

A4 Coolant Fan testing, MANUAL Air Conditioning

REV 7 6/18/2009

Fan response to Air Conditioner.

Remember both fans should come on in slow speed any time the key is on and the AC is on – if the temperature is above about 32 F (0 C). If one fan runs, so should the other – they do not sequence on, or anything fancy. If both fans run for this test, and you have no evidence of other problems, there is little reason to test further.

Low refrigerant pressure will lock out both fans and the AC clutch.

High refrigerant pressure will put both fans in Fast speed.

S180 (fuse 8, 30 amps, green plastic, above battery) must be good for slow speed operation.

A common problem is that this fuse will not blow, but the terminals it mounts to will be damaged by excess heat.

Pull this fuse and examine the area underneath it. You should see shiny copper or brass where the fuse makes contact, if it is dark and discolored, or there is evidence of excess heat such as melted plastic, then you need to repair or replace this fuse holder. Try unbolting the terminal leads and prying the mounting box open, then cleaning the required areas with an Emory board, and bending them back into shape.

This fuse provides power to both the radiator thermostatswitch and to the Fan Control Module (FCM). If the FCM does not see power from this fuse it will not power the A/C compressor clutch.

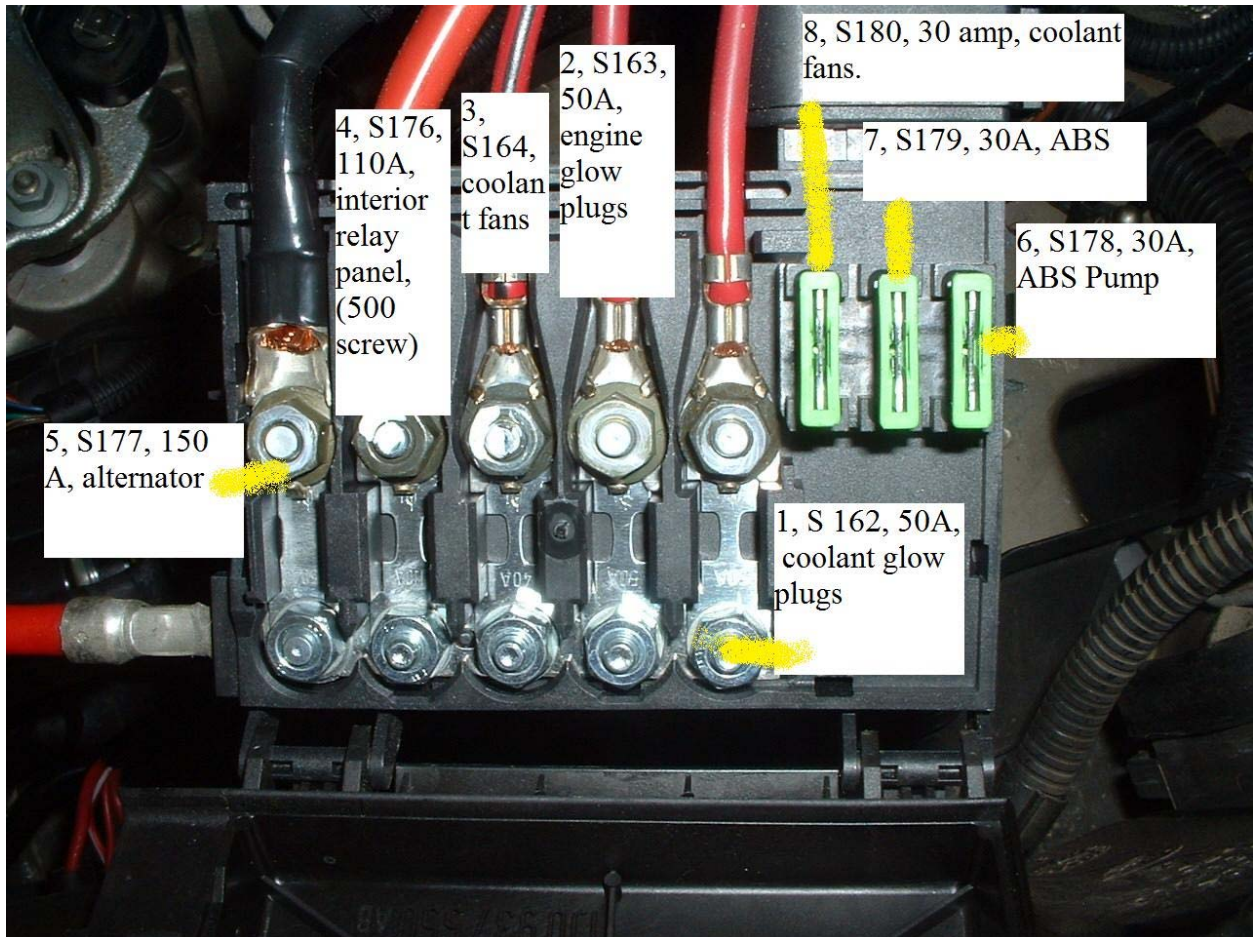
S164 (fuse 3, 40 amps, metal strip, above battery) must be good for fast speed operation.

To ensure the AC circuits and the Fan Control Module has power check:

Fuse 5 on the cabin fuse panel.

Fuse 16 on the cabin fuse panel. **When this fuse is blown the radiator fans will often run unexpectedly.**

Fuse 25 on the cabin fuse panel.



Fan Response to Temperature Signals.

It is fairly easy to **test** the fan's response to temperature signals from the radiator thermostwitch. Refer to section 38, page number 97-532 of the Bentley manual for the schematics, and page 19-7. (But my test below has been purposefully altered, as I disagree with the Bentley written test on some pins for measuring voltages.)

Slow speed operation can be requested by the radiator thermostwitch alone at any time, or the J293 **fan** control module when the AC is on.

Fast speed operation can be requested by the thermostwitch or the AC pressure switch, but fast speed operation always comes through the **Fan** Control Module.

For the first test of the slow speed fans from the radiator thermostwitch have the key off.

Remove the radiator **fan** temperature switch plug, located on the left side of the radiator, and short pin 1 to pin 2 with a fused jumper wire (I used a 25 amp fuse in my jumper.) Both fans should run in slow speed.

The second test is for the fast speed fans, key on, AC off (Bentley forgets to tell you this.) Jumper pins 2 to 3 on the thermostwitch. Both fans should run in fast speed. If they do not then verify that S164 (fuse 3, 40 amps, metal strip, above battery) is good.

If the fans run in the tests above, then you should be good to go. No further tests are needed.

If you have been seeing high coolant temperatures and the fans have not been running, then you may need a new thermostwitch. You have to drain your coolant to replace the switch. {low speed fans; on 197-206 (92-97C), off 183-195 (84-91C) high speed fans; on 210-221 (99-105C), off 195-208 (91-98C)}. Torque it to 35 Nm, 26 lb-ft.

If the fans do not run, verify that the thermostwitch connector has 12 volts on the red wire (pin 2) from S180 (30 amp fuse 8) in the bracket above the battery. The next two steps assume you have done this.

Checking slow speed power from the thermostwitch:

If voltage is present on pin 2 of the thermostwitch, and the fans do not run in slow, reconnect the fused jumper between pins 1-2 of the thermostwitch. With the key off, unplug the **fan** motor connectors and verify that a **test** light turns on when put across pins 2-3 of the motor harness connector (check both fans). Note that this is in the leads from the wiring harness, not the leads to the motor (which I have pictured below.) If the light does not light, there is a wiring fault, not a bad FCM.

Check for slow speed power from the Fan Control Module:

Key on, AC on, interior **fan** speed selected. Unplug the radiator thermostwitch, ensure there are no jumpers on the connector for the thermostwitch. Check for 12 volts or **test** light from pins 2-3 of the wiring harness from the FCM (same place as previous step). If power is not present this time, it is due to an FCM issue, either a bad FCM or bad FCM wiring. Proceed to Air Conditioning Control Circuit testing.

Check the FCM for fast speed operation from the thermostwitch.

Key ON. Connect a fused jumper from pins 2-3 of the thermostwitch. Connect a **test** light between terminals 1-3 of the **fan** motor harness connector, the light should light. (Repeat for the second **fan** connector.) If the light does not light, S164 (fuse 3, 40 amps, metal strip, above battery) is good, and you cannot find a wiring fault, then the FCM is faulty. If the light does light, then the **fan** is faulty.

Test the fans by powering them directly. You can also **test** the fans directly, to verify the test results from above (I certainly would). One way is to check the resistance as indicated in the picture captions.

You can also power up the fans, directly (My favorite way). Ground pin 3 of the **fan** connectors, put a fused power jumper to pin 2 for slow speed operation, then remove the power from pin 2 and put the fused power jumper on pin 1 to see fast speed operation. This will nail down if it is the **fan** or not.

If you are having trouble with your air conditioner, proceed to the Air Conditioner Control Circuit testing for your manufacturing year range.

This is a camera shot with the point of view from the electric motor of the driver's side fan, looking outboard (Port, to the driver's left). You can see the three red wires going into the triangular radiator fan thermoswitch. This switch is mounted about a foot below the upper radiator hose near the battery. Below the thermoswitch you can see the connectors for the driver's side fan (aft) and the passenger side fan (forward). The fan control module is hanging upside down from its mounting plate with the wires going down.



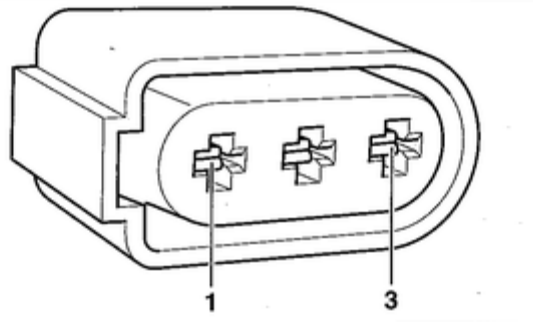
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[IMG]This is a shot of the thermostick connector removed and a fused jumper from pin 1 to 2 to test slow speed operation.

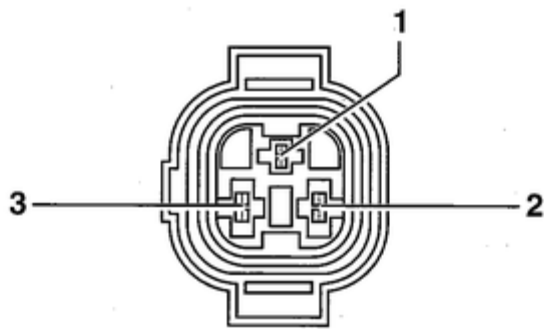


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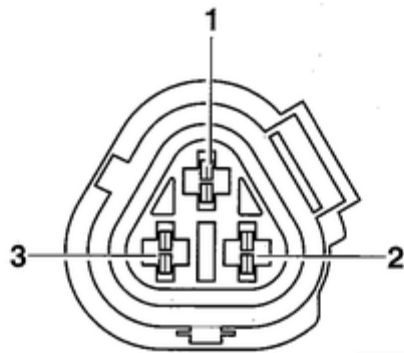
This is a sketch of three common style electrical connectors for the thermostat. My 2005 BEW had the bottom one.



M19-0048



N19-0191



N19-0266

[IMG]

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This is a shot of the drivers side fan connector. Note the spade connections. In this shot pin 1 is bottom, pin 2 middle, pin 3 top. These are 1/4" spades. The resistance on my good fan was 1-3 0.6 ohms, 1-2 0.8 ohms, 2-3 1.2 ohms.



[/IMG]

[IMG] This is a shot of the passenger side fan connector, note that it is female, not male - you cannot mix up the connectors. Pin 1 left, pin 3 right. The resistances for my good fan were 1-3 1.0 ohms, 1-2 1.1 ohms, 2-3 1.9 ohms.

