Mercedes Benz W210 – E320
A/C Diagnostics

Since we are inside the car, I would like to address the great diagnostic capabilities available with the modern pushbutton controller. Three different forms of diagnostic information can be gathered here. I find the "actual value" function most helpful. Diagnostic trouble codes are also available, along with the ability to activate the individual door positions (individual flap tests) within the dash. All of these functions, actual values, fault codes and mode activation, can be done from the various buttons on the pushbutton assembly.

I really like the actual values, as one can drive the car and watch the activity of important functions that include evaporator temperature, engine temperature, blower control voltage, etc. See **Chart 1** for the list of actual values for the 210 chassis E320. Other chassis are similar, but this chart is given as an example.

The **procedures for reading Actual Values** go like this: Turn on the ignition, press the "AUTO" button, set the temperature on each side to 72°F (this can be done quickly by pressing both the red and blue arrows at the same time), then press the "REST" button for five seconds or until the left-side display says "1."

The right-side display will then display the in-car temperature. Pressing the "AUTO" on one side makes the positions change up or down (for example, 1, 2, 3, etc). Pressing the opposite "AUTO" button runs the functions in the other direction (for example, 3, 2, 1). The test can be ended at any time by tapping the "REST" button.

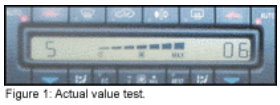

Figure 1: Actual value test.

Figure 1 shows the Actual Value screen. It is value #5, which is evaporator temperature. The right-side value of 06 is the temperature in Celsius.

I first ran across these tests while trying to solve a C230 problem whereby its compressor would shut off within one minute of starting. There were some fault codes involved with communication between the fan control module and the pushbutton module. I came across the actual value test while trying to make some sense of the code. I tried the actual values without the engine running. The evaporator temperature showed 155 degrees. When I discovered that the dealer had two of the sensors in stock, I had a good idea that the problem had been found.

The new sensor gave me realistic values and the problem was fixed. That model has a variable displacement compressor and it was interesting to watch the evaporator temperature while on a road test. It dropped rapidly, then slowed and finally just stopped at 42 degrees. (It was probably 95 degrees outside at the time). This feature has many values, as the list of data is comprehensive — engine temperature, engine speed, vehicle speed, battery voltage — to name a few.

The **procedures for pulling Fault Codes** go like this (See Chart 3): Turn on the ignition, and set the left temperature to "HI" and the right temperature to "LO." Then, simultaneously press buttons "Rest" and "EC" for five or more seconds. All of this must be done within 20 seconds. The "Recirculate" button will flash its LED. The screen will then go blank, and the first code can be brought up by pressing the right "AUTO" button.

Subsequent codes are retrieved by additional application of the right "AUTO" button. Figure 2 shows code B1234. Note that the code starts with "E" for error. Also note that the B1234 code appears as Eb1 234 on the screen.

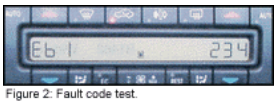

Figure 2: Fault code test.

The **Individual Flap Tests are run** by idling the engine, pressing the left and right "AUTO" buttons, setting temperatures to 72°, manually opening the fascia vents, and simultaneously pressing the "Rest" and "Recirculate" buttons for more than five seconds. The first step: Left display "0" and right display "LO" should appear. Pressing the left "AUTO" button changes the steps. Pressing the right "AUTO" button varies the two modes "HI" and "LO" for each step.
The functions that are checked are described in **Chart 2** and can be verified by the actual air flow changes enacted. Figure 3 shows the third step (DTC) with "2" indicated on the left side and the "HI" mode indicated on the right.
All of these tests are so easy to run that they should be done frequently to gain familiarity with them. They definitely should be run before and after major dash surgery.

Figure 3: Individual flap test.

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Chart 1 - Reading Actual Values
(via A/C Pushbutton Control Module [N22])

1	In-car temperature sensor (B10/4)
2	Outside temperature indicator temperature sensor (B14)
3	Heater core temperature sensor left (B10/1)
4	Heater core temperature sensor right (B10/1)
5	Evaporator temperature sensor (B10/8)
6	ECT sensor (DFI, IFI) (B11/4)
7	Refrigerant pressure in bar, e.g. 4 corresponds to 4 bar
8	Refrigerant temperature sensor (B12/1), e.g. 73 corresponds to 73°F
9	Not used
10	Blower control voltage, e.g. 08 (min) - 6.0 (max) corresponds to .8 - 6 V
11	Emissions sensor (B31), e.g. 3.1 corresponds to 3.1 V
12	Sun sensor (B32), e.g. 4.2 corresponds to 4.2 V
20	Control current for auxiliary fan, e.g. 7 corresponds to 7mA
21	Engine speed, e.g. 00 99 (x 100) corresponds to 9,900 rpm
22	Vehicle speed 155 (km/h)
23	Terminal 58d, e.g. 99.0 corresponds to 99% battery voltage
24	Battery voltage, e.g. 12.8 = 12.8 V
40	Software status, e.g. 37
41	Hardware status, e.g. 08

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Chart 2: Diagnosis — Individual Flap Test (via A/C Pushbutton Control Module [N22])

Diagnostic Trouble Code	Activated flap	Right display	Nominal Value/Air output
0	All	LO HI	No flaps are activated (closed) All flaps opened (activated)
1	Left diverter flap	LO HI	Left center outlet closed Left center outlet opened, cold air
2	Right diverter flap	LO HI	Right center outlet closed Right center outlet opened, cold air
3	Left blend air flap	LO HI	Left center outlet closed. Left center outlet, warm air
4	Right blend air flap	LO HI	Right center outlet, closed Right center outlet, warm air
5	Left defroster flap long stroke	LO HI	Side defroster leak air Side defroster maximum air
6	Left defroster flap long and short stroke	LO HI	Left defroster outlet closed Left defroster outlet opened
7	Right defroster flap, long stroke	LO HI	Right defroster flap open, leak air Right defroster flap opened
8	Right defroster flap long and short stroke	LO HI	Right defroster flap closed Right defroster flap opened
9	Main air flap long stroke	LO HI	Fresh air flow Recirculated air 80%
10	Main air flap long and short stroke	LO HI	Fresh air flow Recirculated air 100%
11	Left footwell air flap long stroke	LO HI	Left footwell air flap closed Left footwell air flap opened, leak air
12	Left footwell flap, long and short stroke	LO HI	Left footwell flap, leak air Left footwell flap, opened
13	Right footwell flap, long stroke	LO HI	Right footwell flap, closed Right footwell flap opened, leak air
14	Right footwell flap, long and short stroke	LO HI	Right footwell flap, leak air Right footwell flap, opened
15	All flaps	LO HI	No flaps are activated (closed) All flaps are activated (opened)

Chart 3: Diagnostic Trouble Code (DTC) Memory For 1997 E320 Models

B1226	In-car temperature sensor (B10/4)	B1417	Duovalve (Y21y1), left
B1227	Outside temperature indicator temp sensor (B14)	B1418	Duovalve (Y21y2), right
B1228	Heater core temperature (B10/1)	B1419	Electromagnetic clutch (A9k1)
B1229	Heater core temperature (B10/1)	B1420	Idle speed increase
B1230	Evaporator temperature sensor (B10/6)	B1421	Pulse module (N65)
B1231	ECT sensor (B11/4)	B1422	Series interface (K1) connection to instrument cluster (A1)
B1232	Refrigerant pressure sensor (B12)	B1423	Switchover valve block (Y11)
B1233	Refrigerant temperature sensor (B12/1)	B1424	Activated charcoal filter actuator (A32m2) open
B1234	Sun sensor (B32)	B1425	Activated charcoal filter actuator (A32m2) closed
B1235	Emissions sensor (B31)	B1432	Non-USA DTC
B1241	Refrigerant fill	B1459	Series interface (K2) connection to instrument cluster (A1)
B1416	Coolant circulation pump (M13)	B1462	Wide open throttle (WOT) position signal: diesel engines

Steve Brotherton, April 2001 - http://www.continentalimports.com/ser_ic40142.html

Air Conditioning Diagnosis

Blake Cameron - February 10, 2010

Introduction

The Mercedes E-class air conditioning is a complicated system of blower motors, computers, relays, switches, and refrigeration parts. With a system this complex, it's likely that you'll encounter an air conditioning problem at some point during your ownership. Thankfully, the onboard climate control computer has a self-check mode that can help you quickly diagnose air conditioning problems.

Tools Required

Pen and paper.

Instructions

Part 1 - Collect Sensor Data

First we'll get the values of all the various climate control sensors. These sensors constantly monitor data like air temperature, refrigerant pressure, etc. Odds are if something's wrong, a sensor will pick it up. Let's get started!

1. Start your car.
2. Press the "AUTO" button on your climate control.
3. Turn on the A/C (i.e. "EC" light must be off; if the light won't shut off, continue with this test. We'll address your "EC" light on the next page.)
4. Let the car idle for about 3 minutes.
5. Set the temperature on each side to 72°F. You can do this quickly by pressing both the red and blue arrows simultaneously.
6. Press and hold the "REST" button for five seconds or until the left side of the display says "01." The left side indicates which sensor you're checking. In this case, #1 is the in-car temperature sensor. The right side of the display shows the value of sensor #1 (in this case, the actual in-car temperature).
7. Press the "AUTO" button on the left side to move to the next sensor. Press the "AUTO" button on the right side to move to the previous sensor.
8. Record the ID number of each sensor (left side of display) and its corresponding value (right side of display). For example, in the picture on the right, you would record that sensor #5 has a value of 6.
9. You only need to do this for sensors #1-8. You can write down the values for the other sensors, but they're not really related to air conditioning function.
10. When you are done, press the "REST" button again to exit the self-check mode.

Part 2 - Collect Trouble Codes

Now that we have all the sensor values, let's check the computer for malfunction codes. Read this carefully, because you have a 20 second window after switching on the ignition to load the trouble code display mode.

1. Ignition must be switched on. 20 second timer starts.
2. Increase the left side temperature (left red arrow) until left side says "HI."
3. Decrease the right side temperature (right cold arrow) until right side says "LO."
4. *If your 20 seconds passed, switch off the ignition and switch it back on. Your HI/LO settings will be preset. Timer restarts.*
5. Press and hold the "EC" and "REST" buttons simultaneously for at least five seconds.
6. The screen will go blank.
7. Load the first code by pressing the right side "AUTO" button.
8. If you have any error codes in memory, the screen should look like the figure on the right. The 'E' stands for "error." In this case, we have error code B1234.
9. Write down each error code. To cycle through the codes, press the right side "AUTO" button.
10. When you finish, press the "REST" button to exit.