Ultra Cheap Way of W210 Evaporator Temperature Sensor Repair

Evaporator temperature sensor on early W210's (and maybe in other models too, I don't know) is known with failures. When the sensor is failed, it may not throw a diagnostic code but it can be easily diagnosed by checking and comparing temperatures of heater core sensors and evaporator temperature sensor when the A/C is not working using climate control diagnostic system. With a failed evaporator temp sensor, evaporator may freeze moisture condensed on it by not knowing its outlet temperature because failed sensors indicates a positive temperature almost always.

To diagnose:

-Put ignition key to position 2 (don't start the engine)
-Press "REST" key on A/C panel for around five seconds to enter the live data acquisition mode.

After entering the live data mode, you will see index number like "1" on L/H side of the display and the corresponding value on the R/H side. To display the next value, press left AUTO key.

We need to check the temperatures of #3, #4 and compare with #5.

Display code in N22 window		Possible cause
1	01	In-car temperature sensor (B10/4)
2	02	Outside temperature indicator temperature sensor (B14)
3	03	Heater core temperature sensor left (B10/1)
4	04	Heater core temperature sensor right (B10/1)
5	05	Evaporator temperature sensor (B10/6)
6	06	ECT sensor (DFI, IFI) (B11/4)
7	07	Refrigerant pressure in bar, e.g. 4 corresponds to 4 bar
8	08	Refrigerant temperature sensor (B12/1), e.g, 73 corresponds to 73 °F
9	-	Not used
10	13	Blower control voltage, e.g. 08 (min) - 6.0 (max) corresponds to .8 - 6 V
11	10	Emissions sensor (B31) e.g. 3.1 corresponds to 3.1 V
12	09	Sun sensor (B32) e.g. 4.2 corresponds to 4.2 V
20	-	Control current for auxliary fan e.g. 7 corresponds to 7 mA
21	12	Engine speed, e.g. 00 . . 99 (x 100) corresponds to 9900 rpm

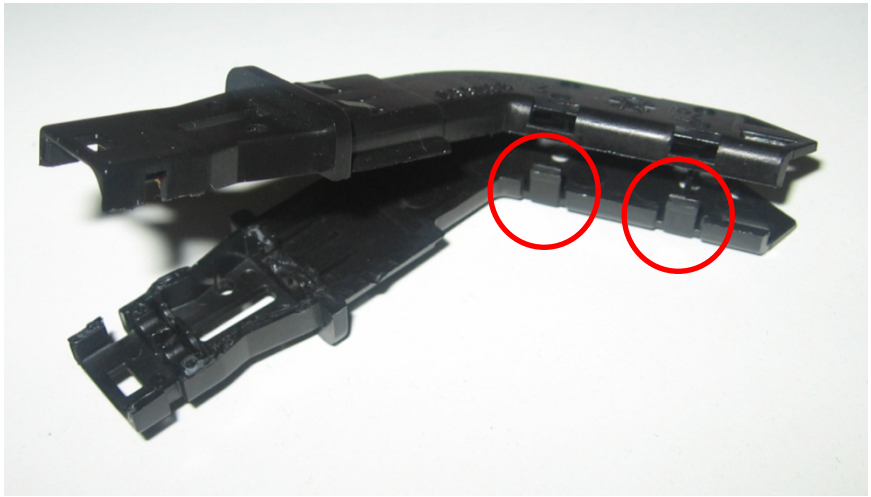
If the heater and/or A/C system is not operated at least for few hours, we expect very close temperature readings (at least within few degrees in tolerance) from sensors #3, #4 and #5 since all are placed in air box located below dash.

In my case, when #3 and #4 (heater core temps) indicating +4˚C, evaporator sensor (#5) was flying on +33˚C in a cold winter day.

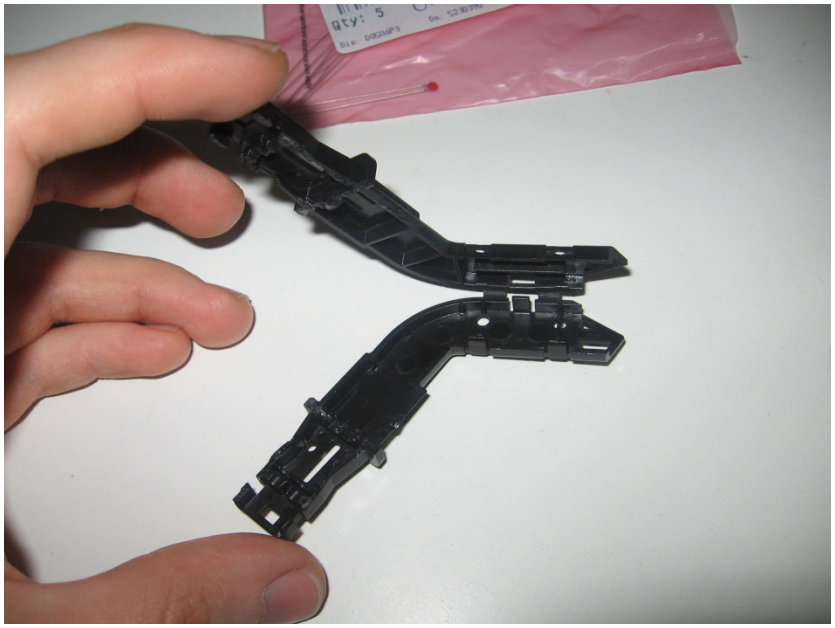
I removed the sensor from the car using instructions.

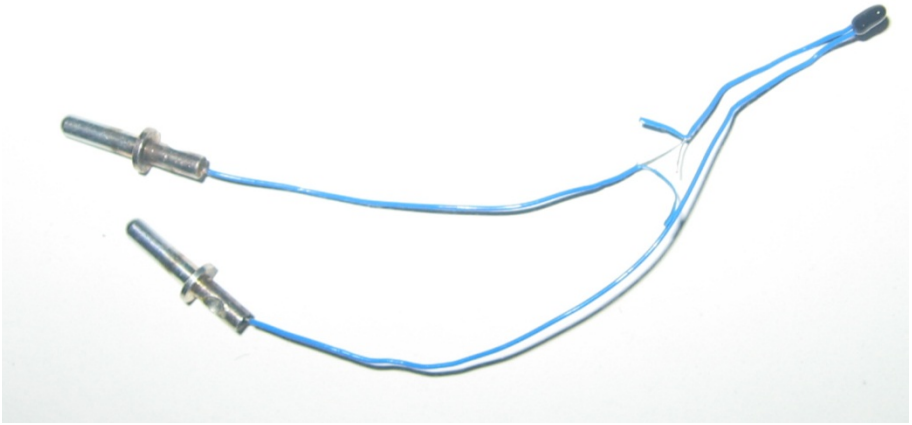
Here is the sensor:

There are two notches in front part of the sensor (you can see them in red circles on the following picture) you have to release them first, but the rear part is glued. You need to separate two halves of the sensor by cracking glue with the aid of a knife/flat head screwdriver etc.



After opening the sensor body, you will see the sensor element, which is a NTC type thermistor.





There are a lot of NTC's in electronic part stores with different specs/values. There is nothing written in our thermistor but in service diagnostic manual, appropriate ranges of resistance versus temperature of good working thermistor is given.

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
5.0	B1230 007	**Evaporator temperature sensor (B10/6)** Resistance	N22 ⊥ — (— Ω —) — 22	Ignition: **OFF** on left connector Disconnect N22 from	°C≙kΩ 10≙5.2 – 5.8 20≙3.2 – 3.6 30≙2.0 – 2.3 45≙1.1 – 1.25	Wiring, B10/6

By using these values, we can determine a suitable replacement in place of our thermistor. I checked the catalogues and found a suitable thermistor (I'm sure that an exact replacement) from Vishay. It was a 2.7kΩ NTC with β value of 3977. Its part number is "NTCLE203E3272FB0" and can be obtained from online electronic stores like Farnell, Digikey etc for around few dollars/euros. I bought it from Farnell.

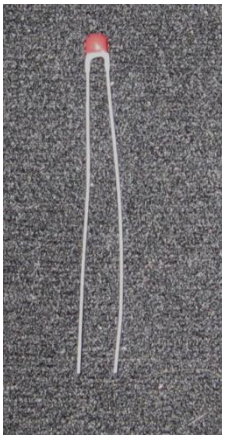
http://parts.digikey.com/1/parts/2050654-thermistor-ntc-2-7k-radial-ntcle203e3272fb0.html

http://uk.farnell.com/vishay-bc-components/ntcle203e3272fb0/thermistor-ntc/dp/1187038

Temperature versus resistance values of our NTC are given in table below:

T_{OPER} (°C)	PART NUMBER NTCLE203E3272*B0
	R_T (Ω)
- 40	89 665
- 35	64 773
- 30	47 304
- 25	34 907
- 20	26 017
- 15	19 575
- 10	14 862
- 5	11 382
0	8790
5	6841
10	5365
15	4239
20	3372
25	2700
30	2176
35	1764
40	1439
45	1180
50	973.4

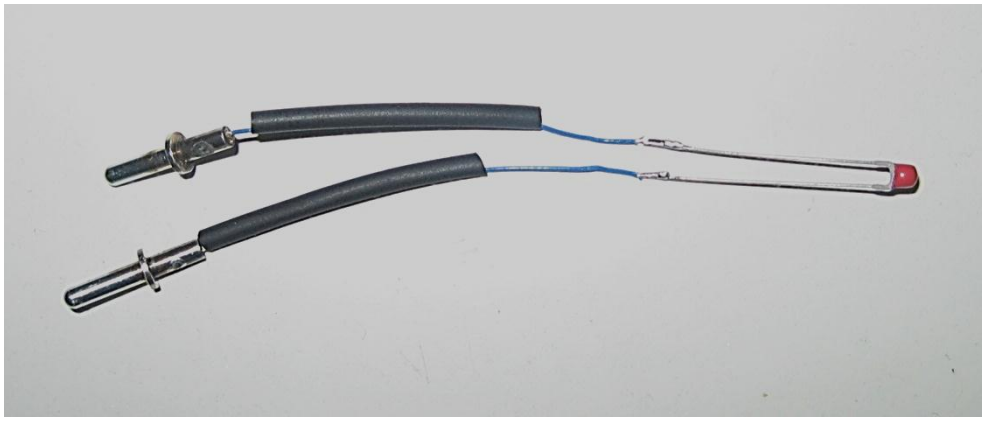
By checking from the table above, we can see that the all values for 10, 20, 30 and 45 degrees are between the limits stated in service diagnostic manual.



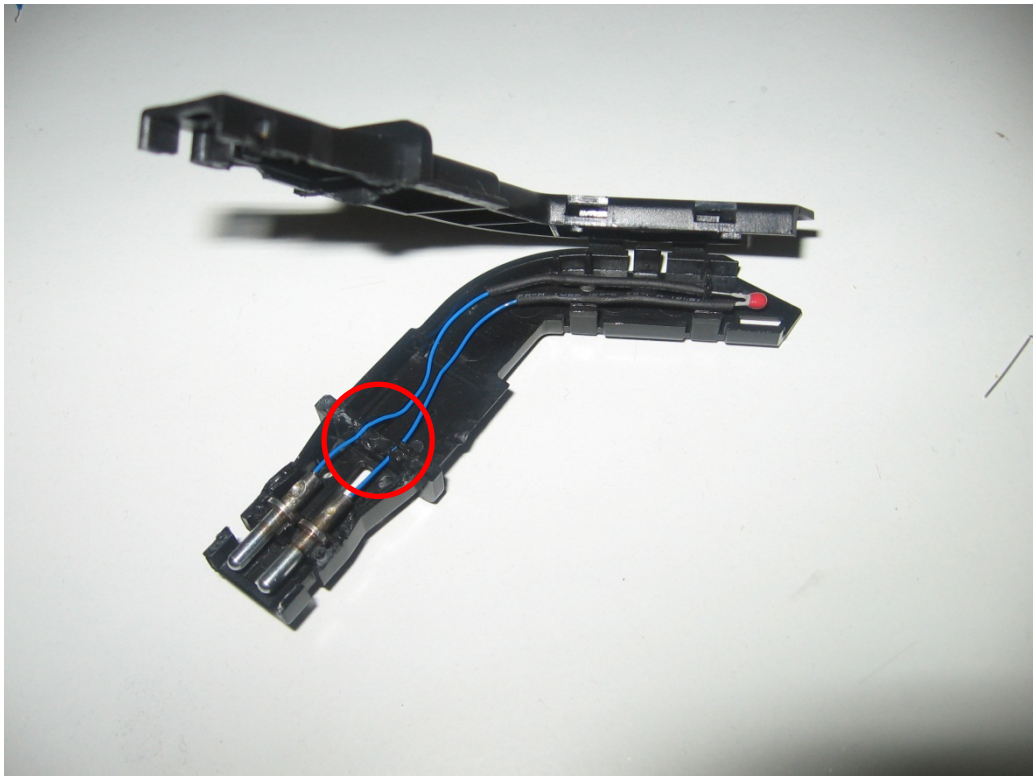
Since the unit price is very cheap, I ordered 5 thermistors that can be used as a spare in future.

After obtaining the thermistors, cut and throw the original thermistor and solder the new one in place of the original. Try to keep the total length from terminals to the thermistor as close as to the original configuration.

If you decide to keep the leads of the thermistor long as in my case, you have to use some kind of insulator like heat shrinkable tube after performing the soldering operation.



Install whole assembly into its plastic case. There are two thin passages in red circled area, install blue cables into those passages to not squeeze them after the closure of the case.



Put few drops of cyanoacrylate adhesive (Pattex etc.) to the originally glued part of the sensor and close the halves. Keep squeezing the back side for few minutes to guarantee the adhesion. After then, your sensor is ready for installation.

If you operate the climate control (heater or A/C) without evaporator temperature probe on its place, a trouble code may be thrown. You have to clear it after installation of the sensor.

To get and clear the codes:

-Turn ignition key on position II.
-Within 20 seconds after turning the ignition, set L/H side temperature to HI and R/H side temperature to LO
-Press REST and EC buttons simultaneously for five seconds.
-If you did all steps correctly, led on circulation key should start to flashing.
-Press R/H auto key to get stored codes on A/C unit. You will see a “d FF” on the display of A/C unit after reading the last code.
-Press L/H and R/H auto buttons simultaneously for more than 2 seconds to clear trouble codes.
-Turn off ignition key.

After installation of the sensor, you can make a re-diagnose to check evaporator sensor temperature. In my case, all three sensors (heater core left, heater core right and evaporator sensor) did show equal value (21˚C in my case, which was the ambient temperature of the day)

I’m very pleased with results since the sensor has a price label of almost $100 here, a $2 fix is definitely free compared to the new part’s price.