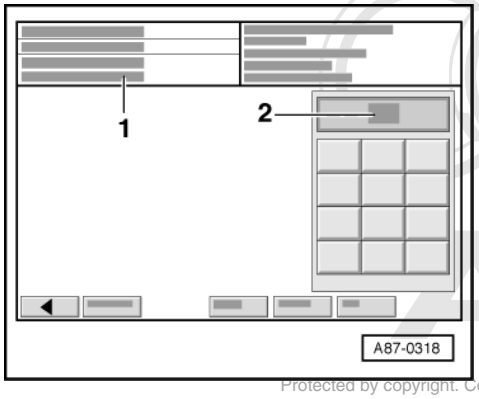


- If another or an additional display appears in the area -2- then eliminate the cause of the fault => Page 18
- Following entry of the "display group 022" in the basic setting function approx. 8 min. remain in order to perform adjustment of the CO2-content. If the time is not sufficient the process can be repeated.

- Press the ← key

-> Display on VAS 5051:

- Select function "10 - Adaption".



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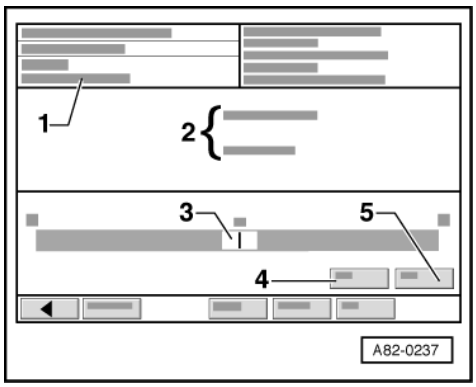
-> Display on VAS 5051:

- The prompt to enter a channel number is given in display zone -1-.
- An input keyboard is displayed in display zone -2-.

- Enter "02" for "Channel 2" using the input keyboard in display zone -2- and confirm entry with "Q key".

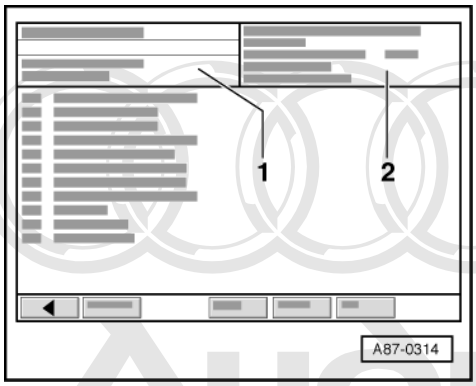


-> Display on VAS 5051:

- The message "Read and test channel 2" appears in display zone -1-.
- "CO2-setting" appears in area -2-.
- A scroll bar appears in area -3- with the encoded value of the currently valid "CO2-setting" (e.g. "126" as adjusted at the factory).

Notes:

- After pressing key -4- the desired adjustment value may also be entered directly via the keyboard => Page 79



- -> If the message "Function unknown or cannot be executed at present" appears in display zone -1- this may have the following cause:
  - The additional heater was switched on and is currently in "run-on" operating status (Interrogate current operating status => Reading measured value block Page 27)
  - A fault is stored in the auxiliary heater which does not permit switching on.

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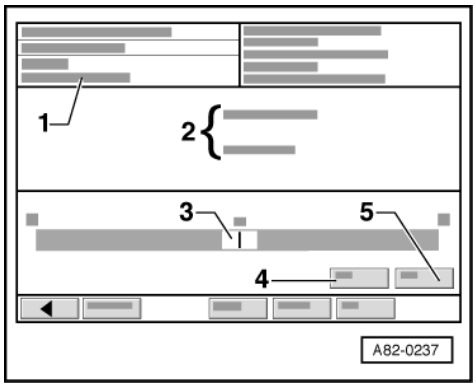
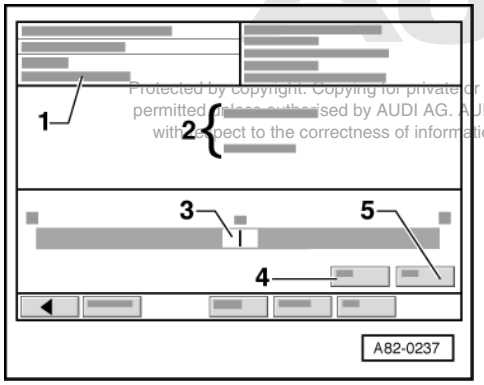


- -> If "Wait" appears in area -2-, the additional heater is in an operating status where the adjustment of CO2-content is not possible, e.g. during starting sequence.
  - Wait until the display switches to "CO2-setting".

- If the display "Wait" is displayed longer than 5 minutes then interrogate the fault memory, a fault has occurred.

- Using the scroll bar -3- the CO2-content in the additional heater exhaust gas can be altered within the specified limits (e.g. from "105" and "136", the actual limits of the adjustment are dependent on the basic setting for this unit by the additional heater manufacturer).
  - By sliding the scrollbar to the left (in direction of "0") the combustion air blower speed is reduced and the CO2-content increases.
  - By sliding the scrollbar to the right (in direction of "262") the combustion air blower speed is increases and the CO2-content decreases.
  - The CO2-content changes by approx. 0.08 % by volume per scroll bar unit.



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- Read measured value for the CO2 (carbon dioxide) content from CO2-measuring unit.
- -> Slide the scroll bar -3- in the desired direction (e.g. by 5 units to the left if the CO2-content in the exhaust gas is to be increased by 0.4%).

Setting:

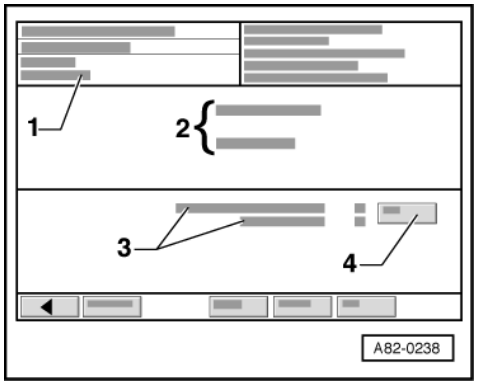
- Diesel engine
  9 to 12 % CO2 by volume.

Notes:

- The scroll bar -3- can be moved between "0" and "262". However, an adjustment within a range of only "105" and "136" is provided in the additional heater control unit to set the CO2-content.
- If the scroll bar -3- jumps back into the initial position after releasing, the specified adjustment range was exceeded.

Following adjustment of the scroll bar -3- the key -5- appears on the display.

- Save the altered value by pressing key -5-.



-> Display on VAS 5051:

- The message "Save channel 2" appears in display zone -1-.

- In area -3- the original and the new value for the "CO2-adjustment" appear encoded.

- Accept and save your entry by pressing the key -4-.

- The message "Save channel 2, value 1 saved" appears in display zone -1-.

- Wait approx. 1 minute (until the altered CO2-content is properly indicated on the measuring unit.
- Read measured value for the CO2 (carbon dioxide) content from CO2-measuring unit.

Setting:

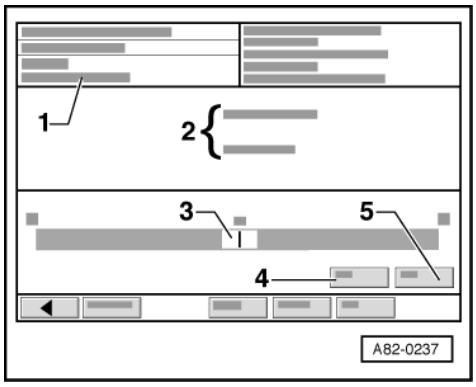
- Diesel engine
  9 to 12 % CO2 by volume.

Notes:

- By pressing the ←key you will return to the selection program.

- If the additional heater is switched off during the CO2-adjustment or leaves the full load operation the value stored before adjustment remains valid. In this case, repeat the procedure again.
- The CO2-content can only be altered within certain limits (from approx. "00105" to "00136"). If the CO2-content cannot be adjusted as required please check the combustion air blower with air intake area, the fuel delivery rate of the metering pump and the exhaust system of the additional heater.

- Switch off the additional heater via the function "Basic setting, display group 33" => Page 18



Altering CO2-content in the exhaust gas with keyboard entry

-> Display on VAS 5051:

- Press the -4- key.

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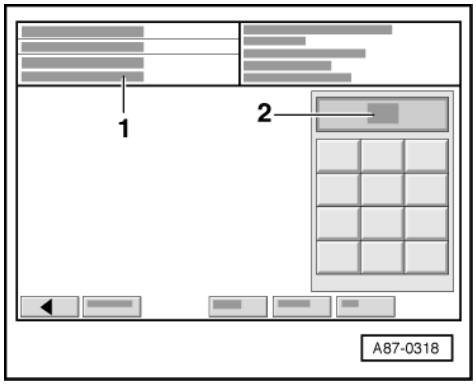


-> Display on VAS 5051:

- The message "Enter adaption value" appears in display zone -1-. 0...XXXXX".
- An input keyboard is displayed in display zone -2-.

- Enter the desired value for the CO2-content in display zone -2- using the input and confirm entry by typing the "Q key".
- Then proceed as for adjustment using the scroll bar.

7.4 - Removing deposits from burner element (only when running on vegetable oil methyl ester)

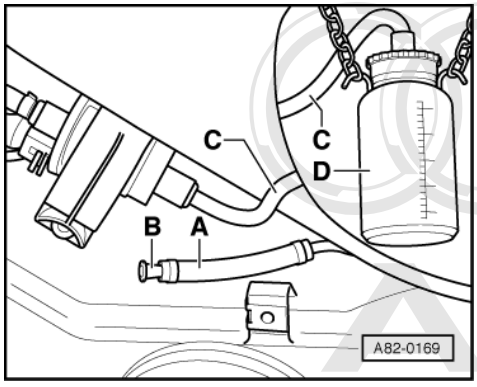
Notes:

- Problems may be encountered with additional heater operation in cold weather in vehicles with diesel engines if vegetable-oil methyl ester is the main fuel that is used.
- Reason:
  Because of the physical properties thereof, deposits may form on the evaporation fabric in the burner element. These deposits could affect combustion if vegetable-oil methyl ester fuel is used for long periods.
- These deposits can be broken up and therefore removed by the petrol combustion process.
- If evaporation fabric in burner element is so clogged that no flame can be produced, replace burner element => Page 93

Preconditions:

- If the fault memory was interrogated =>Page 9 and any displayed faults rectified.
- Initial coolant temperature less than 30 °C.

Removing deposits:



- Switch ignition off.
- Remove the cover under the fuel filter.

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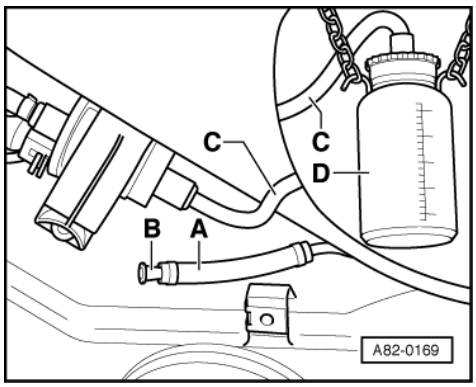
=> Relevant Workshop Manual, Fuel System

- -> Detach the fuel line -A- from the metering pump and close it off with the closure plug -B-.
- Pour approx. 1 litre of fuel (petrol) into container -D-.

Notes:

- Container -D- must contain an ascending pipe that reaches the bottom of the container.
- There must be an opening in the container lid to prevent a vacuum from forming when fuel is removed.



- -> Attach container -D- (VAS 5086) to the vehicle near the metering pump.
- Squeeze container -D- until fuel reaches end of hose -C-, then attach hose to metering pump.
- Start the engine.
- On the heater controls or the -E87 operating and display unit set the system to maximum heating output (e.g. temperature preselection to "Hi" of temperature rotary knob to "Warm" stop and blower to stage 4).
- Open all windows.
- Initiate self-diagnosis for the additional heater and switch on the additional heater via the function "Basic setting" => Page 18
- Repeat this procedure 3 times (the additional heater must be run with petrol for at least 30 minutes).

Notes:

- As the operating time of the additional heater is limited to a maximum of 8 minutes via the function "Basic setting display group 22" this function must be performed 4 times in total. For this the additional heater must be first switched on via the function "Basic setting display group 33" and then off again via the function "Basic setting display group 22" after completion of cut-in time and the end of the caster time.
- The additional heater can be operated via the function "Basic setting display group 22" up to a coolant temperature of 115 °C. Starting from control interval is possible.

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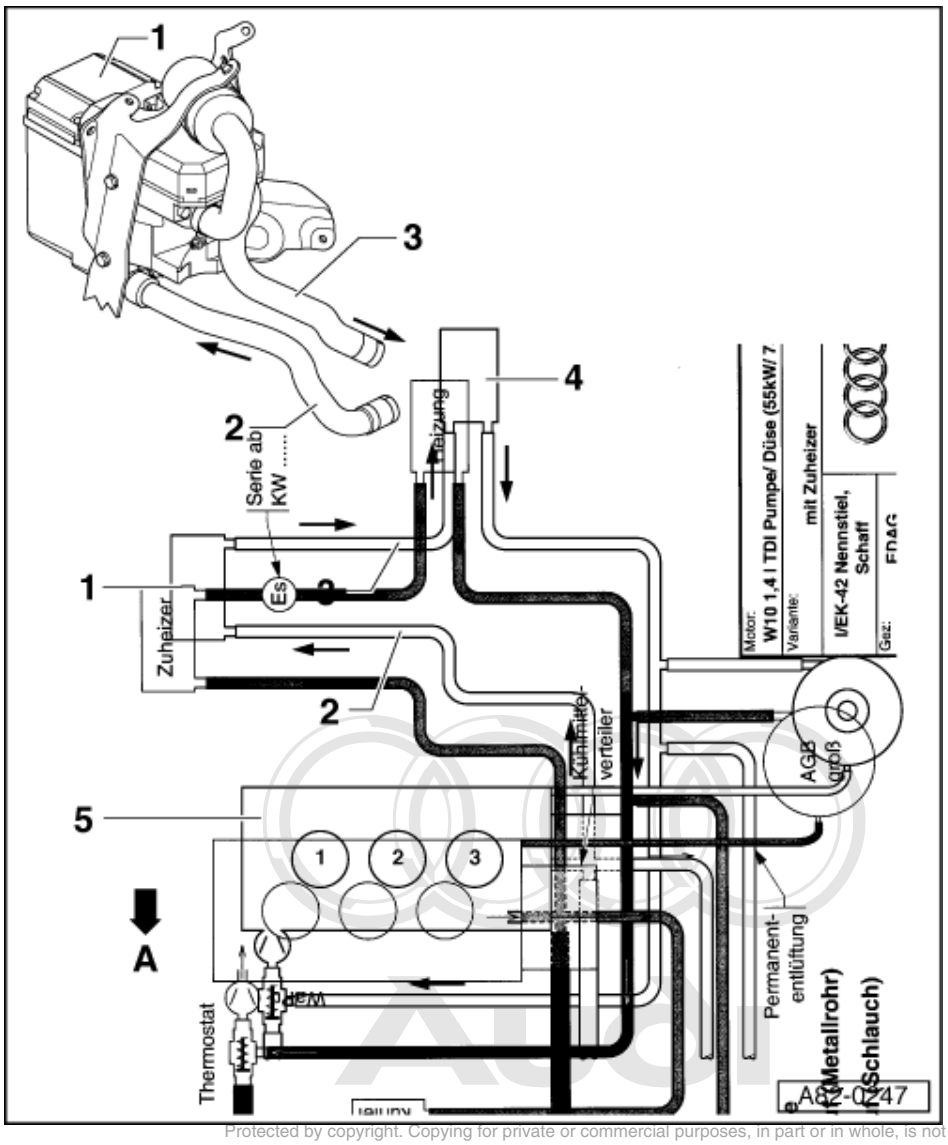
8 - Incorporation of additional heater into coolant circuit

8.1 - Incorporation of additional heater into coolant circuit



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8.2 - For vehicles with 3-cylinder diesel engine

Note:

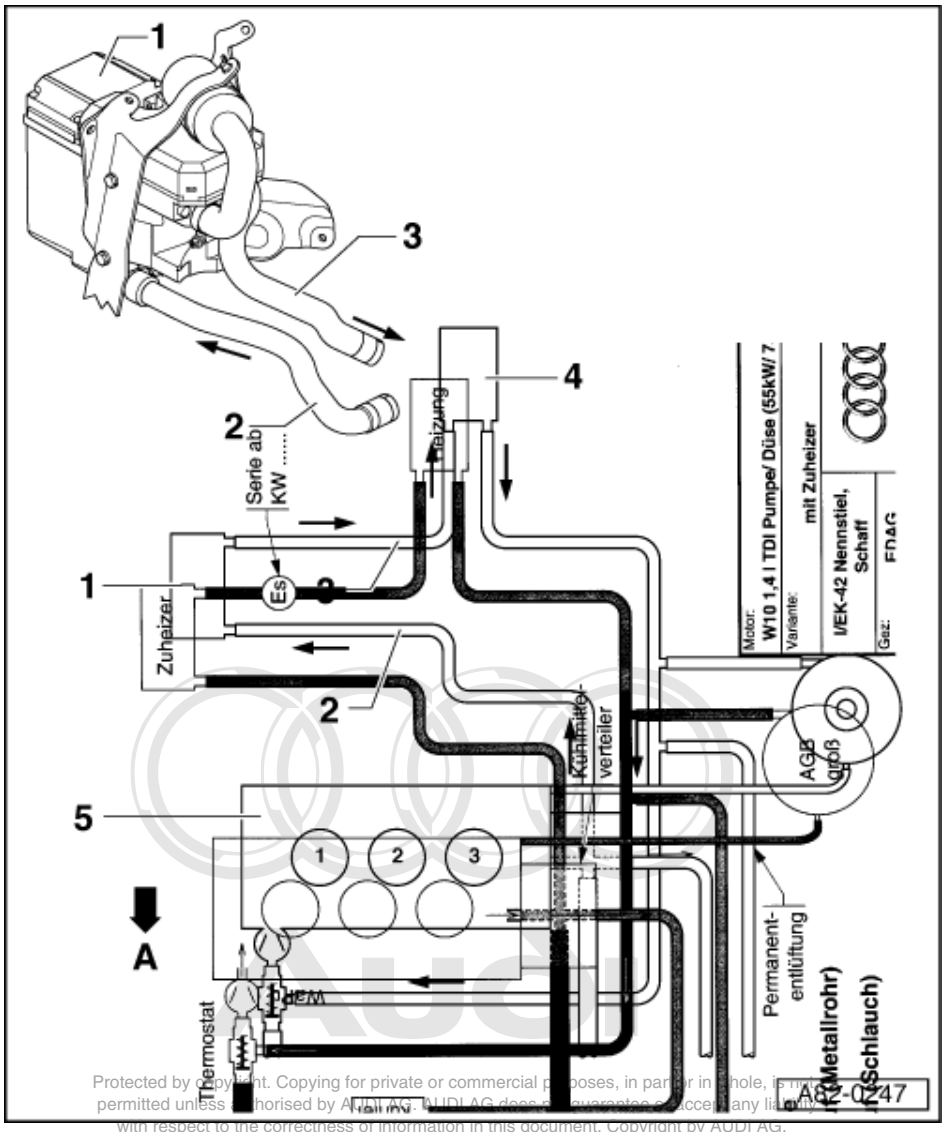
All components not mentioned

=> Relevant Engine Workshop Manual, Mechanical components; Repair group 19; Cooling system

Coolant flow direction ⇒

A = direction of travel

1 Additional heater
2 Coolant supply from engine to additional heater



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3 Coolant supply from additional heater to heating system/air conditioner heat exchanger

- A bleeder screw may be located on the coolant pipe or the coolant hose for purposes of bleeding the coolant circuit (running change).

4 Heating system/air conditioner heat exchanger

5 3-cyl. diesel engine

8.3 - Bleeding coolant circuit

- Bleed engine coolant circuit as specified.

=> Relevant Engine Workshop Manual, Mechanical components; Repair group 19; Cooling system

- Once engine has reached operating temperature:
  - Set air conditioner or heating system to maximum heat output (e.g. temperature preselection "Hi").

Notes:

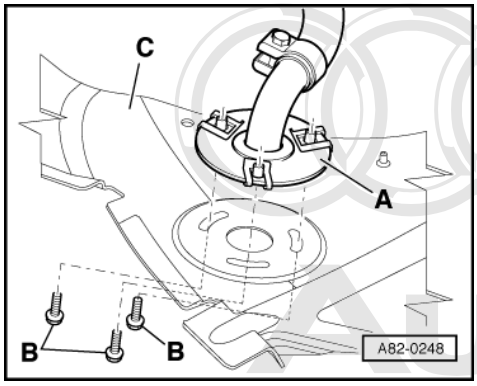
- The additional heater is currently installed without a recirculating pump. The coolant is pumped through the additional heater only by means of the engine coolant pump.

- It is not necessary to switch on the additional heater for bleeding as there is a constant flow through it.

- Top up coolant if necessary.

9 - Removing and installing additional heater

9.1 - Removing and installing additional heater



- Switch ignition off.
- -> Release the end piece of the exhaust pipe -A- of additional heater by removing the screws -B- from the noise insulation -C-.
- Remove the noise insulation.

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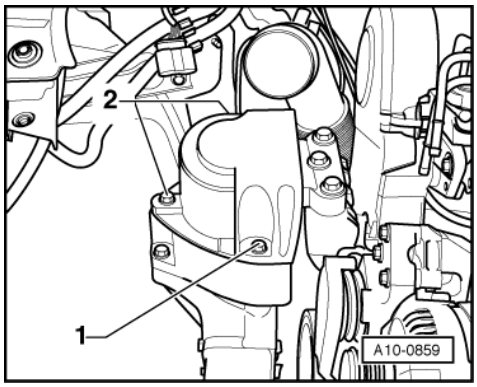
=> General Body Assembly, Exterior; Repair group 50; Body front; Noise insulation - assembly overview

- Release pressure in coolant circuit by opening cap on coolant expansion tank.
- Remove the engine air intake pipe if necessary.



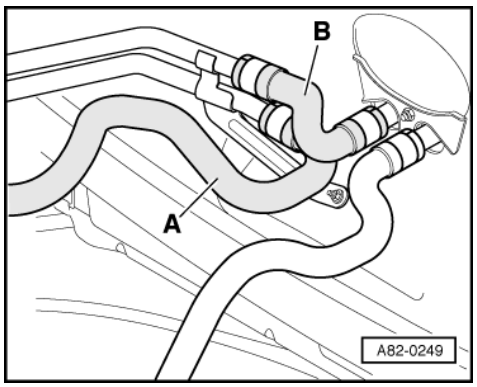
=> Relevant Engine Workshop Manual, Mechanical Components

- -> Remove the cover -2- of the engine mount

=> Relevant Engine Workshop Manual, Mechanical Components; Repair group 10

Notes:

- Given that only the cover is removed, the engine continues to rest on the mount.



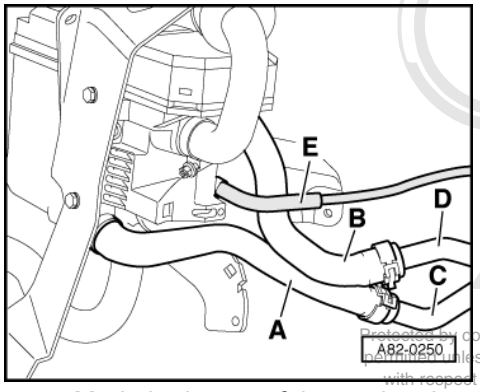
- Should another engine mount be installed, which does not allow removal of the additional heater with the engine mount installed due to its size, this mount must be completely removed.

=> Relevant Engine Workshop Manual, Mechanical Components; Repair group 10

- Remove the fresh air intake duct for the heater in the engine compartment

=> Heating, Air Conditioning; Repair group 80

- -> Clamp the coolant hoses -A- (from the engine to the additional heater) and -B- (from the additional heater to the air-conditioner/heater heat exchanger) using hose clamps (e.g. the V.A.G 3094).



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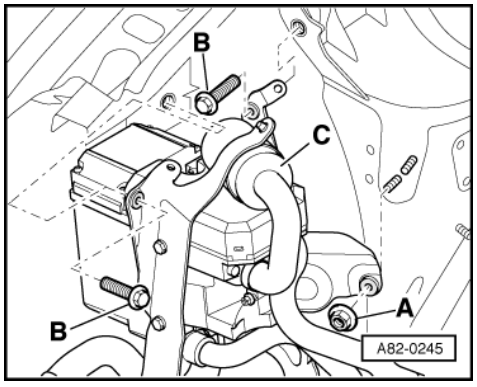
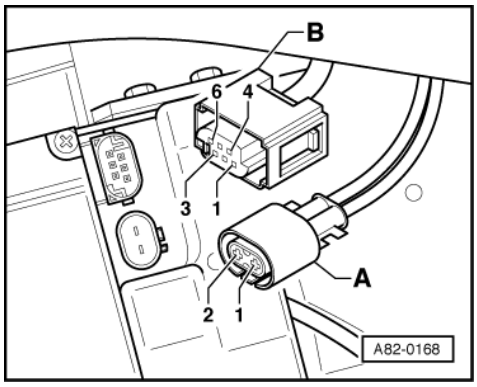
- -> Mark the layout of the coolant hoses -A- and -B-to the additional heater.
- Detach the coolant hoses -A- and -B- from the coolant pipes -C- and -D-.
- Detach the fuel line -E- from the additional heater and seal it.



- -> Remove the intake silencer -C-.
- Detach the additional heater from the vehicle by removing the hexagon nut (bolt) -A- and the bolts -B-.
- Carefully pull the additional heater towards the engine.



- -> Detach connectors -A- and -B- from the heater unit.
- Remove additional heater upwards.

Installation notes:

- After installing, check the exhaust pipes, the coolant hoses, fuel line and wiring to the additional heater, they must not touch any other components.
- Bleed coolant circuit before starting up additional heater (also before starting up via the "Basic setting" function) =>Page 83
- -> If additional heater has been replaced, enter year of initial commissioning of the newly installed heater on heater rating plate and on new "duplicate rating plate" (by deleting year of original initial commissioning).

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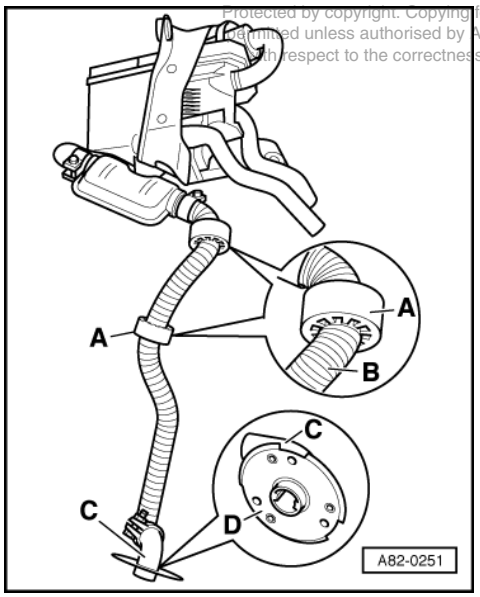
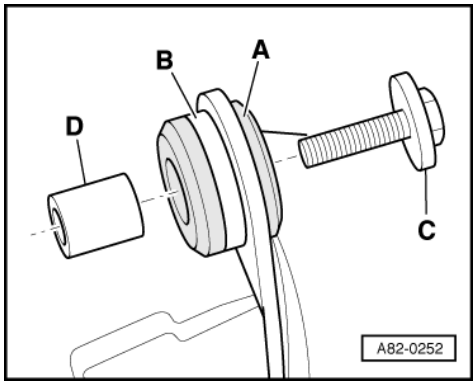


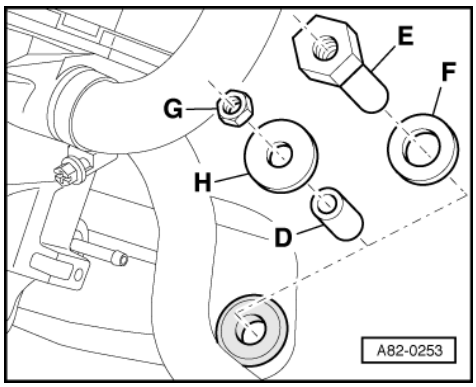
- -> Check the installation location of spacers -A- on the exhaust gas corrugated pipe -B-, they must be fitted so that they prevent the pipe hitting against other components.

- Check the additional heater exhaust pipe end piece -C- prior to installation of the noise insulation, a thermal insulation -D- must be fitted.



- -> The rubber elements -A- are installed on the additional heater bracket at the body mounting points to serve as noise insulators. The rubber elements must be installed in the bracket in such a manner, that the metal ring -B- is positioned between the body and the bracket.
- Securing of the additional heater bracket on the body is dependent on the body version:

- using hexagon bolts with washer -C- and bushings -D-.



- -> using special hexagon nuts -E- with washer -F-.

or

- using hexagon nuts -G-, washers -H- and bushings -D-.

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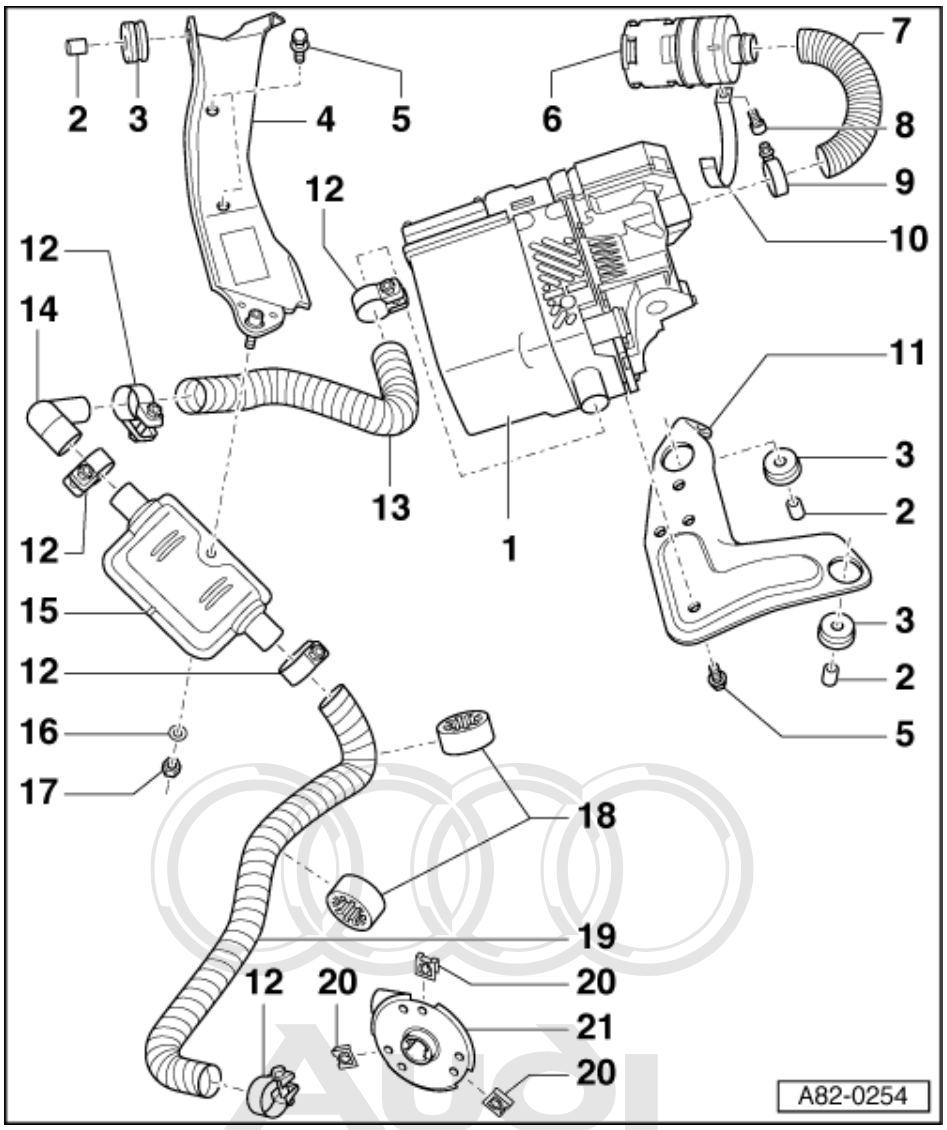
10 - Dismantling and assembling additional heater

10.1 - Dismantling and assembling additional heater



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Removing additional heater => Page 84

10.2 - Removing and re-attaching auxiliary heater exhaust system bracket

1 Additional heater

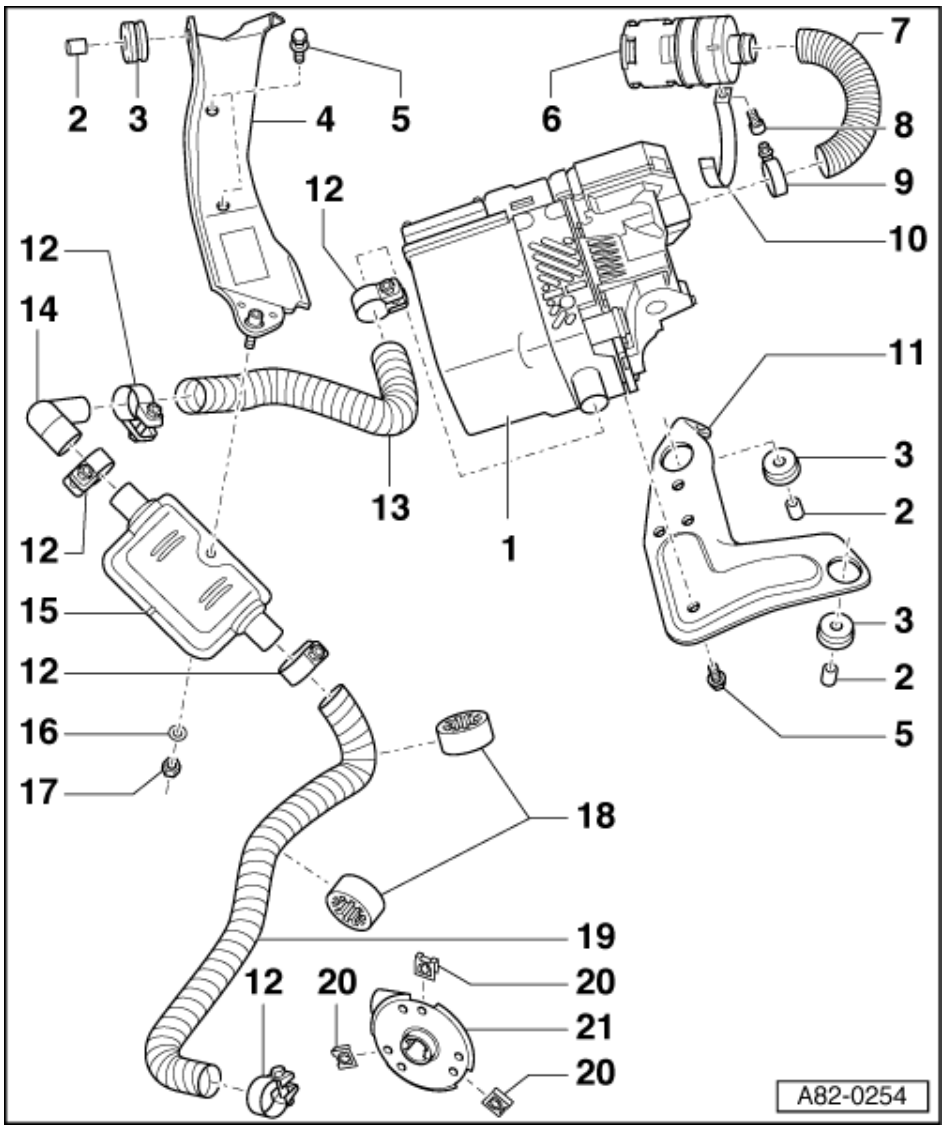
- Different control units (software versions)

=> Parts List

- Dismantling and assembling =>Page 93

Note:

Currently no -V55 recirculating pump is provided for the additional heater.



2 **Socket**

3 **Rubber element with metal ring**

- For noise reduction
- Install correct way round (metal ring is between bracket and body).

4 **Bracket**

- For additional heater, exhaust silencer, and intake silencer
- Upon installation, ensure clearance to coolant hose clamp, rotate clamp as necessary =>Fig. 1

5 **Bolt**

6 **Intake silencer**

- Attaching =>Page 92

7 **Intake hose**

- Attaching =>Page 92

8 **Bolt**

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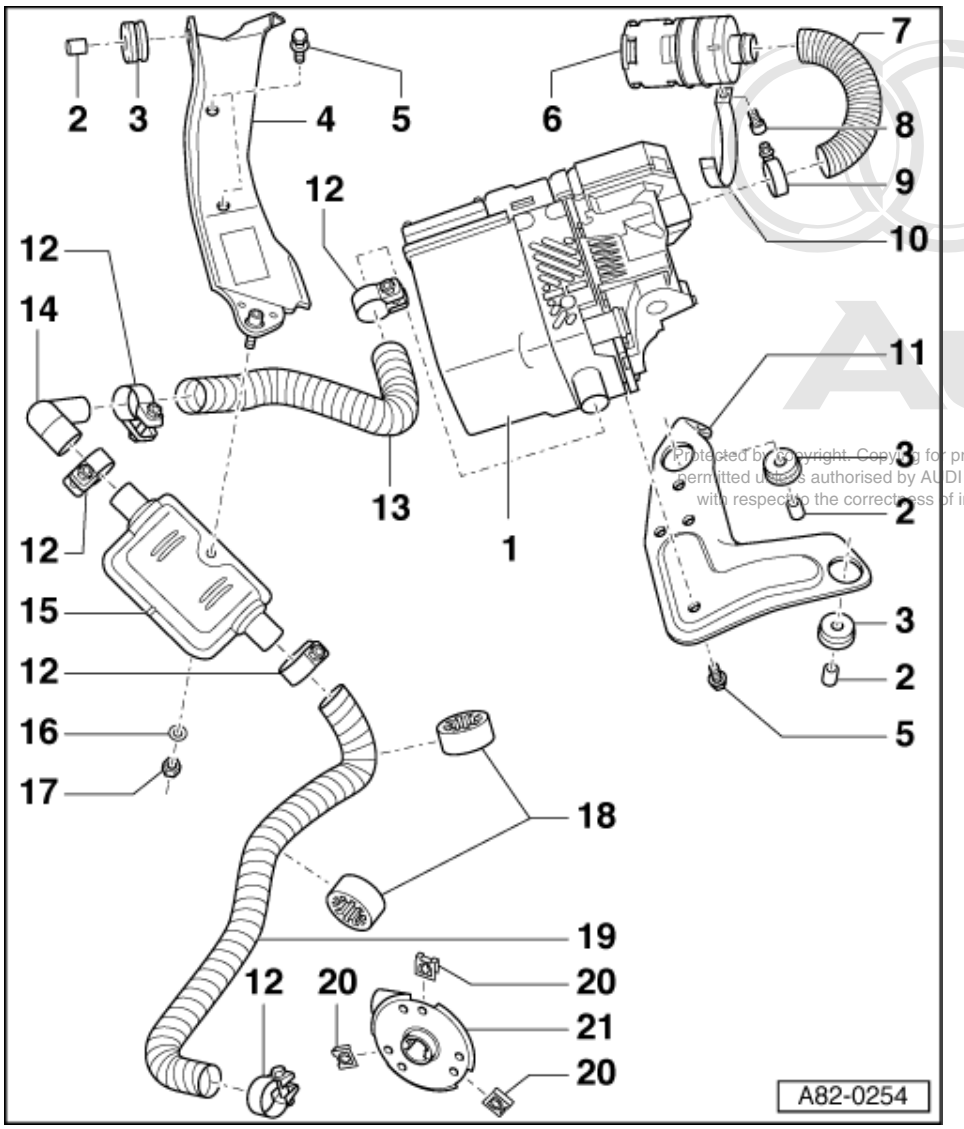

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9 Hose clamp

10 Clip

11 Bracket

- For additional heater
- Upon installation, ensure clearance to coolant hose clamp, rotate clamp as necessary =>Fig. 1

12 Clip

- For exhaust system

13 Corrugated exhaust pipe

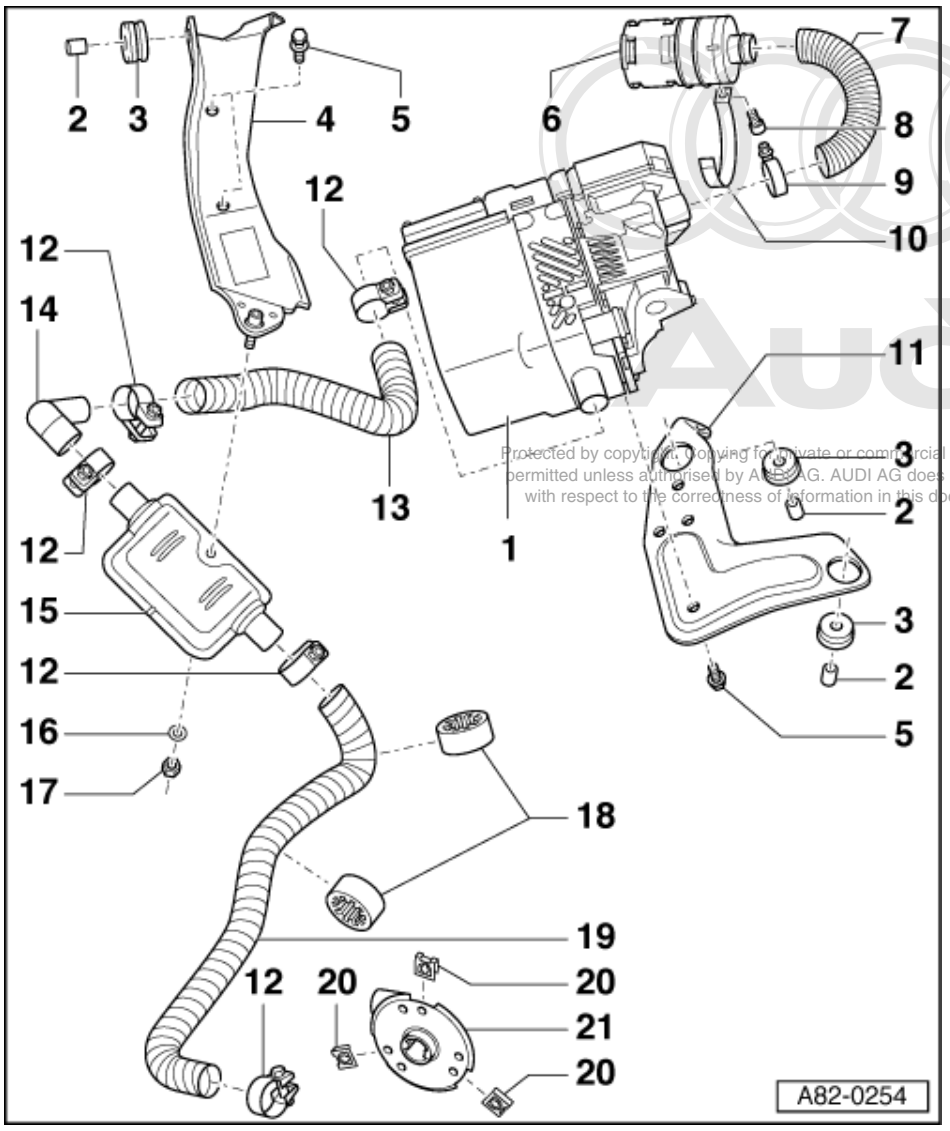
14 Exhaust pipe

- 90° angled

15 Exhaust silencer

16 Washer

17 Hexagon nut



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18 Spacer

- Made of rubber with high temperature resistance

19 Corrugated exhaust pipe

20 Snap nut

21 Tailpipe

- With thermal insulation mat

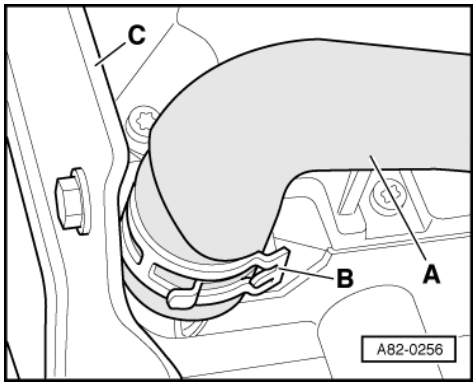
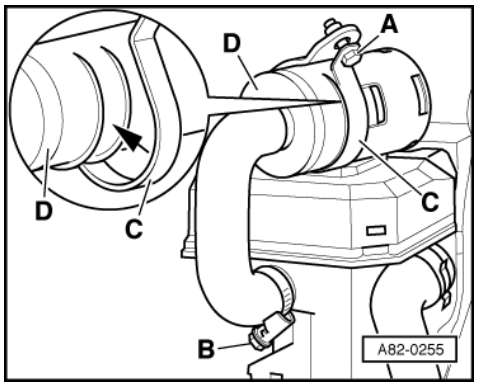


Fig.1 Attaching bracket for additional heater

- When securing the bracket -C- check the clearance to clamp -B- on coolant hose -A-, these must not touch.

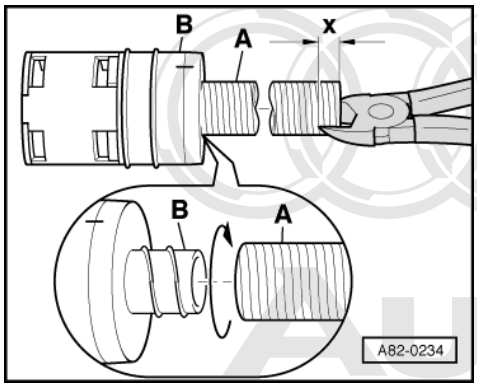
10.3 - Removing and re-installing air intake hose with intake silencer



- Remove the bolt -A-.
- Detach the clamp -B-

Notes:

- When installing the clamp -C-, ensure that intake silencer -D- is in proper installation position (guide on intake silencer).



- -> The intake hose -A- is attached to the intake shock absorber -B-.
- In order to attach the intake hose -A- to the intake pipe of the additional heater using a hose clamp it must be cut with side cutting pliers twice for approx. 10 mm each (dimension X).

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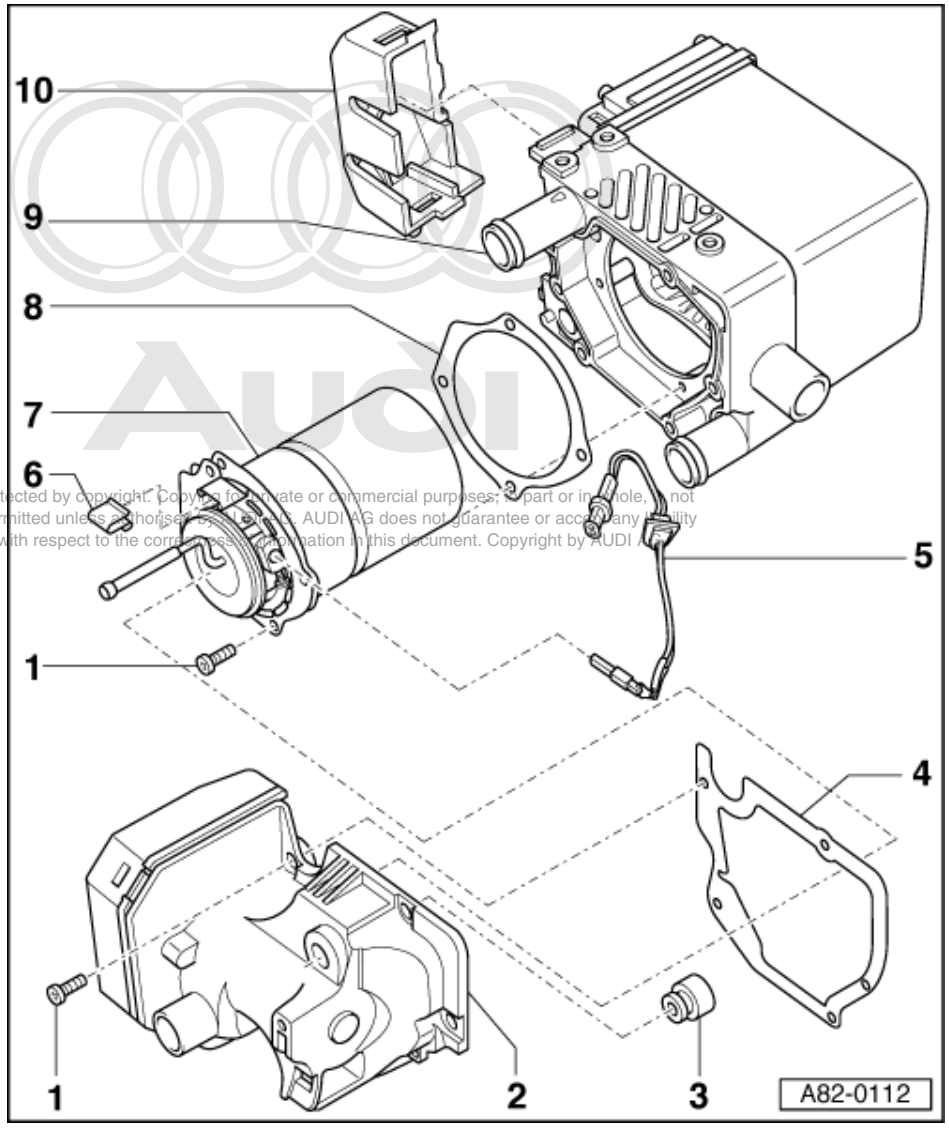
10.4 - Dismantling and assembling additional heater



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Note:

Removing additional heater => Page 84

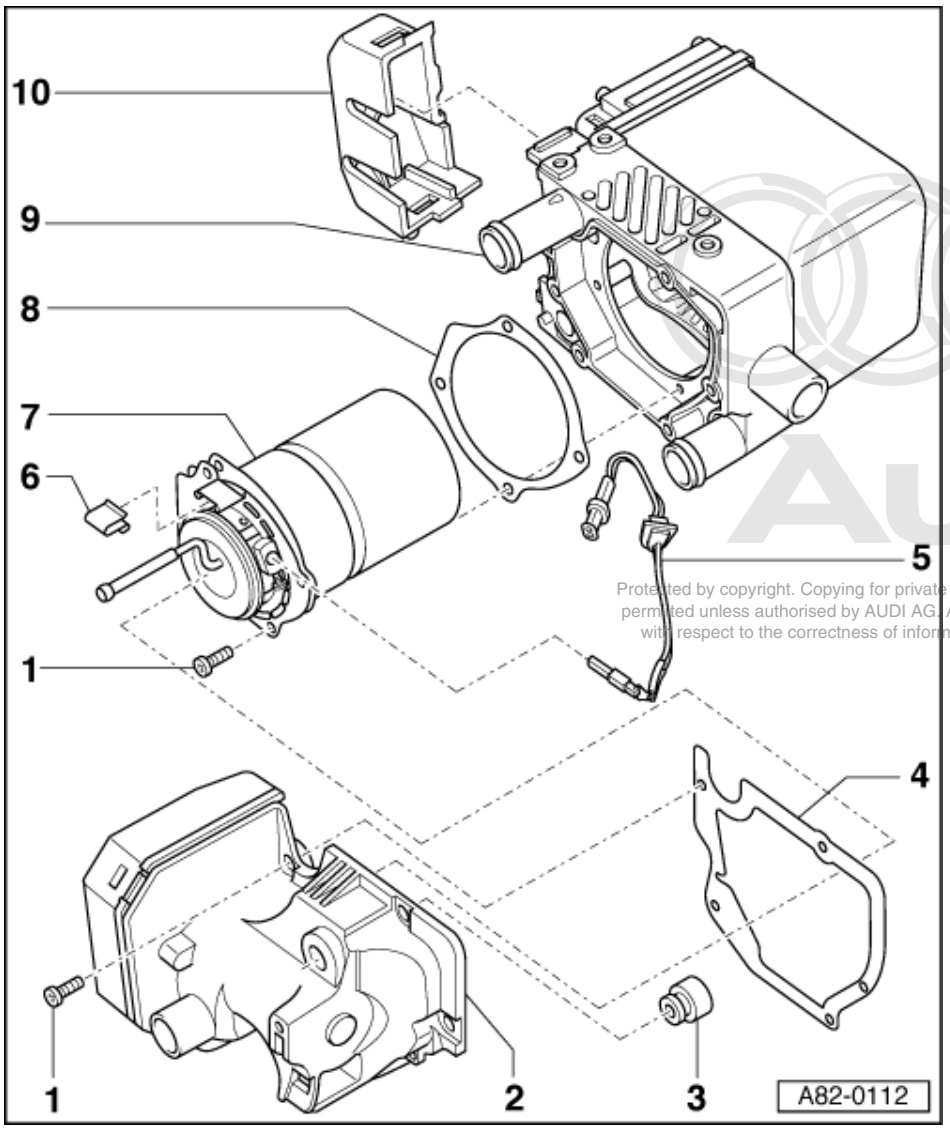
1 **Bolt**

2 **Combustion air blower -V6**
- Checking => Page 45
- Removing and installing => Page 97

3 **Seal**

4 **Shaped gasket**
- Renew

5 **Glow plug with flame detector -Q8**
- With internal filament (sheathed element).



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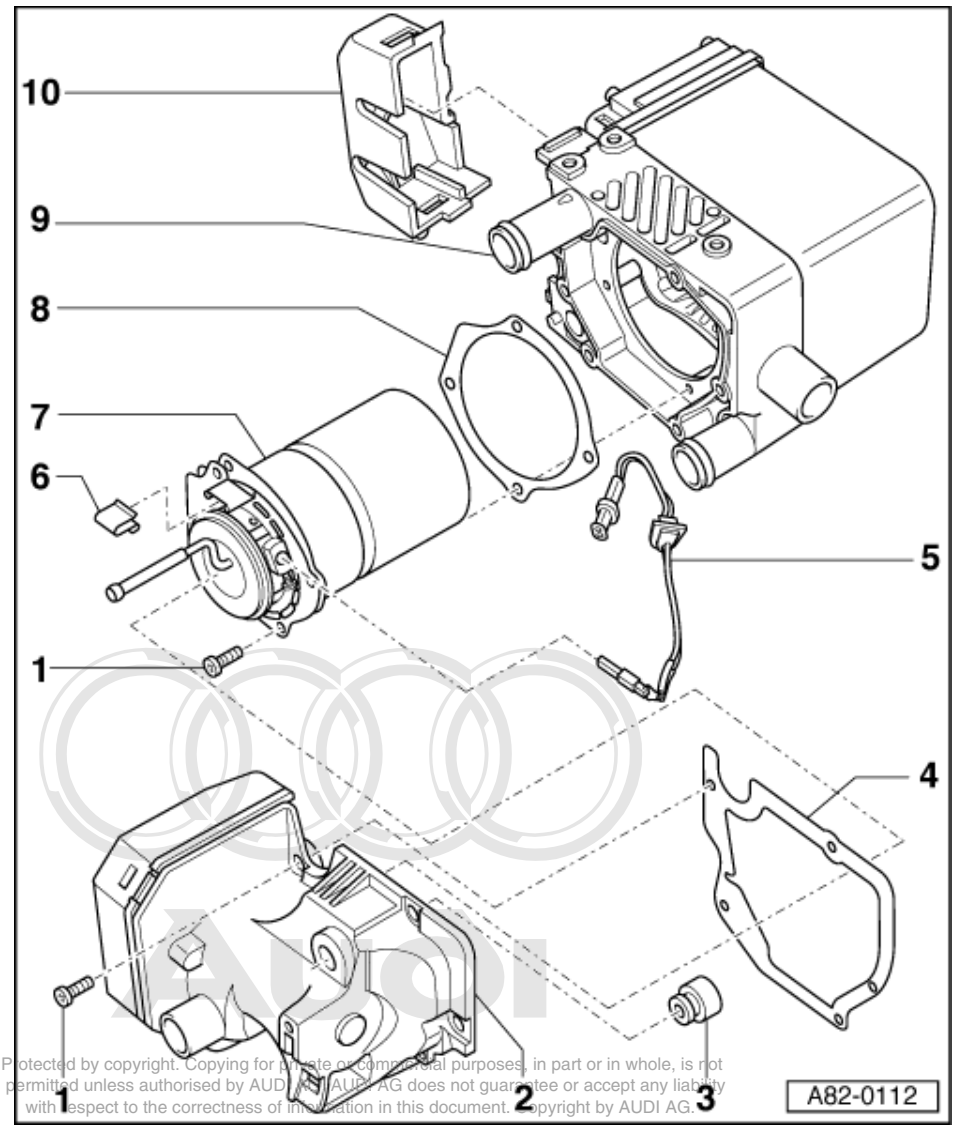
- Different versions for securing with bolt or clamp =>Page 98
- Checking => Page 45
- Removing and installing =>Page 98

6 Clip

- Install in correct position

7 Burner element

- Different versions for securing -Q8 glow plug with flame detector using bolt or clamp =>Page 98
- Removing and installing =>Page 98



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8 Shaped gasket

- Renew

9 Burner housing, heat transmitter and control unit -J162

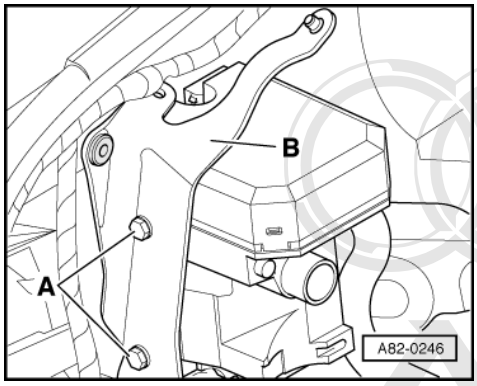
- Do not dismantle
- Different versions

=> Parts List

10 Cover

- For connector rail.
- Removing and installing =>Page 96
- Connector rail assignment =>Page 96

10.5 - Removing and installing connector rail cover



- Detach the additional heater from the vehicle or remove it => Page 84
- -> Detach the bracket from the additional heater by removing bolts -A- and -B-.

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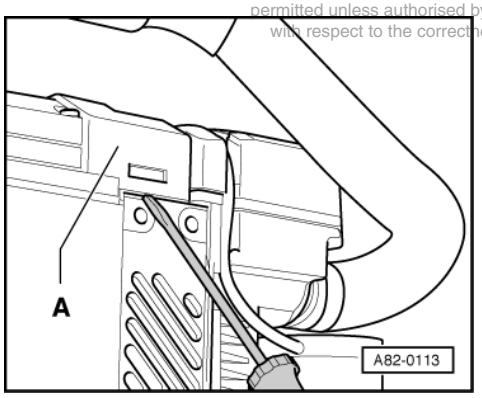
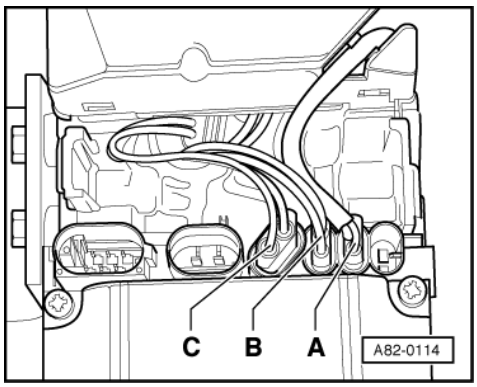


- -> Lever off the cover -A- using a screwdriver.

10.6 - Additional heater connector rail assignment



- -> Connector -A- provided for -V55 recirculating pump.

Note:

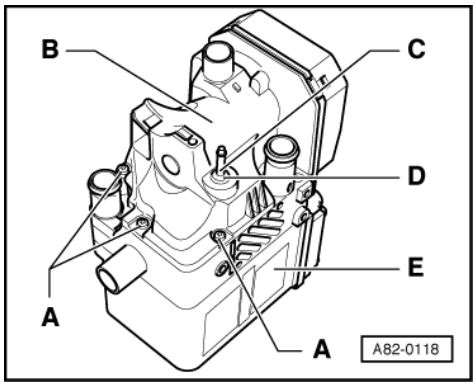
The Audi A2 currently has no recirculating pump installed.

- Connector -B- to combustion air blower -V6.
- Connector -C- to glow plug with flame detector -Q8.

10.7 - Removing and installing combustion air blower -V6

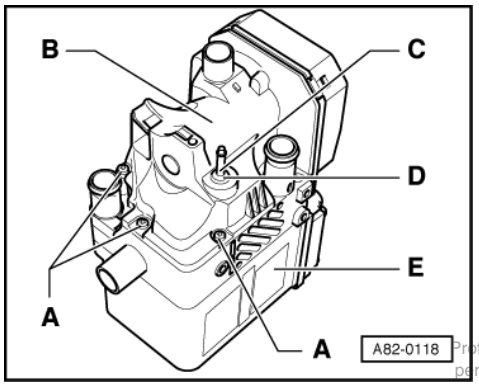
Notes:

- The delivery performance of the combustion air blower is attached with certain tolerances. During the production of the additional heater the CO2-content in the exhaust gas is adjusted in the control unit -J162 (on a test stand). This adjustment may be modified within specified limits using "adaption" function => Page 73
- After replacing the combustion air blower the CO2-content in the exhaust gas must be checked and adjusted, if necessary => Page 73



- Remove the additional heater => Page 84
- Remove the connector rail cover and detach the electrical connections of the combustion air blower to the connector rail =>Page 96
- -> Remove the bolts -A-
- Detach combustion air blower -B- from heater unit -E-.

Installation notes:



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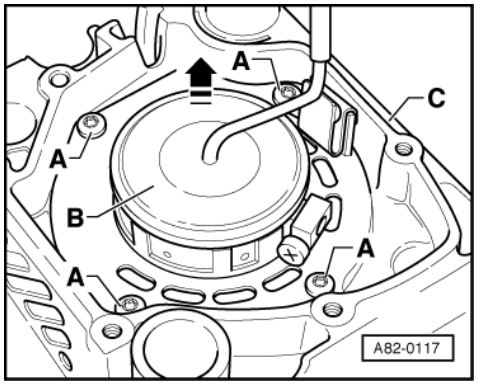
- Before installing combustion air blower, replace shaped gasket (between combustion air blower and heater).
- -> When inserting the fuel pipe -C-, ensure that grommet -D- is properly seated in combustion air blower -B-.

10.8 - Removing and installing burner element



- Remove the combustion air blower -V6 => Page 97
- -> Remove the bolts -A-
- Pull burner element -B- with glow plug out of the heater -C- from above.

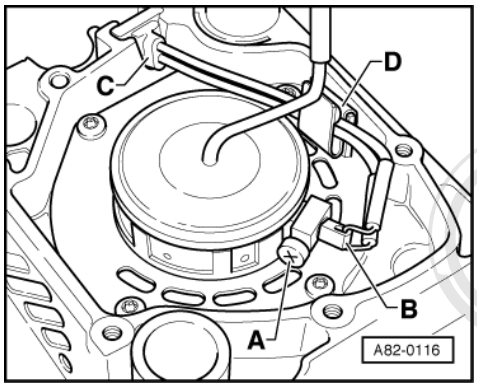
Notes:

- Before installing burner element, replace shaped gasket (between burner element and heater).
- Different burner element versions (for securing -Q8 glow plug with flame detector using bolt or clamp) =>Page 98
- Problems may be encountered with additional heater operation in cold weather in vehicles with diesel engines if vegetable-oil methyl ester is the main fuel that is used.
  Reason:
  Because of the physical properties thereof, deposits may form on the evaporation fabric in the burner element. These deposits could affect combustion if vegetable-oil methyl ester fuel is used for long periods.

- Removing glow plug with flame detector -Q8 =>Page 98
- If burner element is defective, also replace -Q8 glow plug with flame detector.

10.9 - Removing and installing glow plug with flame detector -Q8

Notes:



- Different versions for burner element and for -Q8 glow plug with flame detector (secured using bolt or clamp).

- -> At the start of production the -Q8 glow plug with flame detector was installed in the burner element with bolt -A- in some additional heaters.

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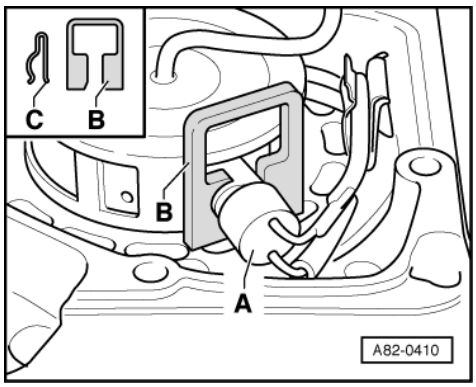
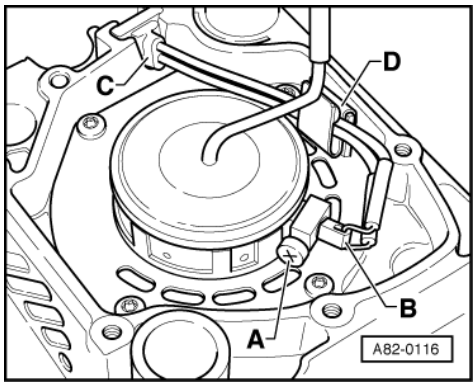
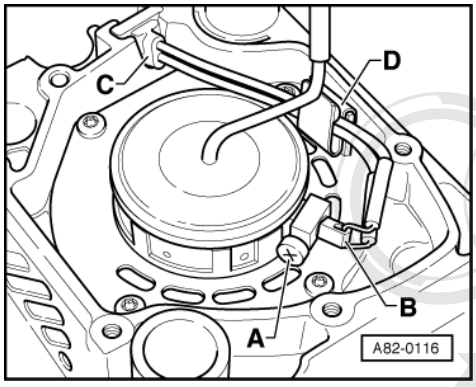


- -> With the exception of several additional heaters at the start of production, the -Q8 glow plug with flame detector was secured in the burner element using clamp -C- up to 11.01 (running change).
- As of 11.01 (running change) the -Q8 glow plug with flame detector is secured in the burner element using clamp -B-.

◆ Clamp -B- dissipates the heat generated at the -Q8 glow plug better than clamp -C-, therefore, install only those burner inserts secured using a bolt or a type -B- clamp.



- Remove the burner insert => Page 98
- -> Remove the bolts -A- (or the clamp).
- Pull glow plug and flame detector -B- out of burner element.



Installation notes:

◆ -> The screw -A- should only be tightened to approx. 0.5 Nm. Higher torque may damage glow plug.
◆ If glow plug is defective, also replace burner element.
◆ Fix wiring into position in clip -D- and route as shown.

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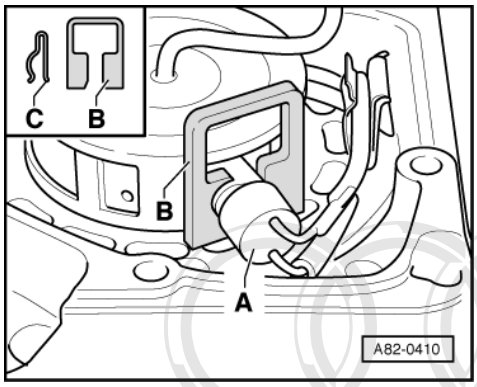

- Check that grommets -C- are properly seated after installation.
- Check non-insulated part of lead to glow plug before fitting combustion air blower. Leads must not make mutual contact or rest against other components (risk of short circuit).
- -> For a burner element where the -Q8 glow plug is secured using the clamp -B- ensure a tight fit of the clamp and install only burner elements where the glow plug is secured using a type -B- clamp.

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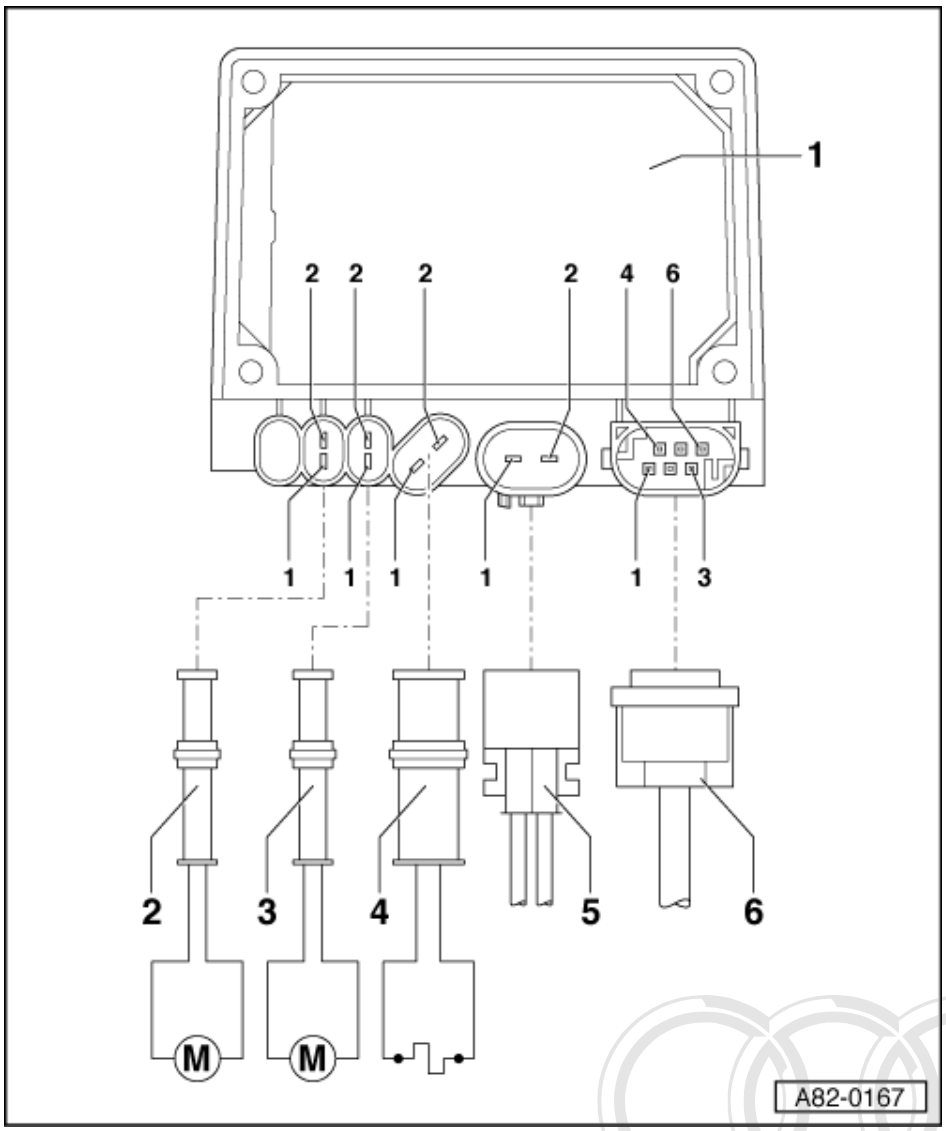
11 - Additional heater block diagram

11.1 - Additional heater block diagram



Note:

Incorporation of additional heater into vehicle electrical system.

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

1 Control unit -J162 with connector rail

- Control unit is fitted with temperature sensors to measure coolant temperature and safeguard against overheating.
- Control unit is permanently attached to burner housing/heat transmitter.
- Different control units (software versions)

=> Parts List

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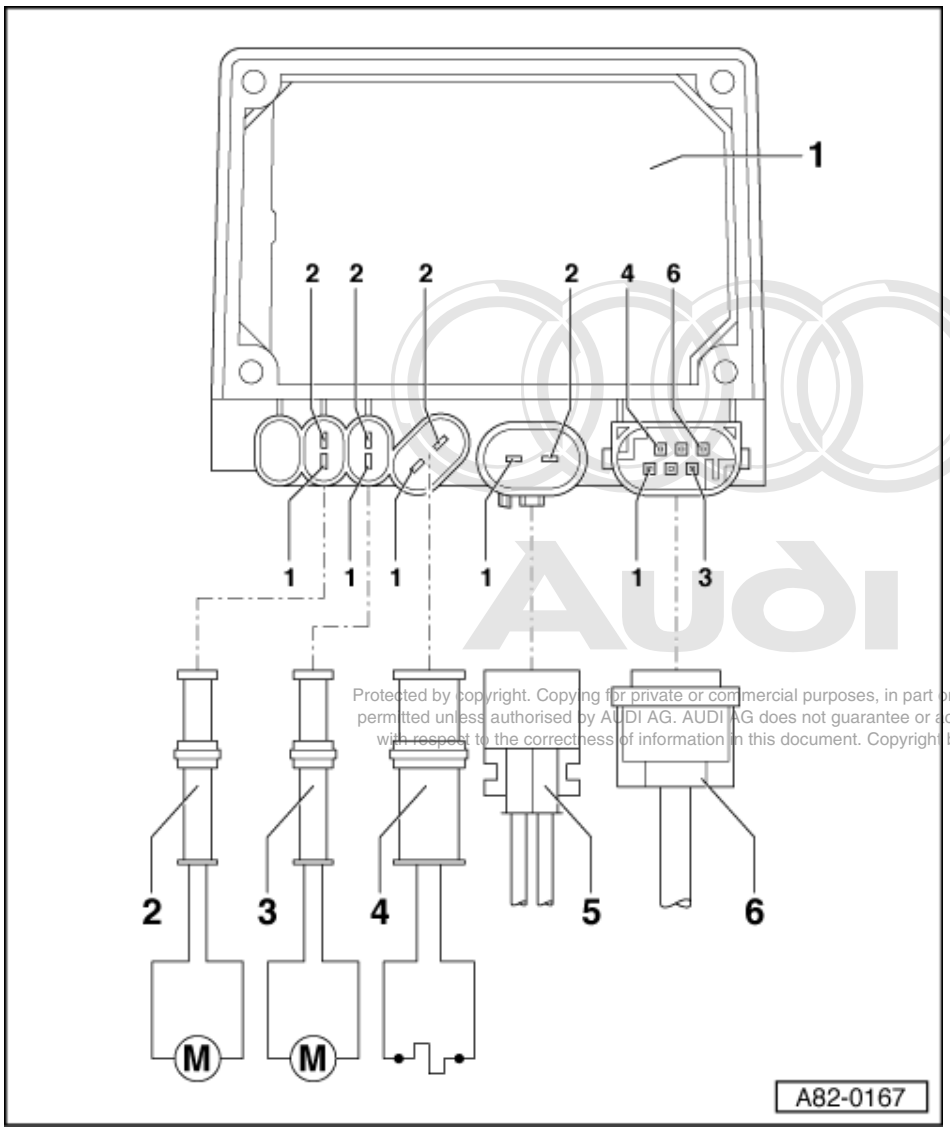

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2 Not used at present

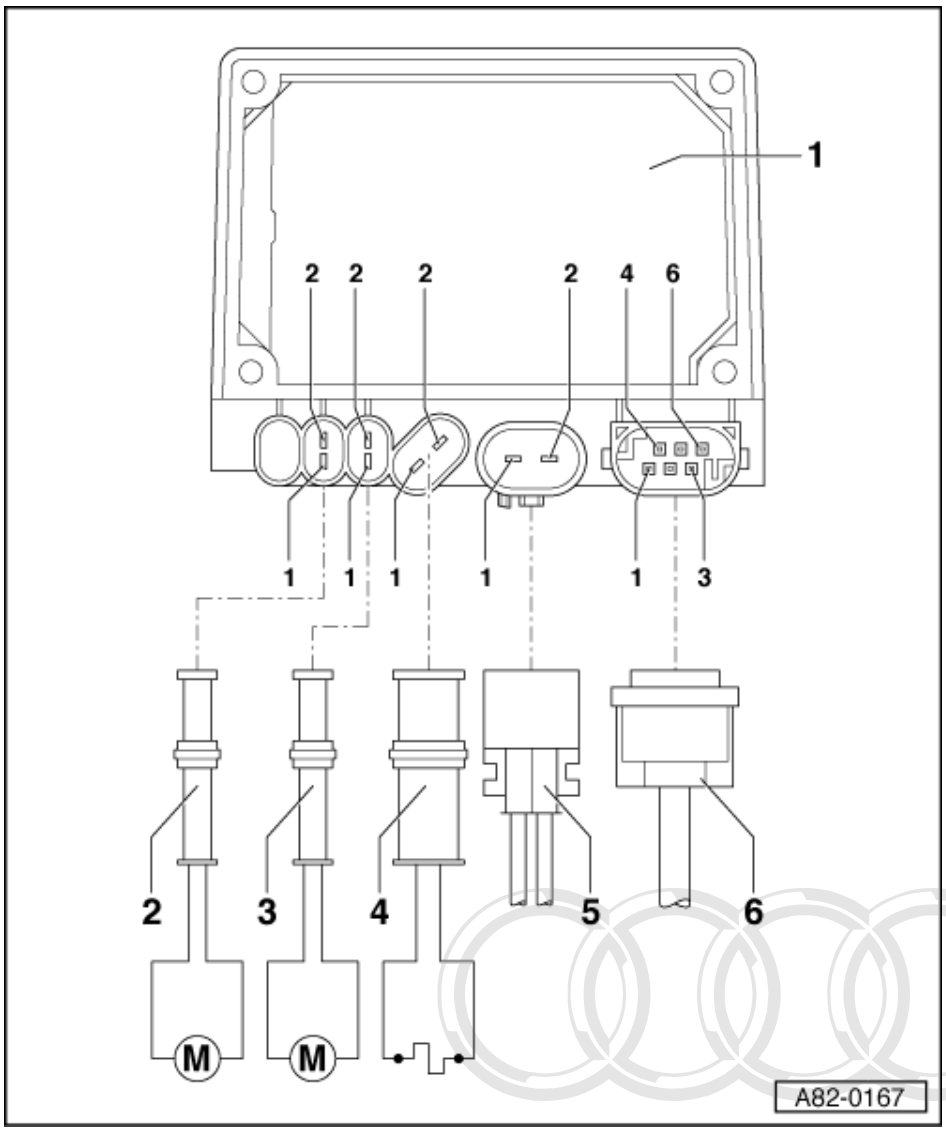
- Provided for the connection of a -V55 recirculating pump
- The Audi A2 currently has no recirculating pump installed (the additional heater is switched on only if the engine is running).

3 Combustion air blower -V6

4 Glow plug with flame detector -Q8

5 2-way connector

- Contact
- 1 terminal 30 power supply (fused)
- Contact 2
- Earth connection



6 6-way connector

- ◆ Contact 1
- Not used on version with additional heater.
- Provided for the cut-in signal for the "auxiliary heater/auxiliary ventilation" (e.g. positive from a preselector clock)
- ◆ Contact 2
- Diagnosis (K-wire)
- ◆ Contact 3
- Cut-in signal for the "additional heater" (earth from engine control unit -J248)
- The signal is received from the control unit for the diesel direct injection system -J248 as soon as the given cut-in conditions are met.

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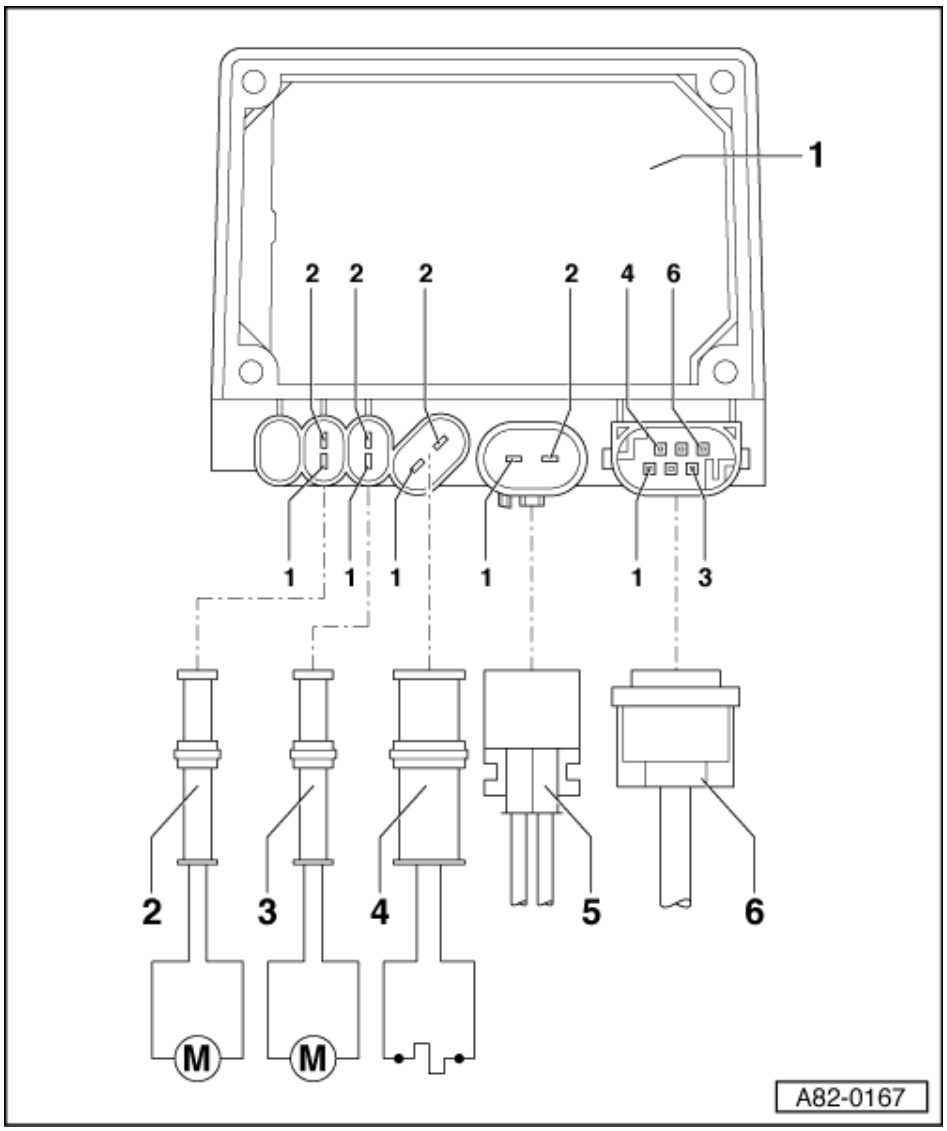
=> Relevant Workshop Manual, Diesel Direct Injection and Preglow System



- ◆ Contact 4
- \- Not used on version with additional heater.
- \- Provided for the actuation of the -E87 operating and display unit, the heater controls, or the fresh air blower via a relay for a version with auxiliary heater (the output must not be loaded with more than 2 A).
- ◆ Contact 5
- \- Not used on version with additional heater.
- \- Provided as input for switching of a auxiliary heater to auxiliary ventilation (switch open = auxiliary heater mode, switch closed = earth = auxiliary ventilation mode) for the auxiliary heater.

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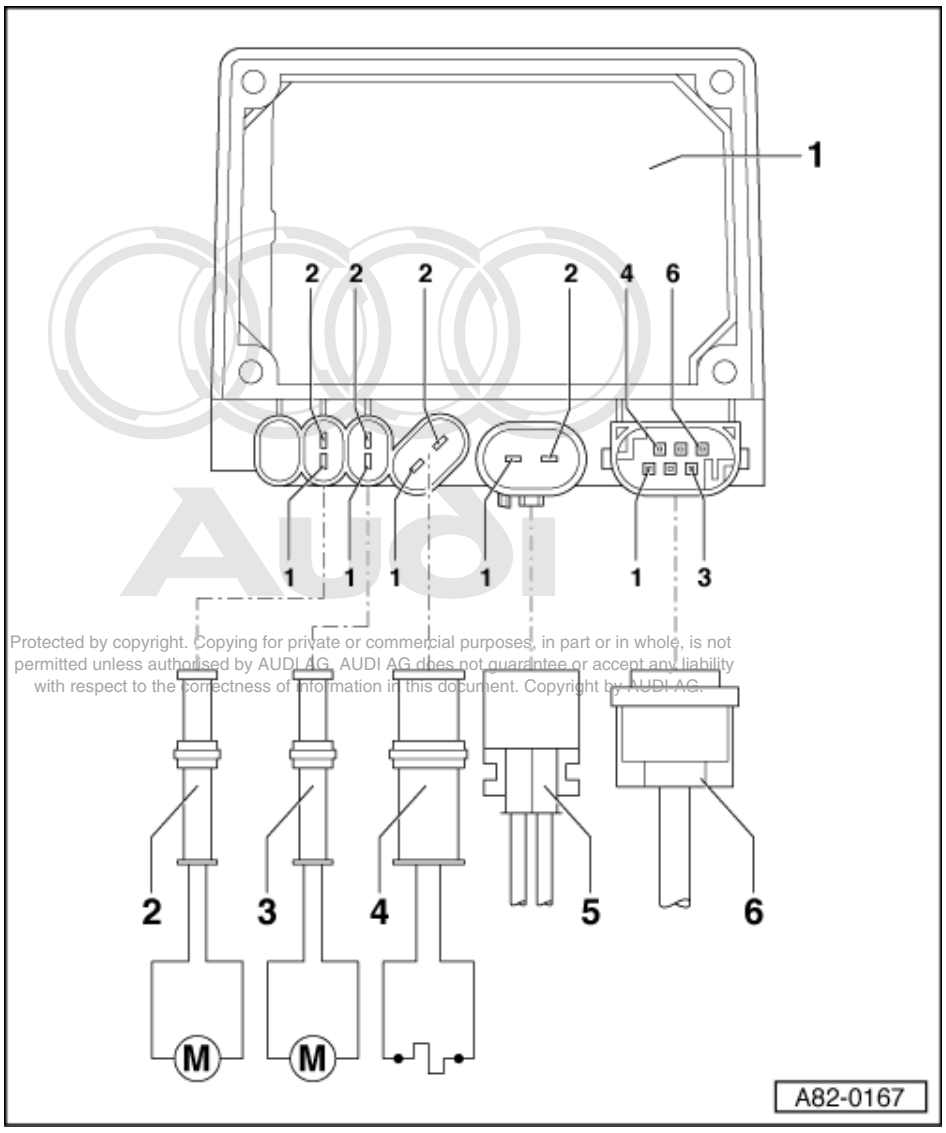

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- ◆ Contact 6
- Metering pump actuation -V54
- Metering pump delivery rate is controlled by frequency of square-wave signal (number of voltage pulses per sec.).
- On the Audi A2, this output is also connected to the control unit for the diesel direct injection and glow plug system. This control module counts the additional heater fuel consumption (for the display in the dash panel insert) as part of the engine fuel consumption.

=> Relevant Workshop Manual, Diesel Direct Injection and Preglow System