

## 3.1 Air Conditioning (A/C)

## Contents

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### 3.1 Model 129 up to M.Y. 1997

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#### Diagnosis – Diagnostic Trouble Code (DTC) Memory

##### Testing via temperature window display

This test is divided into the following test modes:

- A. Continuous display, instantaneous display of actual temperature sensor readings, temperature selector wheel setting, vehicle speed, system voltage and soft top position.
- B. Display of permanent and intermittent diagnostic trouble codes (DTC) stored in memory.
- C. Testing the temperature sensors, potentiometer and feedback potentiometer.

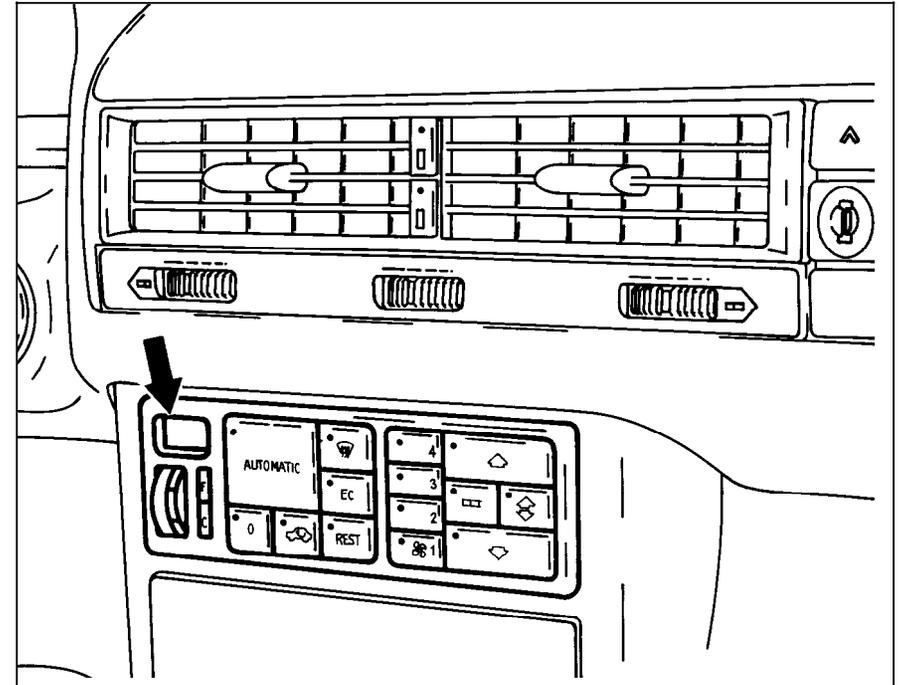


Figure 1

P83-2086-35B

##### Note:

If no DTC can be found when testing via the temperature window display and with the socket box, for example the footwell vacuum flap does not open, it is possible there is a leak in the vacuum system. Check vacuum system, see SMS job no. 83-520.

#### Diagnosis – Diagnostic Trouble Code (DTC) Memory

##### Test mode A.

**Note: To select this test mode**

Ignition **ON**. Press **REST**, and within 1 second press blower speed button 4.  
The temperature window (arrow) will alternately display the test step number "02" with the in-car temperature (in °C) or "OP E" if there is an open circuit or "CL 0" if there is a short circuit.  
Press **F** to go to next higher test step, and  
Press **C** to go to previous test step.  
To exit this test mode, turn ignition **OFF** and wait 5 seconds

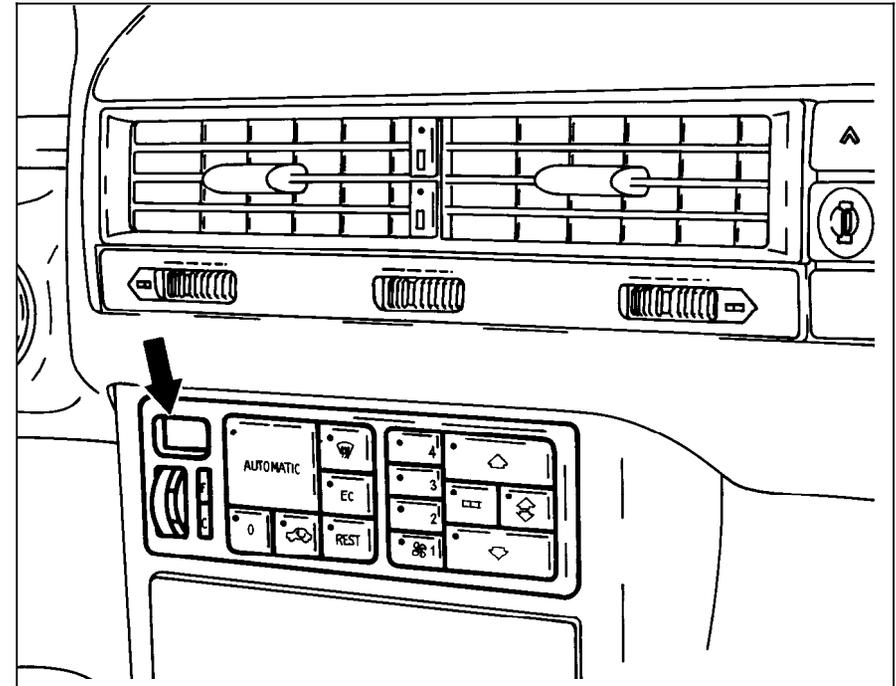


Figure 2

P83-2086-35B

## Diagnosis – Diagnostic Trouble Code (DTC) Memory

Test step display	Possible Cause	Test Step/Remedy <sup>1)</sup>
02	In – car temperature sensor	23 ⇒ 1.0
04	Outside temperature sensor	23 ⇒ 2.0
06	Evaporator temperature sensor	23 ⇒ 3.0
08	Heater core temperature sensor	23 ⇒ 4.0
12	ECT sensor	23 ⇒ 5.0
14	Temperature selector wheel setting (°C)	A/C pushbutton control module
18	Vehicle speed (km/h)	DM, Body and Accessories, Vol. 2 – 11.2
20	Soft top open <b>U</b> , soft top closed <b>O</b>	23 ⇒ 14.0
22	System voltage	23 ⇒ 16.0 – 17.0
83	OFF/ON (not used)	–
84 <sup>2)</sup>	Blower voltage 050 (0.5 V) – 600 (6.0 V)	23 ⇒ 22.0

1) Observe Preparation for Test, see 22.

2) Starting approximately 11/91.

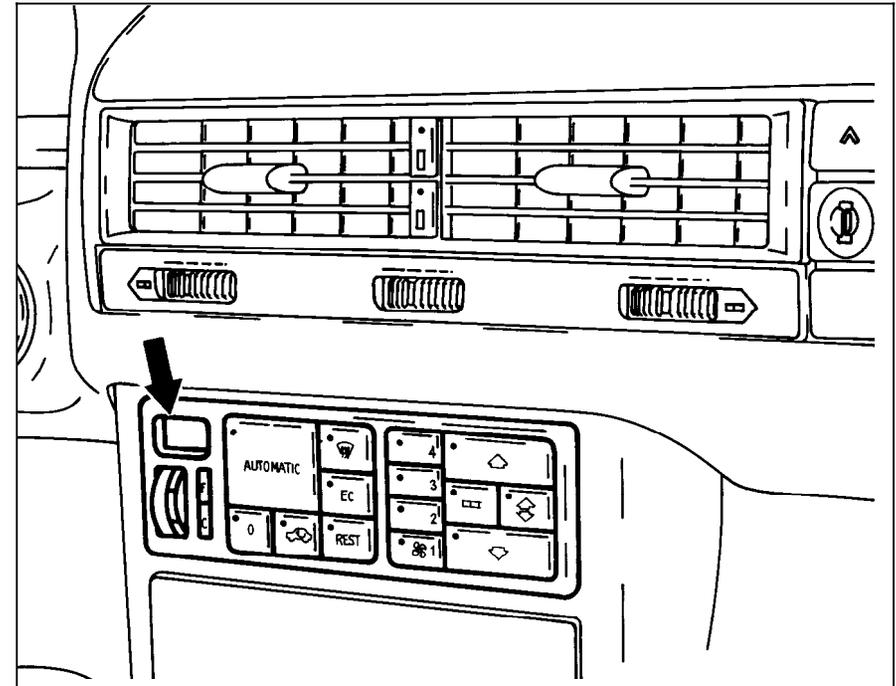
#### Diagnosis – Diagnostic Trouble Code (DTC) Memory

##### Test modes

- B. Display of permanent and intermittent DTC's stored in memory.
- C. Testing the temperature sensors, potentiometer and feedback potentiometer

##### Notes for Diagnosis

- The A/C pushbutton control module (N22) has DTC memory and the capability to display the codes via the temperature display window (arrow) on the A/C pushbutton control panel. The stored DTC's will remain in memory even with the vehicle battery disconnected.
- The DTC readout displays permanent as well as intermittent fault codes. The number "01" indicates that there are no stored fault codes in the systems memory. All other numbers refer to a specific fault code source.
- The display window will show in sequence the actual temperatures of the individual sensors and the voltages at the potentiometers and feedback potentiometers. Thereby allowing the tolerance range of the temperature sensors and the adjustment of the feedback potentiometers to be checked.



P83-2086-35B

Figure 3

### Diagnosis – Diagnostic Trouble Code (DTC) Memory

#### Test preparations for test modes B. and C.

- Turn temperature selector wheel to white field.
- Turn ignition “ON” and within 10 seconds press **F**,  and **REST** **simultaneously** for 2 to 4 seconds.
- The display will show permanent DTC’s stored in memory. After each DTC is displayed and recorded, press  again until the display reads “End”.
- Press  once again. Now the stored intermittent DTC’s will be displayed. The symbol  will appear after each DTC to indicate an intermittent fault. After each DTC is displayed and recorded, press  again until the display reads “End”.
- Press  once again. The display will alternately blink the number “02” and the in – car temperature in °C. Press  until all temperature sensor display numbers from 02 – 12 are shown (see section C).  
Press  once again and the display will alternately blink the number “16” and the voltage of the potentiometer for the center air outlet flap dependent upon the setting (open or closed). The voltage, for example, for 3.5 V is displayed as “35u”. Press  until all potentiometer and feedback potentiometer display numbers from 16 – 26 are shown. Press  until the display reads “End” and the symbol  blinks.
- Turn ignition OFF and repair recorded DTC’s.

#### Note:

The DTC’s can be redisplayed as often as desired. To do so, turn ignition OFF and ON and within 10 seconds press **F**,  and **REST** **simultaneously** for 2 to 4 seconds and then press only . The light diode inside  will blink once per second during the impulse readout.

#### Erasing DTC’s

- Turn ignition ON and within 10 seconds press , **REST** and  **simultaneously** for 2 to 4 seconds until “– – –” appears on the display.

#### Verification

- Repeat readout of DTC’s. The number “01” (no fault) must appear in the display window.

#### Electrical Wiring Diagrams:

See “Electrical Troubleshooting Manual”, Model 129

#### Diagnosis – Diagnostic Trouble Code (DTC) Memory

##### B. DTC readout with permanent and intermittent faults

Diagnostic Trouble Code (DTC)	Possible Cause	Test Step/Remedy <sup>1)</sup>
01	No stored DTC's in system memory	–
02	In – car temperature sensor (B10/4), short circuit	23 ⇒ 1.0
03	In – car temperature sensor (B10/4), open circuit	23 ⇒ 1.0
04	Outside temperature sensor (B10/5), short circuit	23 ⇒ 2.0
05	Outside temperature sensor (B10/5), open circuit	23 ⇒ 2.0
06	Evaporator temperature sensor (B10/6), short circuit	23 ⇒ 3.0
07	Evaporator temperature sensor (B10/6), open circuit	23 ⇒ 3.0
08	Heater core temperature sensor (B10/1), short circuit	23 ⇒ 4.0
09	Heater core temperature sensor (B10/1), open circuit	23 ⇒ 4.0
12	ECT sensor (B10/8), short circuit	23 ⇒ 5.0
13	ECT sensor (B10/8), open circuit	23 ⇒ 5.0
16	Center air outlet adjuster (N18/2r2), short circuit	23 ⇒ 7.0

<sup>1)</sup> Observe Preparation for Test, see 22.

#### Diagnosis – Diagnostic Trouble Code (DTC) Memory

Diagnostic Trouble Code (DTC)	Possible Cause	Test Step/Remedy <sup>1)</sup>
17	Center air outlet adjuster (N18/2r2), open circuit	23 ⇒ 7.0
18	Center air outlet feedback potentiometer (R23/3), short circuit	23 ⇒ 12.0
19	Center air outlet feedback potentiometer (R23/3), open circuit	23 ⇒ 12.0
20	Left air outlet adjuster (N18/2r1), short circuit	23 ⇒ 6.0
21	Left air outlet adjuster (N18/2r1), open circuit	23 ⇒ 6.0
22	Left air outlet feedback potentiometer (R23/1), short circuit	23 ⇒ 11.0
23	Left air outlet feedback potentiometer (R23/1), open circuit	23 ⇒ 11.0
24	Right air outlet adjuster (N18/2r3), short circuit	23 ⇒ 8.0
25	Right air outlet adjuster (N18/2r3), open circuit	23 ⇒ 8.0
26	Right air outlet feedback potentiometer (R23/2), short circuit	23 ⇒ 13.0
27	Right air outlet feedback potentiometer (R23/2), open circuit	23 ⇒ 13.0
30	Auxiliary coolant pump (M13), short circuit	23 ⇒ 20.0

<sup>1)</sup> Observe Preparation for Test, see 22.

## Diagnosis – Diagnostic Trouble Code (DTC) Memory

Diagnostic Trouble Code (DTC)	Possible Cause	Test Step/Remedy <sup>1)</sup>
31	Automatic A/C monovalve (Y19), short circuit	23 ⇒ 19.0
33	A/C compressor signal, short circuit	23 ⇒ 25.0
34	Auxiliary fan signal, 2nd stage, short circuit	23 ⇒ 24.0
35	Auxiliary fan signal, 1st stage, short circuit	23 ⇒ 23.0
36	Not used	–
50	Switchover valve block (Y11), short circuit	23 ⇒ 21.0
70	Auxiliary coolant pump (M13), open circuit	23 ⇒ 20.0
71	Automatic A/C monovalve (Y19), open circuit	23 ⇒ 15.0
73	A/C compressor signal, open circuit	23 ⇒ 25.0
74	Auxiliary fan signal, 2nd stage, open circuit	23 ⇒ 24.0
75	Auxiliary fan signal, 1st stage, open circuit	23 ⇒ 23.0

1) Observe Preparation for Test, see 22.

### Diagnosis – Diagnostic Trouble Code (DTC) Memory

#### C. Readout of momentary sensor temperatures as well as potentiometer and feedback potentiometer voltages.

Test step	Test scope	Test connection	Nominal value	Test step/Remedy
02	In – car temperature sensor	Press 	Indicated value may deviate by no more than $\pm 1$ °C	23 $\Rightarrow$ 1.0
04	Outside temperature sensor	Press 	Indicated value may deviate by no more than $\pm 3$ °C	23 $\Rightarrow$ 2.0
06	Evaporator temperature sensor	Press 	Indicated value may deviate by no more than $\pm 3$ °C	23 $\Rightarrow$ 3.0
08	Heater core temperature sensor	Press 	Indicated value may deviate by no more than $\pm 3$ °C	23 $\Rightarrow$ 4.0
12	ECT sensor	Press 	Indicated value may deviate by no more than $\pm 3$ °C	23 $\Rightarrow$ 6.0

#### Diagnosis – Diagnostic Trouble Code (DTC) Memory

Test step	Test scope	Test connection	Display	Nominal value	Test step/Remedy
16	Center air outlet adjuster	Move center air outlet adjuster completely to the right (outlet closed)	06 – 09 U	0.6 – 0.9 V	23 ⇒ 8.0
		Move center air outlet adjuster completely to the left (outlet open)	39 – 45 U	3.9 – 4.5 V	
18	Center air outlet feedback potentiometer	Move center air outlet adjuster completely to the right (outlet closed)	07 – 11 U	0.7 – 1.1 V	23 ⇒ 13.0
		Move center air outlet adjuster completely to the left (outlet open)	35 – 48 U	3.5 – 4.8 V	
20	Left air outlet adjuster	Move left air outlet adjuster completely to the right (outlet closed)	06 – 09 U	0.6 – 0.9 V	23 ⇒ 7.0
		Move left air outlet adjuster completely to the left (outlet open)	39 – 45 U	3.9 – 4.5 V	

#### Diagnosis – Diagnostic Trouble Code (DTC) Memory

Test step	Test scope	Test connection	Nominal value	Possible cause/Remedy
22	Left air outlet feedback potentiometer	Move left air outlet adjuster completely to the right (outlet closed)	07 – 11 U    0.7 – 1.1 V	23 ⇒ 12.0
		Move left air outlet adjuster completely to the left (outlet open)	35 – 48 U    3.5 – 4.8 V	
24	Right air outlet adjuster	Move right air outlet adjuster completely to the right (outlet closed)	06 – 09 U    0.6 – 0.9 V	23 ⇒ 9.0
		Move right air outlet adjuster completely to the left (outlet open)	39 – 45 U    3.9 – 4.5 V	
26	Right air outlet feedback potentiometer	Move right air outlet adjuster completely to the right (outlet closed)	07 – 11 U    0.7 – 1.1 V	23 ⇒ 14.0
		Move right air outlet adjuster completely to the left (outlet open)	35 – 48 U    3.5 – 4.8 V	

#### Diagnosis – Complaint Related Diagnostic Chart

Complaint/Problem	Possible cause	Test step/Remedy <sup>1)</sup>
A/C compressor does not switch on.	Insufficient rpm sensor voltage or no TD/TN signal	26 ⇒ 1.0 – 5.0

<sup>1)</sup> Observe Preparation for Test, see 22.

#### Electrical Test Program – Component Locations

#### Electrical Components in Passenger Compartment

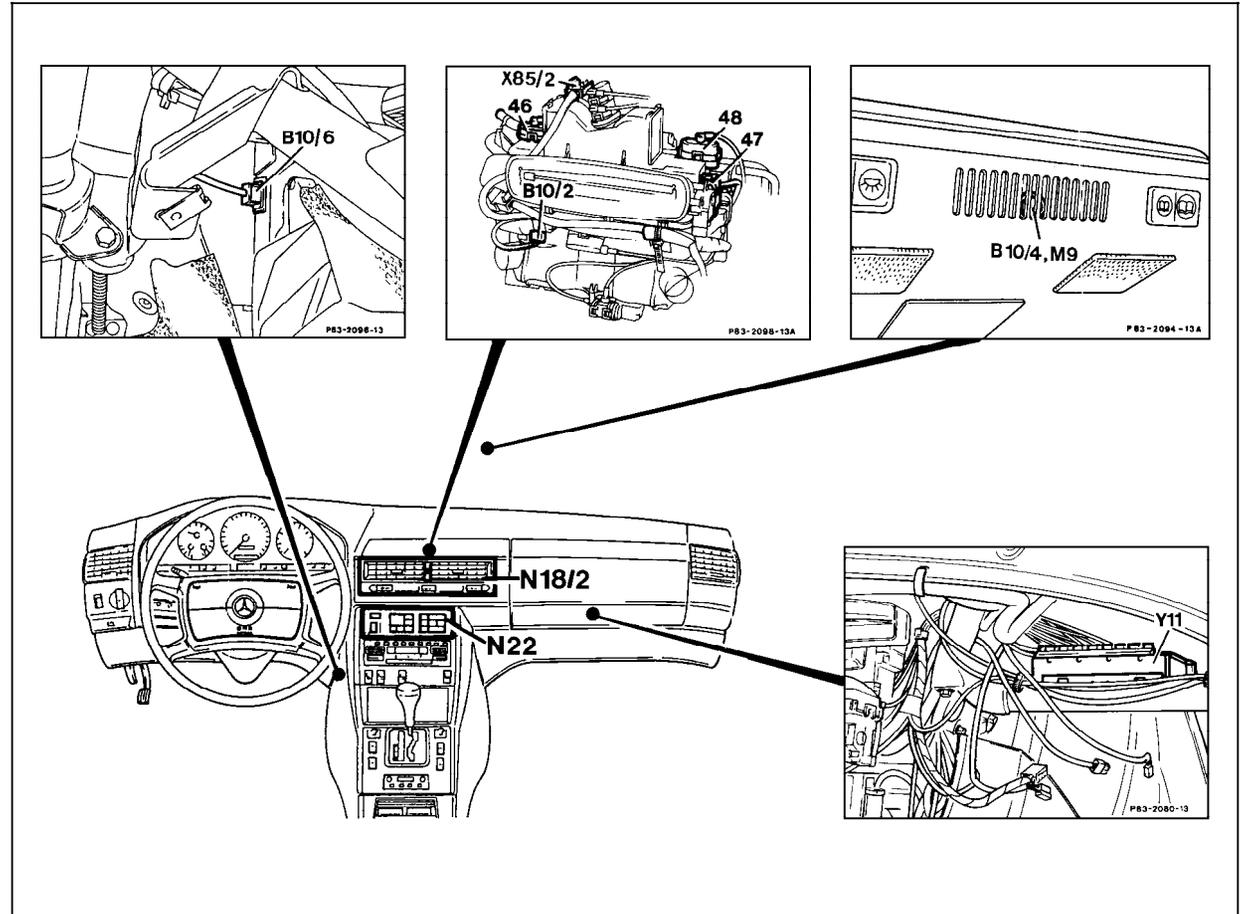


Figure 1

- B10/2 Left heater core temperature sensor
- B10/4 In – car temperature sensor (with aspirator blower in E15)
- B10/6 Evaporator temperature sensor
- M9 In – car temperature sensor aspirator blower
- N18/2 Center and side air outlet flap control module
- N22 A/C pushbutton control module (Automatic A/C)
- X85/2 Heater/interior connector (12–pole)
- Y11 Switchover valve block (15 connections, multiplex)
- 46 Vacuum actuator with left air outlet feedback potentiometer (R23/1)
- 47 Vacuum actuator with center air outlet feedback potentiometer (R23/3)
- 48 Vacuum actuator with right air outlet feedback potentiometer (R23/2)

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## Electrical Test Program – Component Locations

### Electrical Components in Engine Compartment

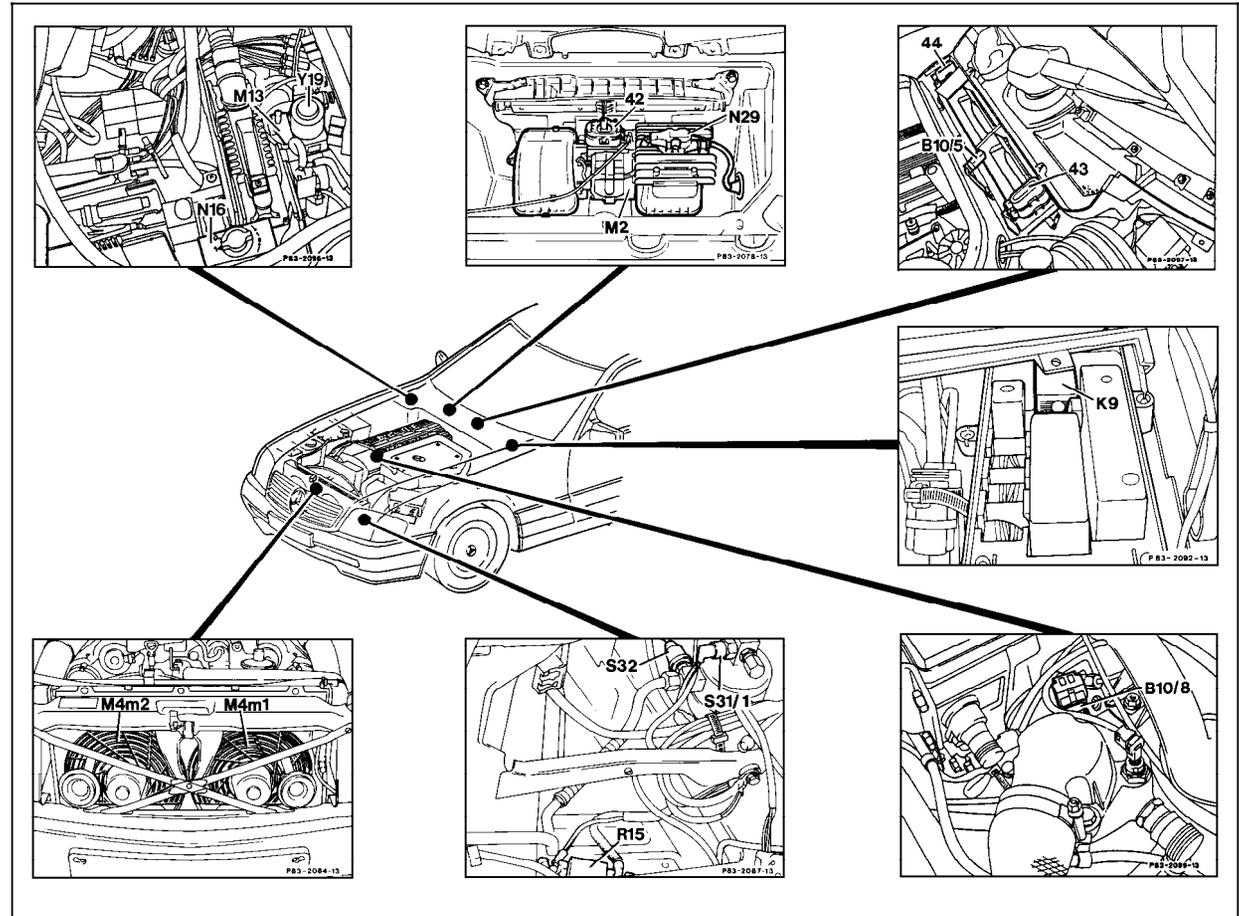


Figure 2

- B10/5 Outside temperature sensor
- B10/8 ECT sensor (A/C)
- K9 Auxiliary fan relay module (stage 1 and 2)
- M2 Blower motor
- M4m1 Left auxiliary fan
- M4m2 Right auxiliary fan
- M13 Auxiliary coolant pump
- N16 Engine systems control module
- N29 Electronic blower regulator
- R15 Auxiliary fan presistor
- S31/1 Dual function A/C compressor pressure switch (OFF 2.0/30.0 bar, ON 2.6/22.0 bar)
- S32 Auxiliary fan/A/C compressor switch (OFF 15.0 bar, ON 20.0 bar) (green)
- Y19 Automatic A/C monovalve

P83-0039-57

#### Electrical Test Program – Preparation for Test

##### Preparation for Test

- Check in – car temperature sensor aspiration blower by placing a small piece of paper (approx. 1" square) over aspirator vent grille with ignition "ON" (arrow, Figure 1). If there is sufficient ventilation the paper will remain on the vent grille, if not check aspiration blower for voltage supply and function.
- Remove A/C pushbutton control module (N22).
- Remove storage compartment just below radio.
- Connect socket box test cable to left connector of wiring harness. The pushbutton control module remains disconnected until test step 6.0.

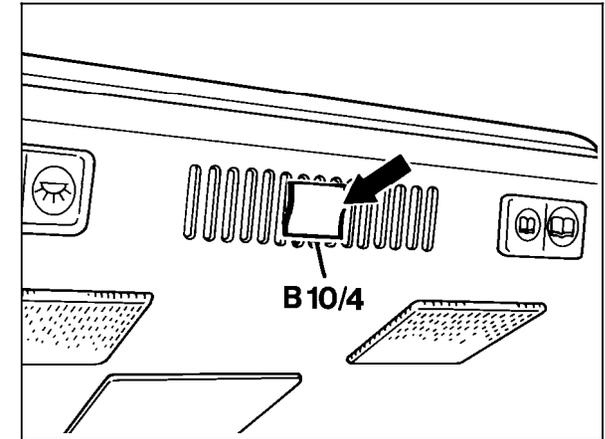
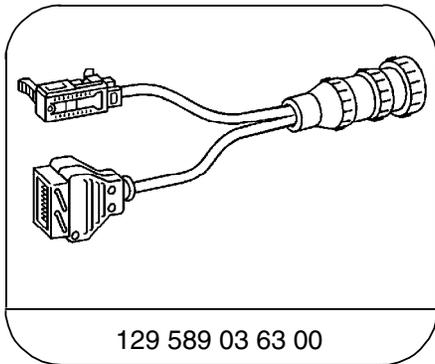


Figure 1

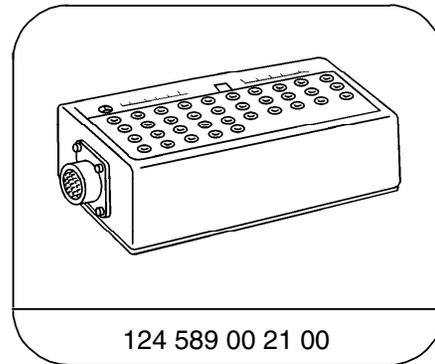
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##### Special Tools



129 589 03 63 00

20-pin test cable



124 589 00 21 00

35-pin socket box

##### Conventional tools, test equipment

Description	Brand, model, etc.
Multimeter <sup>1)</sup>	Fluke models 23, 83, 85, 87

<sup>1)</sup> Available through the MBUSA Standard Equipment Program.

#### Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0	2 3	<b>In-car temperature sensor with aspirator blower (B10/4)</b> Resistance	<p>N22</p> <p>19 —  — 20</p> <p>11 —  — 20</p>	<p> on left connector (1)</p> <p>Ignition: <b>OFF</b></p> <p>Disconnect test cable from pushbutton control module</p>	<p>°C                      kΩ</p> <p>10            18.3 – 21.5</p> <p>15            15.2 – 17.5</p> <p>20            11.5 – 13.5</p> <p>25            9.5 – 10.5</p> <p>30            7.5 – 8.5</p> <p>35            6.0 – 7.0</p> <p>40            4.5 – 5.5</p> <p>45            3.5 – 4.5</p>	Wires from pushbutton control module (N22) to sensor B10/4 via connector (X85/2), B10/4.
2.0	4 5	<b>Outside temperature sensor (B10/5)</b> Resistance	<p>N22</p> <p>19 —  — 20</p> <p>12 —  — 20</p>	<p> on left connector (1)</p> <p>Ignition: <b>OFF</b></p> <p>Disconnect test cable from pushbutton control module</p>	<p>°C                      kΩ</p> <p>10            5.0 – 6.0</p> <p>15            4.0 – 4.6</p> <p>20            3.1 – 3.9</p> <p>25            2.4 – 3.0</p> <p>30            1.9 – 2.3</p> <p>35            1.6 – 2.0</p> <p>40            1.4 – 1.6</p> <p>45            1.1 – 1.3</p>	Wires from pushbutton control module (N22) to sensor B10/5, B10/5.

#### Electrical Test Program – Test

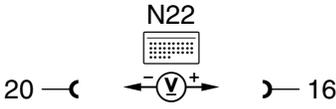
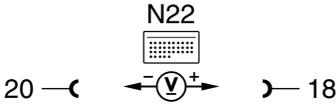
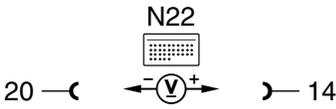
⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
3.0		<b>Evaporator temperature sensor (B10/6)</b> <sup>1)</sup> Resistance	<p>N22 </p> <p>19  20</p> <p>8  20</p>	<p> on left connector (1)</p> <p>Ignition: <b>OFF</b></p> <p>Disconnect test cable from pushbutton control module</p>	<p>°C</p> <p>kΩ</p> <p>0 8.1 – 9.9</p> <p>5 6.3 – 7.7</p> <p>10 5.0 – 6.0</p> <p>15 4.0 – 4.6</p> <p>20 3.1 – 3.9</p> <p>25 2.4 – 3.0</p> <p>30 1.9 – 2.3</p> <p>35 1.6 – 2.0</p> <p>40 1.4 – 1.6</p> <p>45 1.1 – 1.3</p>	Wires from pushbutton control module (N22) to sensor B10/6, B10/6.
4.0		<b>Heater core temperature sensor (B10/1)</b> Resistance	<p>N22 </p> <p>19  20</p> <p>10  20</p>	<p> on left connector (1)</p> <p>Ignition: <b>OFF</b></p> <p>Disconnect test cable from pushbutton control module</p>	<p>°C</p> <p>kΩ</p> <p>10 18.3 – 21.5</p> <p>15 15.2 – 17.5</p> <p>20 11.5 – 13.5</p> <p>25 9.5 – 10.5</p> <p>30 7.5 – 8.5</p> <p>35 6.0 – 7.0</p> <p>40 4.5 – 5.5</p> <p>45 3.5 – 4.5</p>	Wires from pushbutton control module (N22) to sensor B10/1, B10/1.

<sup>1)</sup> If the A/C system was in use immediately before the test, the temperature at the evaporator temperature sensor will be lower than the outside air temperature.

#### Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
5.0	12 13	<b>ECT sensor (A/C)</b> Resistance	<p style="text-align: center;">N22 </p> <p>19  20</p> <p>7  20</p>	<p> on left connector (1)</p> <p>Ignition: <b>OFF</b></p> <p>Disconnect test cable from pushbutton control module</p>	<p>°C                    Ω</p> <p>20 5000 – 8000</p> <p>60 900 – 1800</p> <p>85 460 – 650</p> <p>100 300 – 400</p> <p>110 230 – 290</p> <p>120 180 – 220</p> <p>130 135 – 175</p>	Wires from pushbutton control module (N22) to sensor B10/8, B10/8.

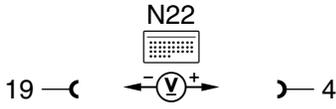
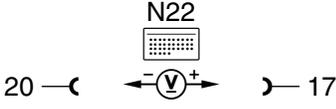
#### Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
6.0	20 21	<b>Center and side air outlet flap control module, left air outlet adjuster (N18/2r1)</b> Voltage		 on left connector (1) Move left air outlet adjuster completely to the right (outlet closed)  completely to the left (outlet open)	0.6 – 0.9 V  continuous, no steps  3.9 – 4.5 V	Wires from control module (N22) to left air outlet adjuster (N18/2r1), Center and side air outlet flap control module (N18/2).
7.0	16 17	<b>Center and side air outlet flap control module, center air outlet adjuster (N18/2r2)</b> Voltage		 on left connector (1) Move center air outlet adjuster completely to the right (outlet closed)  completely to the left (outlet open)	0.6 – 0.9 V  continuous, no steps  3.9 – 4.5 V	Wires from N22 to center air outlet adjuster (N18/2r2), N18/2.
8.0	24 25	<b>Center and side air outlet flap control module, right air outlet adjuster (N18/2r3)</b> Voltage		 on left connector (1) Move right air outlet adjuster completely to the right (outlet closed)  completely to the left (outlet open)	0.6 – 0.9 V  continuous, no steps  3.9 – 4.5 V	Wires from N22 to right air outlet adjuster (N18/2r3), N18/2.

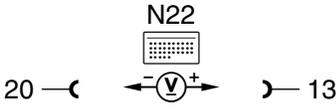
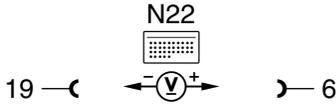
### 3.1 Air Conditioning (A/C)

Model 129

#### Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
9.0		<b>Center and side air outlet flap control module, pushbutton “cold” (N18/2s1)</b> Voltage		 on left connector (1) Press blue switch on center air outlet and hold	< 0.1 V	Wires from N22 to cold pushbutton switch (N18/2s1), Center and side air outlet flap control module (N18/2).
10.0		<b>Center and side air outlet flap control module, pushbutton “warm” (N18/2s2)</b> Voltage		 on left connector (1) Press red switch on center air outlet and hold	< 0.1 V	Wires from N22 to cold pushbutton switch (N18/2s2), N18/2.
11.0	 	<b>Left air outlet feedback potentiometer (R23/1)</b> Voltage		 on left connector (1) Move left air outlet adjuster completely to the right (outlet closed)  completely to the left (outlet open)	0.7 – 1.1 V  Continuous, no steps  3.5 – 4.8 V	Wires from N22 to feedback potentiometer (R23/1), R23/1, Incorrect adjustment or defective, replace vacuum element.
12.0	 	<b>Center air outlet feedback potentiometer (R23/3)</b> Voltage		 on left connector (1) Move center air outlet adjuster completely to the right (outlet closed)  completely to the left (outlet open)	0.7 – 1.1 V  Continuous, no steps  3.5 – 4.8 V	Wires from N22 to feedback potentiometer (R23/3), R23/3, incorrect adjustment or defective, replace vacuum element.

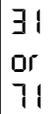
#### Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
13.0		<b>Right air outlet feedback potentiometer (R23/2)</b> Voltage		 on left connector (1) Move right air outlet adjuster completely to the right (outlet closed)  completely to the left (outlet open)	0.7 – 1.1 V  Continuous, no steps  3.5 – 4.8 V	Wires from N22 to feedback potentiometer (R23/2), R23/2, incorrect adjustment or defective, replace vacuum element.
14.0		<b>Left soft top fabric bow switch group (A22)</b> Voltage		 on left connector (1) Soft top closed  Soft top open	< 0.1 V  > 10 V	Wires from N22 to left soft top bow switch group (A22) via connectors (X85/2, X18/3).

#### Electrical Test Program – Test

##### Test Conditions

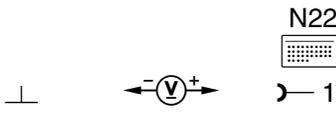
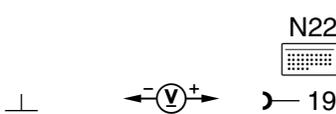
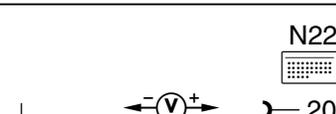
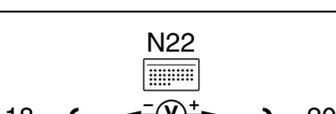
1. Ignition: **OFF**
2. Disconnect both connectors from A/C pushbutton control module (N22).
3. Disconnect test cable from left connector and reconnect to right connector.

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
15.0		<b>Monovalve (Y19)</b>			11 – 19 Ω	Wires from N22 to Y19, Y19.

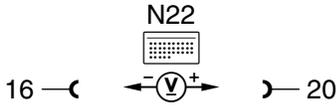
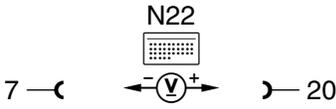
#### Electrical Test Program – Test

##### Test Conditions

1. Connect test cable to right connector of A/C pushbutton control module (N22).
2. Connect wiring harness to left connector of A/C pushbutton control module.
3. Ignition: **ON**

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
16.0		<b>A/C pushbutton control module (N22)</b> Voltage supply (circuit 30)		 on right connector (2)	> 10 V	Fuse 10 (F1-10), circuit 30, Wires from N22 to fuse F1-10 open.
17.0		<b>A/C pushbutton control module (N22)</b> Voltage supply (circuit 15)		 on right connector (2)	> 10 V	Fuse 7 (F1-7), circuit 15, Wires from N22 to fuse F1-7 open.
18.0		<b>A/C pushbutton control module (N22)</b> Voltage supply, output		 on right connector (2)	> 10 V	N22.
19.0		<b>Mono valve (Y19)</b> Ground connection		 on right connector Temperature selector (2) wheel set at "MIN".	After 10 seconds > 10 V	N22.

#### Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy								
20.0		<b>Auxiliary coolant pump (M13) and additional function test by manual touch</b> Ground connection		 on right connector (2) Temperature selector wheel set at "MAX"	After approx. 50 seconds > 10 V	A/C pushbutton control module (N22).								
21.0		<b>Switchover valve block (Y11)</b> Data transfer		 on right connector (2)	Voltage oscillates between 0 – 8 V	N22.								
22.0		Electronic blower regulator (N29) Voltage supply		 on right connector (2) Blower speeds: <table style="margin-left: 20px;"> <tr><td>1</td><td>0.8 – 1.2 V</td></tr> <tr><td>2</td><td>1.8 – 2.2 V</td></tr> <tr><td>3</td><td>2.7 – 3.3 V</td></tr> <tr><td>4</td><td>&gt; 5 V</td></tr> </table>	1	0.8 – 1.2 V	2	1.8 – 2.2 V	3	2.7 – 3.3 V	4	> 5 V		N22.
1	0.8 – 1.2 V													
2	1.8 – 2.2 V													
3	2.7 – 3.3 V													
4	> 5 V													

#### Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
23.0	35 75	<b>Auxiliary fan (M4)</b> Stage 1		on right connector (2) Press <b>AUTOMATIC</b> Outside temperature above 86 °F	> 10 V and auxiliary fan running in stage 1	A/C pushbutton control module (N22).
24.0	34 74	<b>Auxiliary fan (M4)</b> Stage 2		on right connector (2) Disconnect and bridge ETC sensor plug (B10/8)	> 10 V and auxiliary fan running in stage 2	N22.
25.0	33 73	<b>A/C compressor (A9)</b> Ground connection <sup>1)</sup>		on right connector (2) Press <b>AUTOMATIC</b>	After 10 seconds > 10 V	N22.

1) If the A/C compressor does not engage, check compressor shut-off 24.

#### Electrical Test Program – Component Locations (Compressor Shut-Off)

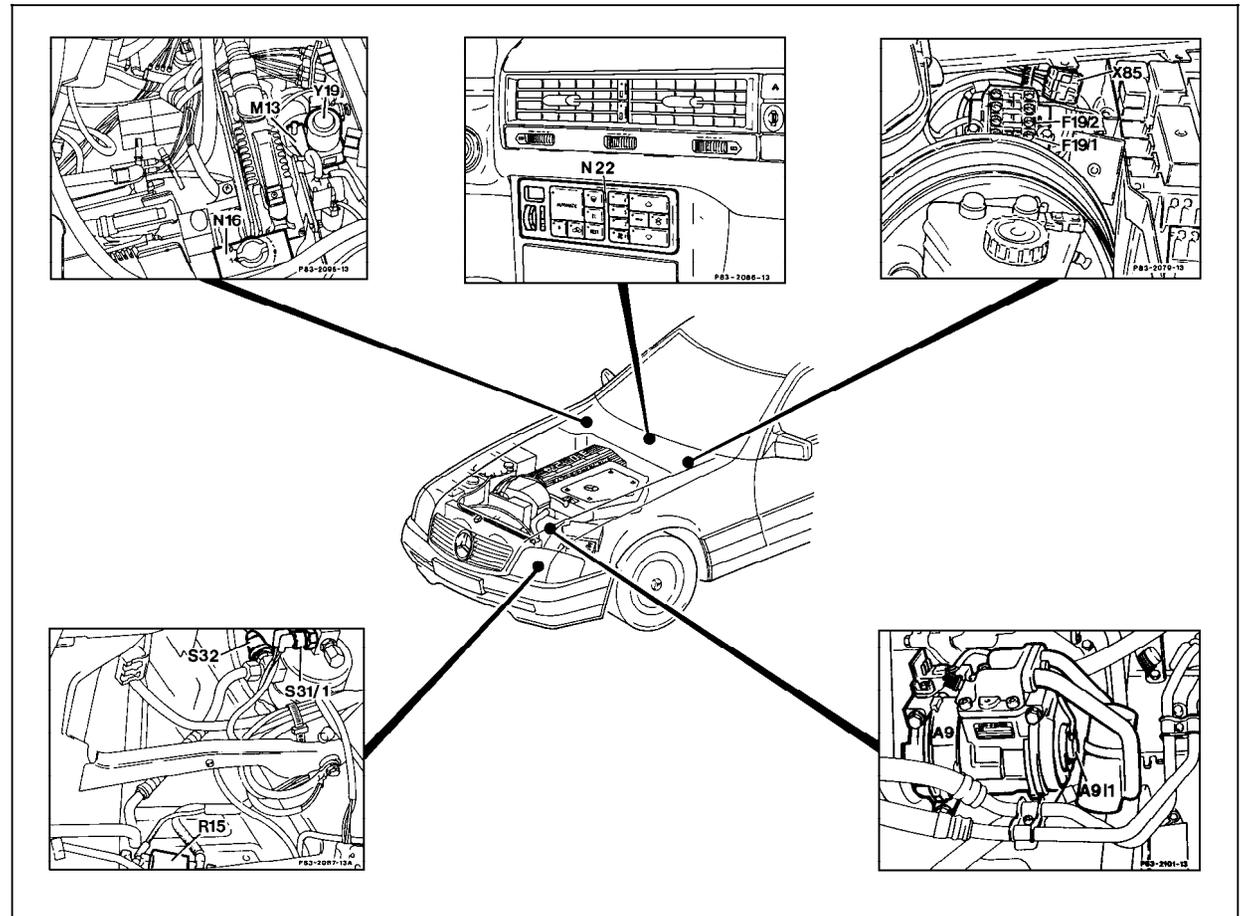


Figure 1

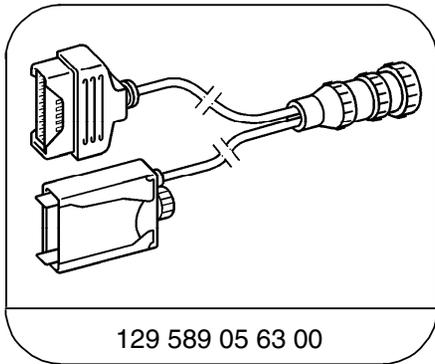
- A9 A/C compressor
- A911 RPM sensor
- F19-1 Fuse 1, circuit 15X
- F19-2 Fuse 2, circuit 30
- M13 Auxiliary coolant pump
- N16 Engine systems control module
- N22 A/C pushbutton control module
- R15 Auxiliary fan presistor
- S31/1 Dual function A/C compressor pressure switch (OFF 2.0/30.0 bar, ON 2.6/22.0 bar)
- S32 Auxiliary fan/A/C compressor pressure switch (OFF 15.0 bar/ON 20.0 bar)
- X85 Automatic A/C/engine harness connector (6-pole)

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#### Electrical Test Program – Preparation for Test (Compressor Shut-Off)

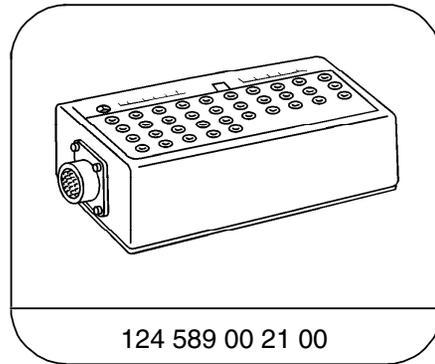
- Check ground connection for A/C pushbutton control module (N22) by turning ignition “ON” and pressing **AUTOMATIC**. Connect voltmeter ( + ) to terminal block, terminal 30/30U/61e/87L (X4/10) and test both connections of dual function A/C compressor pressure switch (S31/1) in series for ground. If there is no ground signal on either connection test the A/C compressor signal ( 23 ⇒ 25.0). If there is a ground signal to only one of the connections, test A/C system pressure. If the pressure is above 3 bar, replace dual function A/C compressor pressure switch (S31/1). If the pressure is below 2 bar, add 200 g refrigerant (R12 or R134a). Check for leaks and repair if necessary (see connection diagram for signal test).

#### Special Tool



129 589 05 63 00

22-pin test cable



124 589 00 21 00

35-pin socket box

#### Conventional tools, test equipment

Description	Brand, model, etc.
Multimeter <sup>1)</sup>	Fluke models 23, 83, 85, 87

<sup>1)</sup> Available through the MBUSA Standard Equipment Program.

#### Electrical Test Program – Preparation for Test (Compressor Shut-Off)

#### Connection Diagram – Signal Test

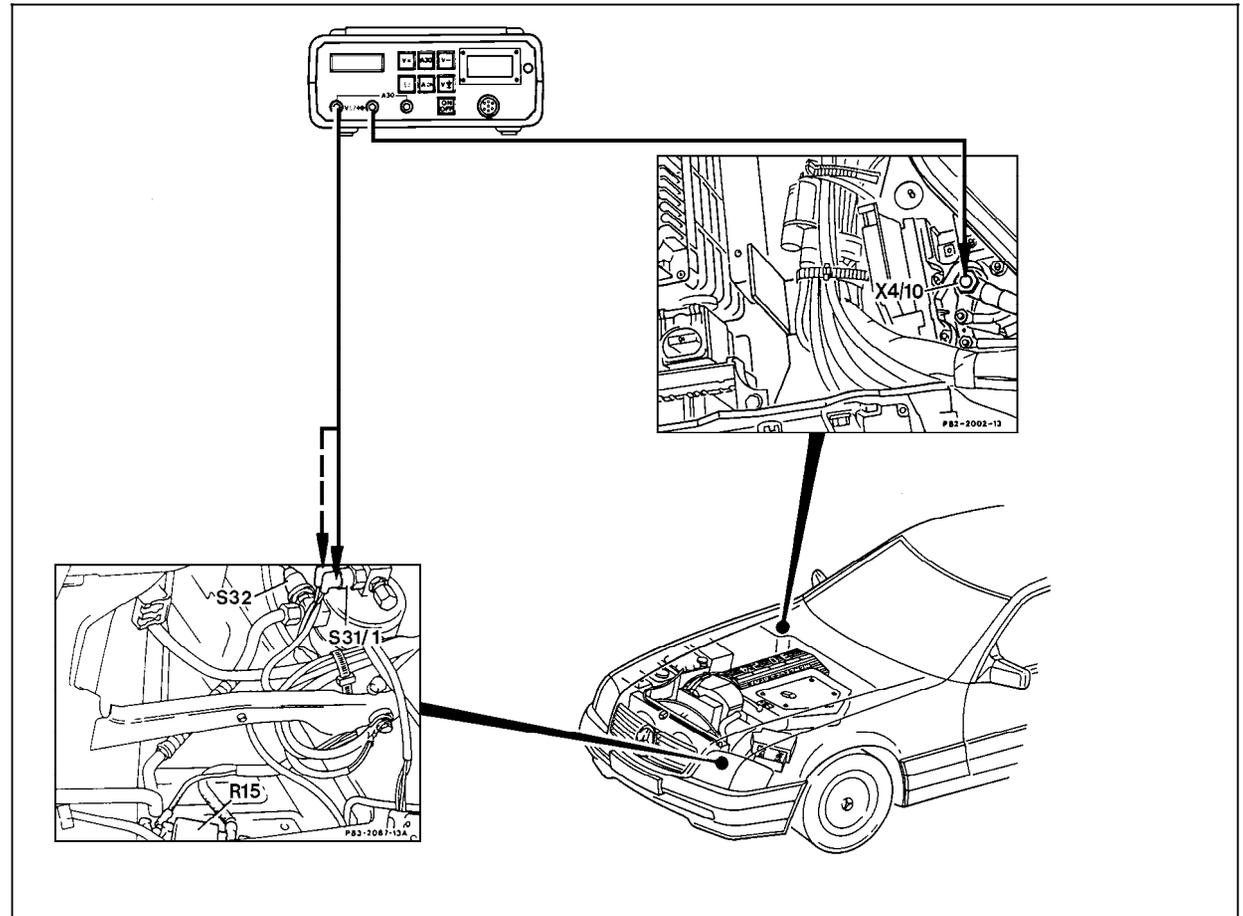


Figure 1

- R15 Auxiliary fan preresistor
- S31/1 Dual function A/C compressor pressure switch (OFF 2.0/30.0 bar, ON 2.6/22.0 bar)
- S32 Auxiliary fan/A/C compressor pressure switch (OFF 15.0 bar/ON 20.0 bar)
- X4/10 Terminal block (circuit 30/30Ü/61e/87L) (6-pole)

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#### Electrical Test Program – Preparation for Test (Compressor Shut-Off)

Connection Diagram – Compressor Shut-Off Test

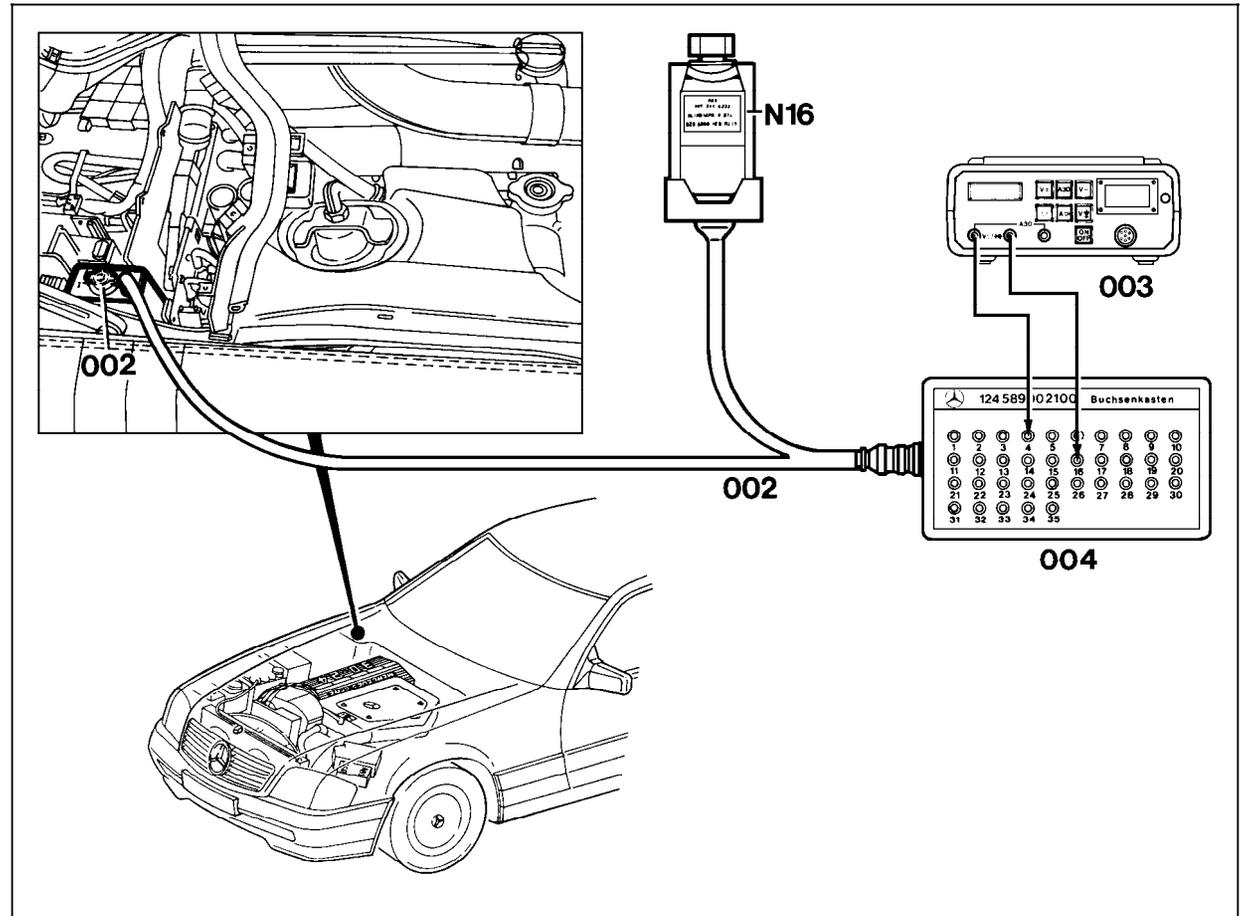
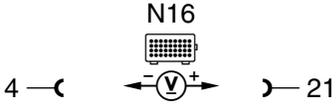
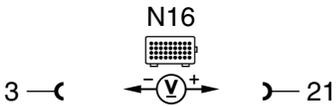
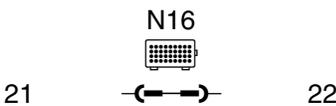
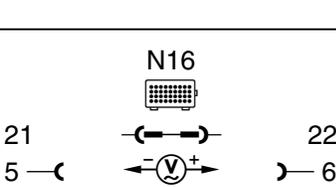
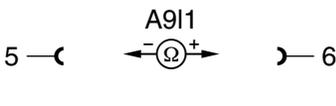
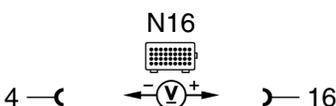


Figure 2

- 002 Test cable
- 003 Multimeter
- 004 Socket box
- N16 Engine systems control module

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#### Electrical Test Program – Test (Compressor Shut-Off)

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0		<b>Engine systems control module (N16)</b> Voltage supply		Ignition: <b>ON</b>	> 10 V	Fuse B blown, Wiring.
2.0		<b>A/C pushbutton control module (N22)</b> Ground connection		Ignition: <b>ON</b> Engage compressor by pressing <b>AUTOMATIC</b>	> 10 V	Wiring.
3.0		<b>A/C compressor, electromagnetic clutch (A9k1)</b>		Engine: <b>at Idle</b>	Compressor must run	Wiring, A9k1.
4.0		<b>A/C compressor, RPM sensor (A9I1)</b>		Engine: <b>at Idle</b>	0.25 V~	Wiring, ⇒ 4.1, A/C compressor (A9).
4.1		Resistance		Disconnect engine systems control module (N16) from 	530 – 900 Ω	
5.0		RPM signal (TD or TN)		Engine: <b>at Idle</b>	5.5 – 12 V	Wiring from DI control module (N1/3) to engine systems control module (N16).