

Electrical test in vehicles from model year 2002

Test steps 5 to 9

Test step 5:

Pressure signal from high-pressure sender -G65

VAS 5051, Measurement technique mode: DSO (digital storage oscilloscope) Setting 5V/Div =, 5ms/Div (5 V DC and 5 milliseconds per unit) ▪ Adapter cable V.A.G 1598/11 connected					
Test step	V.A.G 1598 A Socket	Testing of	▪ Test conditions - Additional operations	Specified value	Remedies if specified value not attained
5.1	21 + Earth1)	Pressure-dependent square-wave signal from sender - G65	<ul style="list-style-type: none"> ▪ Ignition switched on ▪ Engine does not run ▪ Ambient temperature over 20 °C and under 35 °C 	<ul style="list-style-type: none"> - Square-wave signal (dependent on pressure in refrigerant circuit =>Page01-346 Signal ratio above 16.5% and below 50% 	<ul style="list-style-type: none"> ▪ No detectable signal <p>Use current flow diagram to locate and rectify open circuit, contact resistance or short circuit between the -E87 and the -G65.</p> <p>Check voltage supply and earth connection to high-pressure sender - G65 => Page 01-347.</p> <p>Replace high-pressure sender -G65</p>
Continued on next page					

1) Contact 14 of connector D is connected to earth.

VAS 5051, Measurement technique mode: DSO (digital storage oscilloscope) Setting 5V/Div =, 5ms/Div (5 V DC and 5 milliseconds per unit) ▪ Adapter cable V.A.G 1598/11 connected					
Test step	V.A.G 1598 A Socket	Testing of	▪ Test conditions - Additional operations	Specified value	Remedies if specified value not attained
5.1 (cont.)	21 + Earth1)	Pressure-dependent square-wave signal from sender - G65	<ul style="list-style-type: none"> ▪ Ignition switched on ▪ Engine does not run ▪ Ambient temperature over 20 °C and under 35 °C 		<ul style="list-style-type: none"> ▪ Signal ratio under 5% and over 95% <p>Check voltage supply and earth connection to high-pressure sender - G65 => Page 01-347.</p> <p>High-pressure sender -G65 defective, replace</p> <ul style="list-style-type: none"> ▪ Signal ratio over 5% and under 16.5 % <p>Too little refrigerant in circuit, vehicle must be taken to a specialist air conditioner workshop</p>
Continued on next page					

1) Contact 14 of connector D is connected to earth.

VAS 5051, Measurement technique mode: DSO (digital storage oscilloscope) Setting 5V/Div =, 5ms/Div (5 V DC and 5 milliseconds per unit) ▪ Adapter cable V.A.G 1598/11 connected					
Test step	V.A.G 1598 A Socket	Testing of	▪ Test conditions - Additional operations	Specified value	Remedies if specified value not attained
5.1 (cont.)	21 + Earth1)	Pressure-dependent square-wave signal from sender -G65	<ul style="list-style-type: none"> ▪ Ignition switched on ▪ Engine does not run ▪ Ambient temperature over 20 °C and under 35 °C 		<ul style="list-style-type: none"> ▪ Signal ratio over 50% or under 16.5% <p>High-pressure sender -G65 defective, replace</p> <p>Fault in refrigerant circuit, vehicle must be taken to a specialist air conditioner workshop</p>

1) Contact 14 of connector D is connected to earth.

Notes:

- ◆ When the refrigerant circuit is filled with the correct quantity of refrigerant the pressure and therefore the signal ratio changes with the ambient temperature.
- ◆ The signal ratio and the pressure calculated by the operating and display unit -E87 is displayed in the measured value block => Page 01-192 (display group 001).

- ◆ The signal transmitted at a refrigerant circuit pressure of approx. 5 to 6 bar absolute is equivalent to a signal ratio of approx. 22% (automatic adjustment with compressor at a standstill, at an ambient temperature of 20 °C, and with properly filled refrigerant circuit).
- ◆ The signal transmitted at a pressure in the refrigerant circuit of approx. 16 bar absolute is equivalent to a signal ratio of approx. 50%. This is set automatically when the compressor is at a standstill only under extreme conditions (e.g. very high ambient temperatures and a hot engine).

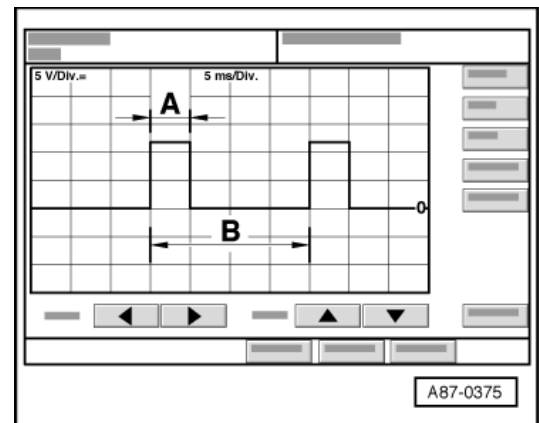
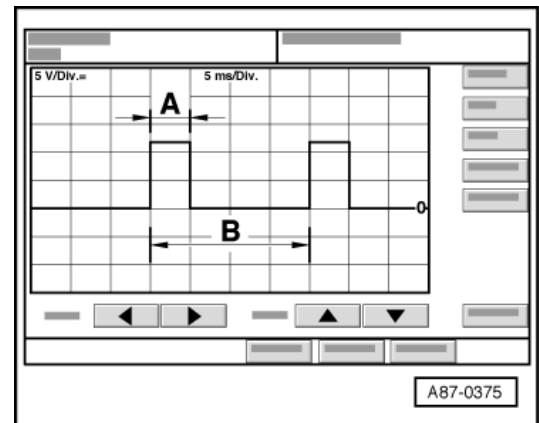
Checking pressure signal from high-pressure sender -G65

→ This display appears on the oscilloscope screen if the following conditions have been satisfied.

- Ignition switched on (positive and earth applied at sender -G65)
- Oscilloscope setting:
5 V/Div. = (5 V DC per unit)
5 ms/Div. (5 milliseconds per unit)
- Test lead (signal wire) connected to socket -21- of test box V.A.G 1598/11.
- Test lead (screening) connected to connector -D- contact -14- to the -E87 or to the vehicle earth.

Notes:

- ◆ The illustration shows the signal transmitted at a refrigerant circuit pressure of approx. 7 bar absolute, which is equivalent to a signal ratio of approx. 25% (automatic adjustment with compressor at a standstill, at an ambient temperature of 30 °C, and with filled refrigerant circuit).
- ◆ Pulse width -A- is governed by the refrigerant circuit pressure (if the pressure increases, the -A- range widens).
- ◆ → The signal gap -B- is always 20 milliseconds (equivalent to a frequency of 50 Hertz).
- ◆ The signal ratio is derived from the ratio between pulse width -A- and signal gap -B-.



→ Pin assignment for high-pressure sensor -G65

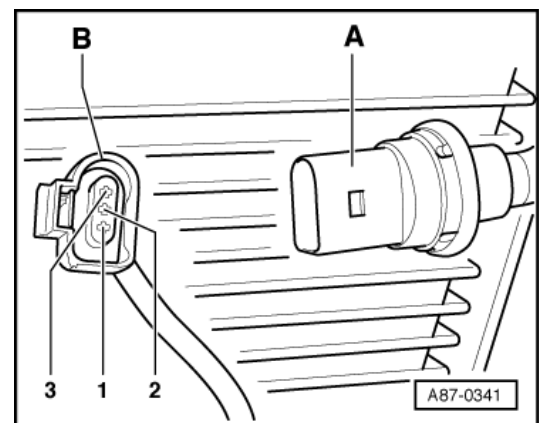
Contact 1, earth

Contact 2 signal output (square-wave signal to the -E87)

Contact 3, positive (terminal 75)

Notes:

- ◆ → The compressor will not be switched on if connector -B- is disconnected.
- ◆ High-pressure sensor -A- is an electronic control unit that generates a square-wave signal whose signal ratio changes with the pressure in the refrigerant circuit =>Page [01-348](#).



Pressure signal from high-pressure sender -G65

→ A- Pressure on high-pressure side of refrigerant circuit in bar (absolute)

B- Signal ratio of the square-wave signal

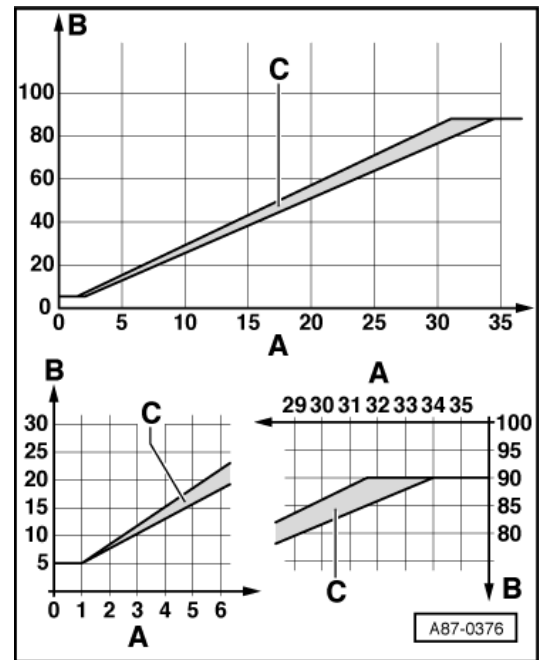
C- Curve

Notes:

- ◆ The operating and display unit -E87 switches the compressor on as soon as no compressor shut-off criterion is present (by actuating the -N280 or the -J44):

- – If the signal ratio is over 12 % (equivalent to approx. 1.8 bar absolute pressure) and below 87.5% (equivalent to approx. 32 bar absolute pressure).
- – If the signal ratio is under 12 % or over 87.5% the compressor is not switched on (regulating valve -N280 is not actuated).
- ◆ The signal ratio and the pressure calculated by the operating and display unit -E87 is displayed in the measured value block => Page [01-192](#) (display group 001)
- ◆ An absolute pressure of 0 bar represents an absolute vacuum. Therefore normal ambient pressure is equivalent to approx. 1 bar absolute. On the dials of most pressure gauges 0 bar is equivalent to an absolute pressure of one bar (recognisable by the datum -1 below 0).

In vehicles with a petrol engine and a compressor with regulating valve -N280 (-E87 encoding)



- ◆ The -E87 transmits the request to switch on the radiator fans via the drive data bus to the engine control unit, which then switches the radiator fan on via the fan control unit:
 - – Irrespective of the pressure in the refrigerant circuit as soon as the compressor is switched on.
- ◆ → The -E87 transmits the request for a higher speed for the radiator fan to the engine control unit via the drive data bus:
 - – In vehicles with a petrol engine 100% is at present only requested at a pressure of approx. 26 bar in the refrigerant circuit.

In vehicles with a diesel engine and a compressor with regulating valve -N280 (-E87 encoding)

- ◆ The -E87 switches the radiator fan on via dedicated wires to relays -J26 and -J101:
 - – The 1st speed irrespective of the pressure in the refrigerant circuit as soon as the compressor is switched on.
 - – The 2nd speed is at present actuated 100% from a pressure in the refrigerant circuit of 16 bar.

In vehicles with a compressor with magnetic clutch -N25 (-E87 encoding)

- ◆ The -E87 switches the radiator fan on via dedicated wires to relays -J26 and -J101 or to the radiator fan control unit -J293:
 - – The 1st speed irrespective of the pressure in the refrigerant circuit as soon as the compressor is switched on.
 - – The 2nd speed is at present actuated 100% from a pressure in the refrigerant circuit of 16 bar.

In vehicles with a petrol or diesel engine and a compressor with regulating valve -N280 (-E87 encoding)

- ◆ The signal generated by the high-pressure sender -G65 is also used to control the engine. The -E87 transmits the information to the engine control unit via the drive data bus (the torque required for the compressor drive depends on the pressure in the refrigerant circuit). Depending on the engine control unit version, the signal in the measured value block is displayed as signal ratio.

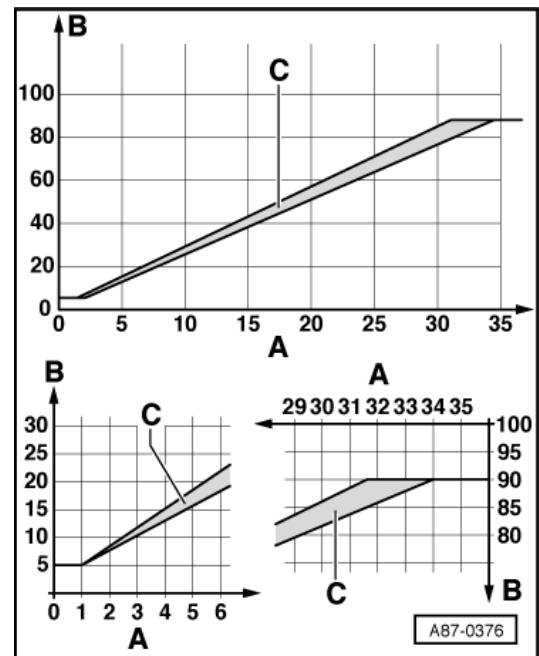
=> Relevant Workshop Manual, Injection and Ignition System; Repair group 01

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

Test step 6:

Actuation for the air conditioner compressor regulating valve -N280

Notes:



- ◆ Test step 6 must only be performed in vehicles with a compressor with regulating valve -N280.
- ◆ In vehicles with a compressor with magnetic clutch -N25 test step 7 must be performed.

VAS 5051, Measurement technique mode: Multimeter, resistance measurement (200 ω) ▪ Adapter cable V.A.G 1598/12 connected					
Test step	V.A.G 1598 A Socket	Testing of	▪ Test conditions - Additional operations	Specified value	Remedies if specified value not attained
6.1	8 + 14	Wiring to regulating valve - N280	▪ Ignition switched off	- over 5 ω and under 20 ω	- Use current flow diagram to locate and rectify open circuit or contact resistance in the wiring between - N280 and - E87. Open circuit in regulating valve - N280, replace compressor (vehicle must be taken to a specialist air conditioner workshop)

VAS 5051, Measurement technique mode: Multimeter, voltage measurement (20V =) ▪ Adapter cable V.A.G 1598/12 connected					
Test step	V.A.G 1598 A Socket	Testing of	▪ Test conditions - Additional operations	Specified value	Remedies if specified value not attained
6.2	8 + 14	Wiring to regulating valve - N280	▪ Ignition switched off	- Less than 1 V	- Use current flow diagram to locate and rectify short circuit to positive in the connection to the - N280 or between the -N280 and the - E87.
					- Use current flow diagram to locate and eliminate open circuit in

6.3	8 + 14	Voltage supply to regulating valve - N280	▪ Ignition switched on	- Approx. battery voltage	power supply to - N280. Use current flow diagram to locate and rectify short circuit to earth in the connection between - N280 and -E87.
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VAS 5051, Measurement technique mode: Multimeter, current measurement (10 A =) ▪ Adapter cable V.A.G 1598/12 connected					
Test step	V.A.G 1598 A Socket	Testing of	▪ Test conditions - Additional operations	Specified value	Remedies if specified value not attained
6.4	8 + 14	Current measurement across regulating valve -N280	▪ Ignition switched on	- over 0.5 A and under 1.5 A	- Use current flow diagram to locate and rectify open circuit in the wiring between - N280 and - E87. Regulating valve - N280 defective, replace compressor (vehicle must be taken to a specialist air conditioner workshop)

Notes:

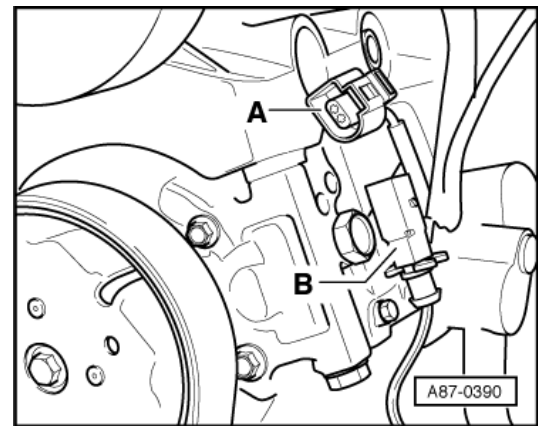
- ◆ During operation the compressor output is controlled via regulating valve -N280.
- ◆ The operating and display unit -E87 controls the current that flows across the regulating valve and consequently the output of the compressor => Reading measured value block Page [01-192](#) (display group 001)
- ◆ In vehicles with a magnetic clutch a current of approx. 0.2 A is measured (control current across the coil of the relay -J44)

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

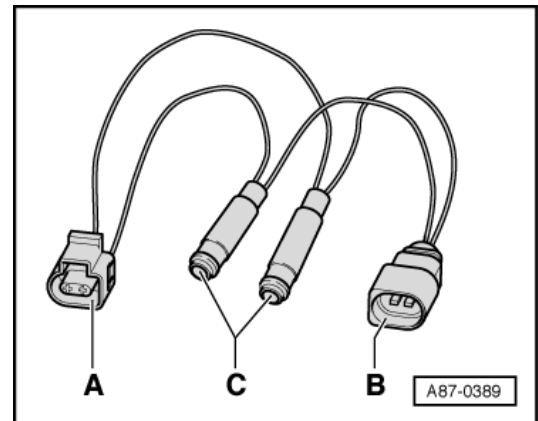
Checking switch-on signal for regulating valve -N280

- Switch ignition off.
- Connect the operating and display unit to the vehicle wiring harness.
- → Unplug the connector from the air conditioner compressor.
- Restore the connection between connector -A- and connector -B- at the regulating valve using the adapter cable from adapter set V.A.G 1594 A.

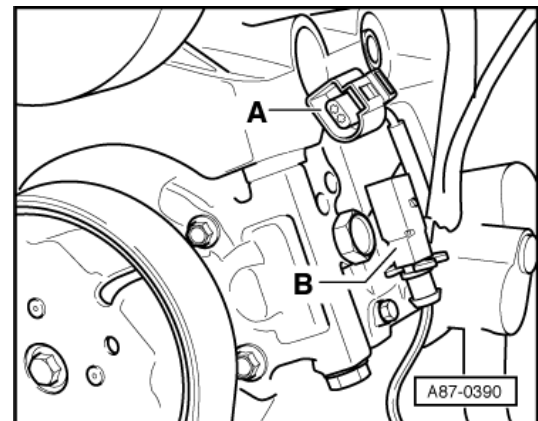
Note:



→ An adapter cable may also be made for this test. To do so, use e.g. a connector -A- and a connector -B- (with part nos. 1J0 973 702 and 1J0 973 802 and the relevant plug contacts), two commercially available sockets for banana plug -C- and two wires with a cross section of 0.5 mm².



- → Connect the DSO measuring cable VAS 5051/8 to the adapter leads
 - Test lead (signal wiring) to contact -2-.
 - Test lead (screening, earth) to contact -1-.
- Set the VAS 5051 to measurement technique mode: DSO (digital storage oscilloscope) on
- Setting 5V/Div =, 0.5ms/Div (5 V DC and 0.5 milliseconds per unit)
- Start the engine
- Set the operating and display unit temperature selection to "Lo"
- Switch the actuation of regulating valve -N280 on and off on the -E87 by actuating the "Auto" and "Econ" buttons.

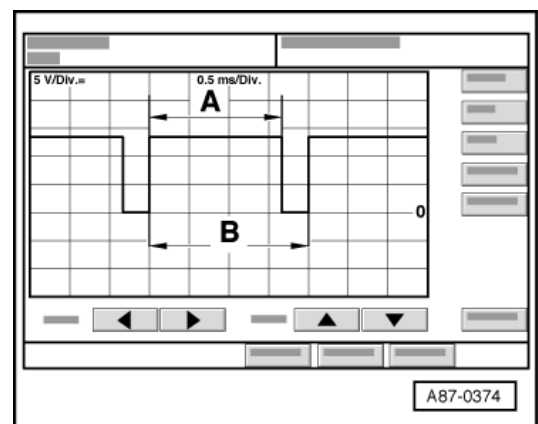


Irrespective of the -E87 setting, the following is displayed on the oscilloscope screen:

- In "OFF" or "Econ" mode
no square-wave signal (the regulating valve is not actuated).
- → In "Auto" mode, with temperature setting "Lo"
a square-wave signal with a pulse width -A- between 75% and 100% (the regulating valve is actuated).

Notes:

- ♦ The illustration shows a signal with a signal ratio of approx. 80%.
- ♦ The pulse width -A- depends on the required refrigeration capacity, the vehicle voltage etc. (the current across regulating valve -N280 is regulated by the -E87 via the width of range -A-).
- ♦ The signal gap -B- is always 2 milliseconds (equivalent to a frequency of 500 Hertz).
- ♦ The duty cycle is derived from the ratio between pulse width -A- and signal gap -B-.
- ♦ A mirror image of the signal shown in illustration A87-0374 can be obtained by connecting the signal wire to contact -1- and the wire with the earth connection to vehicle earth.



- → The pulse width of the square-wave signal is changed according to the

setting on the -E87 and the measured environmental factors (signal ratio between 100% and over 30%, the regulating valve is actuated so that the compressor output required to obtain the prescribed temperatures is achieved).

Notes:

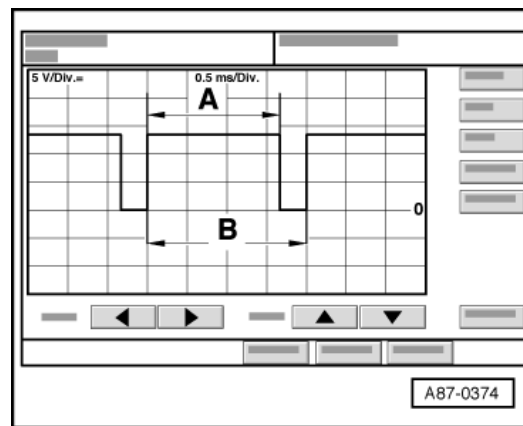
- ◆ In "Auto" mode with temperature setting "Lo" the -N280 is actuated so that the maximum permitted current of approx. 0.65 A flows across the regulating valve -N280 (maximum compressor output).
- ◆ In control mode, the actuation time depends on the requested refrigeration capacity, the vehicle voltage etc. However, the actuation time is at least long enough for a mean current of 0.3 A to flow.

Test step 7

Relay for magnetic clutch -J44 and actuation of magnetic clutch -N25

Notes:

- ◆ Test step 7 must only be performed in vehicles with a compressor with magnetic clutch -N25.
- ◆ In vehicles with a compressor with regulating valve -N280 test step 6 must be performed.



VAS 5051, Measurement technique mode: Multimeter, voltage measurement (20V =)					
▪ Adapter cable V.A.G 1598/12 connected					
Test step	V.A.G 1598 A Socket	Testing of	▪ Test conditions - Additional operations	Specified value	Remedies if specified value not attained
7.1	8 + 14	Magnetic clutch relay -J44	▪ Ignition switched off	- Less than 1 V	- Use current flow diagram to locate and rectify short circuit to positive in the connection to the -J44 or between the -J44 and the -E87.

VAS 5051, Measurement technique mode: Multimeter, voltage measurement (20V =)					
▪ Adapter cable V.A.G 1598/12 connected					
Test step	V.A.G 1598 A Socket	Testing of	▪ Test conditions - Additional operations	Specified value	Remedies if specified value not attained
7.2	8 + 14	Magnetic clutch relay -J44	▪ Ignition switched on	- Approx. battery voltage	- Use current flow diagram to locate and rectify open circuit in voltage supply to -J44. Use current flow diagram to locate and

					rectify short circuit to earth in the connection between - J44 and - E87. Relay -J44 defective, replace.
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VAS 5051, Measurement technique mode: Multimeter, current measurement (10 A =) ▪ Adapter cable V.A.G 1598/12 connected					
Test step	V.A.G 1598 A Socket	Testing of	▪ Test conditions - Additional operations	Specified value	Remedies if specified value not attained
7.3	8 + 14	Current measurement via the magnetic clutch relay - J44	▪ Ignition switched on	- Over 0.1 A and under 0.5 A	- Use current flow diagram to locate and rectify open circuit in the wiring between - J44 and - E87. Relay - J44 defective, replace.
7.4	No connection plugged in	Actuation of magnetic clutch -J44	▪ Engine running	- The compressor is not driven:	- Use current flow diagram to locate and rectify short circuit to positive in the wiring between - J44 and magnetic clutch - N25. Check magnetic clutch relay - J44; replace if necessary. Check magnetic clutch - N25; repair if necessary.

VAS 5051, Measurement technique mode: Multimeter, current measurement (10 A =) ▪ Adapter cable V.A.G 1598/12 connected					
Test step	V.A.G 1598 A	Testing of	▪ Test conditions - Additional	Specified value	Remedies if specified

	Socket		operations		value not attained
7.5	8 + 14	Actuation of magnetic clutch - J44	▪ Engine running	<ul style="list-style-type: none"> - Over 0.1 A and under 0.5 A - The compressor is driven 	<ul style="list-style-type: none"> - Use current flow diagram to locate and rectify open circuit in the wiring between - J44 and the magnetic clutch - N25 - Use current flow diagram to locate and eliminate open circuit in voltage supply to - J44 - Open circuit in the earth connection to the - N25 - Check magnetic clutch relay -J44; replace if necessary. - Check magnetic clutch - N25; repair if necessary.

VAS 5051, Measurement technique mode: Multimeter, voltage measurement (20V =)

▪ Adapter cable V.A.G 1598/12 connected

Test step	V.A.G 1598 A Socket	Testing of	▪ Test conditions - Additional operations	Specified value	Remedies if specified value not attained
7.6	23 + Earth1)	Supply voltage for magnetic clutch - J44	▪ Ignition switched on	- 0 V	<ul style="list-style-type: none"> - Use current flow diagram to locate and rectify short circuit to positive in the connection to the -J44 or between the -J44 and the - E87.
		Supply	▪ Ignition switched on		<ul style="list-style-type: none"> - Use current flow diagram to

7.7	23 + Earth1)	voltage for magnetic clutch - J44	Jumper 2) at connector - D- (to the - E87) between contacts -8- and 14	- Approx. battery voltage	locate and rectify open circuit in the wiring between - J44 and - E87.
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1) Contact 14 of connector D is connected to earth.

2) The jumper must be created using adapter wires from adapter set V.A.G 1594 A, relay -J44 is actuated via this jumper

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

Test step 8:

Actuation of the radiator fan -V7 speeds 1 and 2

Notes:

- ◆ Test step 8 must only be performed in the following vehicles:
 - Vehicles with compressor with magnetic clutch -N25.
 - Vehicles with compressor with regulating valve -N280 and diesel engine.

=> [Relevant Workshop Manual Injection and Ignition system; Repair group 01](#)

=> [Relevant Workshop Manual Diesel Direct Injection and Glow Plug System; Repair group 01](#)

- ◆ In vehicles with compressor with regulating valve -N280 and a petrol engine the radiator fan is actuated via the drive data bus and the relevant engine control unit by the -E87

=> [Relevant Workshop Manual Injection and Ignition system; Repair group 01](#)

- ◆ Depending on the engine, the radiator fan -V7 is actuated via the radiator fan relays -J26 and -J101 or the radiator fan control unit -J293.

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

- ◆ The radiator fan -V7 is switched to 1st speed by relay -J26/control unit -J293:
 - when thermoswitch -F54 is closed.
 - as soon as a positive signal from the -E87 is present (is output as soon as the compressor is switched on).
- ◆ The radiator fan -V7 is switched to 2nd speed by relay -J101/control unit -J293:
 - when thermoswitch -F18 is closed.
 - as soon as a positive signal from the -E87 is present (is output as soon as the pressure in the refrigerant circuit exceeds 16 bar).
- ◆ In vehicles with a radiator fan control unit -J293 the fan is only switched on when the engine is running, depending on the version of the -J293 (positive at terminal "61").

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

VAS 5051, Measurement technique mode: Multimeter, current measurement (10 A =)					
▪ Adapter cable V.A.G 1598/12 connected					
Test step	V.A.G 1598 A Socket	Testing of	Test conditions - Additional operations	Specified value	Remedies if specified value not attained
					- Use current flow diagram to locate and rectify open circuit in the wiring between -

8.1	6 + 32	Actuation of radiator fan -V7 1st speed via relay - J26 or control unit -J293	▪ Ignition switched on	- Over 0.1 A and under 0.5 A Radiator fan -V7 runs at speed 1 (in vehicles with control unit -J293 possibly only when the engine is running).	J26/-J293 and -E87. Use current flow diagram to locate and rectify open circuit in voltage supply or earth connection to -J26/-J293. Check relay - J26/control unit -J293, replace if necessary. Check radiator fan -V7, replace if necessary. => Electrical System; Repair group 01
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VAS 5051, Measurement technique mode: Multimeter, current measurement (10 A =)

▪ Adapter cable V.A.G 1598/12 connected

Test step	V.A.G 1598 A Socket	Testing of	▪ Test conditions - Additional operations	Specified value	Remedies if specified value not attained
8.2	6 + 33	Actuation of radiator fan -V7 2nd speed via relay - J101 or control unit - J293	▪ Ignition switched on	- Over 0.1 A and under 0.5 A Radiator fan -V7 runs at speed 2 (in vehicles with control unit -J293 possibly only when the engine is running).	- Use current flow diagram to locate and eliminate open circuit in the wiring between - J101/-J293 and -E87. Use current flow diagram to locate and eliminate open circuit in voltage supply or earth connection to -J101/-J293. Check relay - J101/control unit -J293, replace if necessary. Check radiator fan -V7, replace if necessary. => Electrical System;

					Repair group 01
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Test step 9:

Sunlight penetration photosensor -G107

VAS 5051, Measurement technique mode: Multimeter, voltage measurement (20V =) ▪ Adapter cable V.A.G 1598/11 connected					
Test step	V.A.G 1598 A Socket	Testing of	▪ Test conditions - Additional operations	Specified value	Remedies if specified value not attained
9.1	25 + Earth1)	Wiring to photosensor -G107	▪ Ignition switched on	- Less than 2 V	- Use the current flow diagram to locate and rectify short to positive
9.2	26 + Earth1)	Wiring to photosensor -G107	▪ Ignition switched on	- Less than 2 V	- Use the current flow diagram to locate and rectify short to positive

1) Contact 14 of connector D is connected to earth.

VAS 5051, Measurement technique mode: Multimeter, resistance measurement (20 k Ω) ▪ Adapter cable V.A.G 1598/11 connected					
Test step	V.A.G 1598 A Socket	Testing of	▪ Test conditions - Additional operations	Specified value	Remedies if specified value not attained
9.3	25 + Earth1)	Wiring to photosensor -G107	▪ Ignition switched on	- $\infty \Omega$	- Use the current flow diagram to locate and rectify short to earth.
9.4	26 + Earth1)	Wiring to photosensor -G107	▪ Ignition switched on	- $\infty \Omega$	- Use the current flow diagram to locate and rectify short to earth.

1) Contact 14 of connector D is connected to earth.

Test step 10:

Input for switch-on signal for actuation of the -E87 (of an auxiliary heater, in vehicles with sunroof with solar cells)

VAS 5051, Measurement technique mode: Multimeter, voltage measurement (20V =) ▪ Adapter cable V.A.G 1598/12 connected					
					Remedies

Test step	V.A.G 1598 A Socket	Testing of	▪ Test conditions - Additional operations	Specified value	if specified value not attained
10.1	1 + 14	Input for switch-on signal to the -E87	▪ Ignition switched off ▪ Auxiliary heater/auxiliary ventilation switched off	- Less than 2 V	- Use the current flow diagram to locate and rectify short to positive

VAS 5051, Measurement technique mode: Multimeter, voltage measurement (20V =) ▪ Adapter cable V.A.G 1598/12 connected					
Test step	V.A.G 1598 A Socket	Testing of	▪ Test conditions - Additional operations	Specified value	Remedies if specified value not attained
10.2	1 + 14	Signal from auxiliary heater to the -E87	▪ Ignition on. Switch on auxiliary ventilation mode via the rotary/pressure switch	- Less than 2 V Shortly after auxiliary ventilation is switched on, voltage should change to approx. operating voltage.	- Use the current flow diagram to locate and rectify short to positive

Notes:

- ◆ -E87 starts up if voltage is applied to this -E87 output with ignition switched off.
- ◆ In auxiliary ventilation mode, the -E87 is actuated after a short time by the auxiliary heater. In auxiliary heater mode, the output of the auxiliary heater is only activated when the temperature of the coolant in the auxiliary heater exceeds a certain level.
- ◆ The auxiliary heater/auxiliary ventilation is switched on and off by the control unit in the dash panel insert. The control unit is actuated via the rotary actuator/pressure actuator installed in the dash panel centre section.

=> [Auxiliary heater: Repair group 01](#)

VAS 5051, Measurement technique mode: Multimeter, voltage measurement (20V =) ▪ Adapter cable V.A.G 1598/12 connected					
Test step	V.A.G 1598 A Socket	Testing of	▪ Test conditions - Additional operations	Specified value	Remedies if specified value not attained
	50	Maintenance of voltage	▪ Ignition on.	- Approx. battery voltage Voltage is retained	- Use current flow diagram to locate and rectify open circuit in wiring or contact resistance in power supply. Use current

10.3	+ Earth1)	(vehicles with solar roof only)	Switch off ignition.	for approx. 20 s and then drops to approx. 0 V	flow diagram to locate and eliminate open circuit in power supply to -J309. Check control unit - J309, replace if necessary.
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1) Contact 14 of connector D is connected to earth.

Notes:

- ◆ -E87 is only supplied with power via terminal 15; all positioning motors thus remain in their current position when ignition is switched off. Ventilation of passenger compartment in solar mode does, however, necessitate setting of fresh/recirculated-air flap to "fresh-air mode". On vehicles with solar roof, -E87 is therefore still supplied with power for a specific period by way of solar cell separation relay -J309 after switching off ignition (maintenance of voltage).
- ◆ For vehicles with a sunroof with solar cells and/or auxiliary heater note the relevant current flow diagram for the voltage supply for the fresh air blower -V2 (voltage is supplied to the -V2 via an isolating relay).

Test step 11

Actuation of additional heater

Notes:

- ◆ Test step 11 must only be performed in vehicles with diesel engine and a compressor with magnetic clutch -N25

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

- ◆ In vehicles with compressor with regulating valve -N280 and a diesel engine the request to switch on the additional heater is transmitted by the -E87 to the relevant engine control unit via the drive data bus.

[=> Relevant Workshop Manual Diesel Direct Injection and Glow Plug System; Repair group 01](#)

- ◆ At temperatures less than 5 °C, engine control unit on vehicles with diesel engine is informed by way of this output that additional heater is to be switched on.
- ◆ In "Econ" mode, not only is the compressor shut off in these vehicles, the output for activation of the additional heater is also no longer switched.
- ◆ Depending on the vehicle equipment, an electrical additional heater is provided or the additional heating function is taken on by the auxiliary heater=> Page [01-116](#) and.

[=> Relevant Workshop Manual Diesel Direct Injection and Glow Plug System; Repair group 01](#)

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

Voltage tester V.A.G 1527, ▪ Adapter cable V.A.G 1598/11 connected					
Test step	V.A.G 1598 A Socket	Testing of	▪ Test conditions - Additional operations	Specified value	Remedies if specified value not attained
					- Use current flow diagram

11.1	13 + Earth1)	Signal to engine control unit to switch on additional heater (diesel models only)	▪ Engine running	▪ LED in voltage tester lights up.	to locate and eliminate open circuit or short to earth in the wiring between engine control unit and - E87.
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1) Contact 14 of connector D is connected to earth.

VAS 5051, Measurement technique mode: Multimeter, current measurement (10 A =)					
▪ Adapter cable V.A.G 1598/12 connected					
Test step	V.A.G 1598 A Socket	Testing of	▪ Test conditions - Additional operations	Specified value	Remedies if specified value not attained
11.2	13 + Earth1)	Signal to engine control unit to switch on additional heater (diesel models only)	▪ Engine running	<ul style="list-style-type: none"> ▪ Less than 5 mA ▪ When the earth connection is made, the relevant display in the measured value block of the engine control unit should change from "0" to "1" 	- Use current flow diagram to locate and eliminate open circuit or short to positive in the wiring between engine control unit and - E87.

1) Contact 14 of connector D is connected to earth.