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*adapted for TDI's from September 2008 to May 1999 by Dan Goldston in October of 2008. Comments and new steps were added. No one has checked my work, here, so use this with caution. Don't make expensive decisions without checking with another source.*

***" The problem involved a 1999.5 Jetta TDI ALH manual A/C system with no compressor clutch operation. On this vehicle, the cooling fan and A/C compressor operation are controlled by the J293 fan control module, which is usually located in the driver's front corner of the engine compartment on the lower frame rail. The J293 module has both a 10-pin connector identified as the T10b connector in Volkswagen wiring diagrams and a four-pin connector identified as the T4a connector. "***

*This summer has been a hot one, and I'm sure you have seen your share of air conditioning problems. Unfortunately, A/C systems have grown steadily more complex and difficult to diagnose.*

*The problem involved a 1999.5 Jetta ALH TDI manual A/C system with no compressor clutch operation. On this vehicle, the cooling fan and A/C compressor operation are controlled by the J293 fan control module, which is usually located in the left front corner of the engine compartment on the lower frame rail, sort of under the battery. The J293 module has both a 10-pin connector identified as the T10b connector in Volkswagen wiring diagrams and a four-pin connector identified as the T4a connector.*

*Before you really get started:*

*Check fuses 5, 25, and 16 on the fuse panel inside the cabin. Verify voltage on both sides.*

*Check fuses S164 and S180 on top of the battery. Verify voltage on both sides.*

*Bentley section 14 of the wiring diagrams, pages 97-152 to 97-156, is an excellent reference.*

*Never check continuity (ohms) on a circuit that has power to it. You'll get bad readings and/or destroy your meter. Continuity for our purposes here, where we are checking switches and wires, means 0, zero, ohms.*

#### **Section A.**

*To diagnose this system, starting on the T10 connector:*

*1) Start and idle the vehicle. Select "A/C on" at maximum cooling and "blower on" at high speed (high speed just keeps the compressor loaded, signal development is the same for any speed).*

*1a) First check for 12 volts at pin 1 of N25, the AC clutch connector, if voltage is not present go to step 2.*

1b) if 12 volts is present on Pin 1 of N25, then check for continuity to ground at pin 2 of the AC clutch connector.

1c) If these are both good, check for continuity through the clutch coil. It must be bad.

2) Check for 12 volts at the T10a connector pin No. 8 and 5 (T10b/8, T10b/5). This 12-volt signal comes from the A/C switch and requests both cooling fans on at low speed and compressor activation by the Fan Control Module. (Through fuse 25, the fresh air blower switch, the AC switch, F129 pressure switch, F38 ambient temperature switch, and F163 A/C high temperature cutout switch. This signal is also sent to the ECM, Engine Control Module.) If this voltage is not present, drop down to section B.

3) If you had voltage on T10b/8, and T10b/5, Check for 12 volts at pin T10b/9. This voltage is a switched ignition source and will have 12 volts when the ignition is in the "on" position. (Through fuse 5.)

4) Check for 12 volts at pin T10b/4. This is a constant battery source and should read 12 volts at all times from fuse S16.

5) Check for a good ground at pin T10b/6.

6) Check for 12 volts at all times at the four-pin connector, T4a pins T4a/4 and T4a/3 from fuses S164 and S180, respectively.

7) Check for an 11-volt reference voltage at pin T10/3. The reference voltage originates in the J293 fan control module and can be grounded by the control module (ECM) under certain circumstances (typically wide open throttle or vehicle overheat conditions) to turn the A/C compressor off.

7a) If zero volts are present, the PCM is commanding "compressor off" or the wiring harness is shorted to ground. Raise vehicle idle speed above 2500 rpm and observe compressor operation and voltage at pin T10b/3. If the voltage at pin T10b/3 returns to 11 volts with the idle speed above 2500 rpm and compressor operation resumes, then a throttle basic setting procedure is needed and must be performed with a factory-compatible, by-directional scan tool. Note: A loss of throttle basic settings will keep the compressor from activating. (I just left this section in from the 2000 and on version...I have no idea if this is the case for the early version of the vehicle or not, DanG144.)

8) If all previous tests have passed, check the T10b connector pin T10b/10 for 12 volts. This pin is the output signal to the compressor clutch coil. If all the other tests have passed and there is no voltage at pin T10b/10, this indicates a faulty fan control module. As you can see, turning on an A/C clutch is not a simple function on late model vehicles, and systems that you might not associate with an A/C problem can stop you and your customer from keeping cool. Be sure to check Direct-Hit's Hotline Archive section for more diagnostic procedures and tips.

### **Section B (from section A step 2)**

If 12 volts is not present on T10b/8 and T10B/5 you need to find out why - and there can be many reasons.

1) Verify Fuse 25 is good, with voltage on both sides. Make sure.

- 2) Check the halfway point. Verify 12 volts are present on Pin 2 (blue and red wire) of the F129 connector (pressure switch located in A/C line near firewall and expansion valve. If not go to step 8, the problem is in the first half of the circuit.
  - 3) So you had 12 volts on F129 pin 2, verify continuity from pins 1 to 2 on F129, and reinstall the connector. You should definitely have continuity if the A/C pressures are between 1.2 and 24 bar (17.4 and 348 psig). [The high pressure switch opens at 32 bar (464psig) and closes back at 24 bar (348 psig), so it is sometimes closed between these pressures and sometimes open] If continuity is good, reinstall the connector. If bad, check the pressures. If pressures are good and continuity is bad, you have a bad pressure switch.
  - 4) If everything checks out so far, check 12 volts present at pin 2 of F38, the Ambient Temperature Switch. If not, your wiring must be bad from F129 to F38. If 12 volts is present at pin 2, check the continuity of F38. This switch should have 0 ohms if temperature is above 45 degrees F. (it opens at 30F, closes at 45 F). Reinstall the connector.
  - 5) If everything checks out so far, check 12 volts at pin 1 of F163, the A/C thermal cutout switch. If 12 volts is not present, the wiring must be bad between F38 and F163. If 12 volts is present, check the continuity of F163. F163 should be closed (0 ohms, have continuity) unless the A/C temperature is greater than 234 F (opens at 246F, closes at 234 F.)
  - 6) If everything is good so far, follow the green wire off of pin 2 of F163 until you find a junction - L10 - named "wire connection-2- in A/C wiring harness" the green wire is headed for pins T10b/8 and T10b/5. No further clues as to location. At this junction wires will connect from the three terminals mentioned (and PM Dang144 with the location, pictures would be good). Theoretically the car is still running with the A/C on and a fan speed selected, so be careful to not short these wires to ground. (More likely, after you locate this connection, turn the car and A/C back on to check the voltage. Have the car off if you disassemble and clean this connection.)
  - 7) There is nothing left but wire to pins T10b/8 and T10b/5. IF the problem was in the second half of the circuit, you should have found it.
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- 8) If the voltage in step B2 was bad at pin 2 of F129 the problem must be in the first half of the circuit. Check for 12 volts at pin T8b/1, the 8 pin connector on the A/C switch. If 12 volts is present then the problem must be in the wiring between these two components, which includes L9 "wire connection-1-in A/C wiring harness (pm DanG144 with location and pics) and T10/2 "10 pin connector, orange, in protective housing for connectors in plenum, left" pin 2. Reinstall connectors.
  - 9) If voltage is not present at T8b/1, check for voltage at T6d/2 pin 2 of the 6pin connector on the fresh air blower switch. If voltage is present then the fresh air blower switch is bad or L45 "wire connection, in A/C harness" or the wires themselves between these two components are bad. Reinstall the connectors.
  - 10) If voltage was not present on T6d/2 then check that voltage is present on T10j/1 "10 pin connector behind instrument panel, center." You are down to just this connector and wiring between Fuse 25 and T6d/2. You did start out by verifying that Fuse 25

*had voltage on both sides, right? Right?*

*This simple circuit test took me forever to write, and is best understood with the Bentley section 14 of the wiring diagrams, pages 97-152 to 97-156.*