

3.5 Model 210

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Version Coding

Programming

1. Turn ignition **ON**.
2. Left display "Hl", right display "L0".
3. Turn ignition **OFF**.
4. Press **REST** and turn ignition **ON** simultaneously:
"P1" flashes in left side of display window (value 1), right side of display window: (e.g.) "03".
5. Press the right temperature selector (blue = <; red = >).
6. To enter value 1, Press **EC** > 1sec.
7. To access value 2, press **EC**:
"P2" flashes (cycle of 1 Hz) in left side of display window (value 2). Right side of display window: (e.g.) "02".
8. Press the right temperature selector (blue = <; red = >).
9. To enter (value 2) press **EC** > 1sec.
10. Turn ignition **OFF**: A/C (i.e. A/C pushbutton control module [N22]) returns to normal operation.
11. Reset right and left temperature selectors to normal settings.

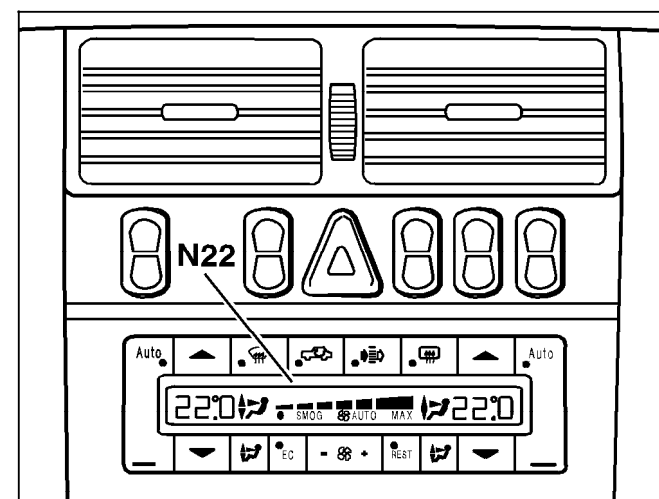




Figure 1

P83.30-0289-01


Version Coding

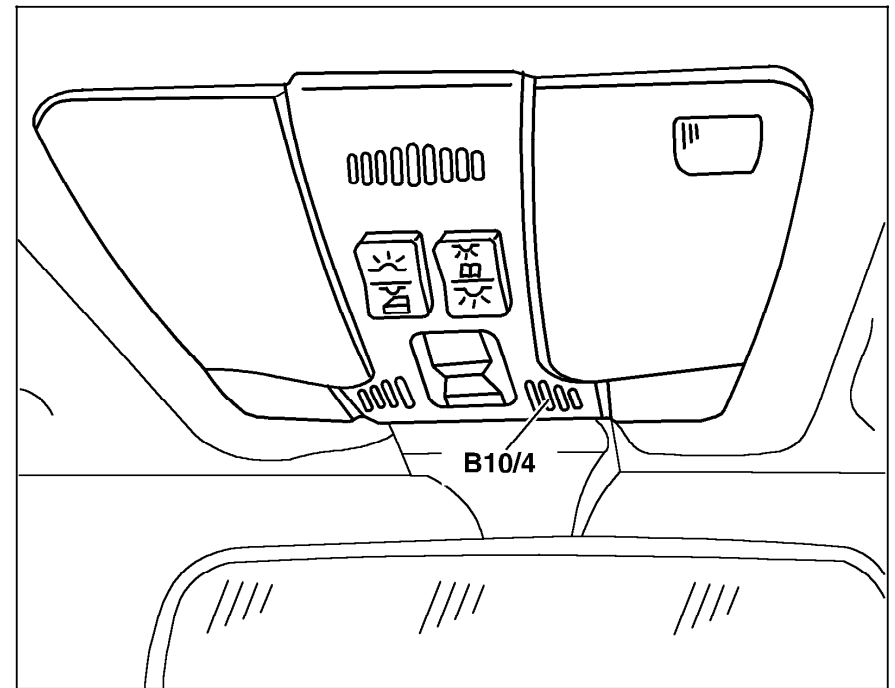
1. Numerical Value  ¹⁾ (Display code in N22 window)	Preliminary setting
00	Serial interface K1
08	Serial interface K1 and K2 (M.Y. 1997)
32	Auxiliary fan not available as of (M.Y. 1997)
2. Numerical Value  ¹⁾ (Display code in N22 window)	Version
00	Engine version over CAN from instrument cluster (as of M.Y. 1997)
+ 08	Blower motor bar graph switched on by AUTO
+ 16	Refrigerant fill level check switched off
+ 128	SMOG display switched off

¹⁾ Version coding menu.

Diagnosis – Function Test

Preparation for Test

1. Review 11, 12, 13, 14, 15, 20, 21, 22, 31, 32, 41, 42
2. Check condition of fuses F1/4, F1/7, F1/8
3. Check in-car temperature sensor aspirator blower (Figure 1) by placing a small piece of paper (arrow) approximately 1" square over in-car temperature sensor aspirator blower vent grille (B10/4) with ignition **ON**. If there is sufficient ventilation the paper will remain on the vent grille, if not check aspirator blower for voltage supply and function. The after-run time for the blower motor is greater than six seconds.
4. Run engine at closed throttle and operating temperature (approx. 80 °C engine coolant temperature) during entire test (ensure that the shift lever is in "P" and that the parking brake is engaged).
5. Manually open the center and side air outlets.
6. Ensure that the  button is **not depressed**.





P83.40-0437-11

Figure 1

B10/4 In-car temperature sensor

Diagnosis – Function Test

Test step/Test sequence	Test condition	Nominal value	Possible cause/Remedy ¹⁾
⇒ 1.0 Defrost	Press  Temperature selection at random setting	Blower runs with increased speed. Air venting from defroster outlets. A/C compressor engaged. Maximum heat output, 100% fresh air	23 ⇒ 9.0, 10.0, 14.0, 15.0, 18.0 20.0
⇒ 2.0 Ventilation in cooling mode	Press AUTO Temperature selection “L0”	Blower runs with increased speed. Air venting from center and side outlets. A/C compressor engaged, no heat output.	32 ⇒ Test A, B, C, 23 ⇒ 9.0, 14.0, 18.0, 20.0
⇒ 3.0 Normal setting in regulating mode	Press AUTO Temperature selection set at present in-car temperature.	Blower speed decreases. Air venting from defroster outlets, leak air from footwell outlets. A/C compressor engaged. Tempered air venting. Duovalve cycles and auxiliary coolant pump runs.	32 ⇒ Test A, B, C, 23 ⇒ 9.0, 14.0, 18.0, 19.0, 20.0
⇒ 4.0 Economy mode, no heating	Temperature selection “L0” Press EC Press 	Air venting from dash outlets (ambient temperature) A/C compressor OFF.	32 ⇒ Test A, B, C, 23 ⇒ 18.0, 19.0

¹⁾ Observe Preparation for Test, see 22.

Diagnosis – Function Test

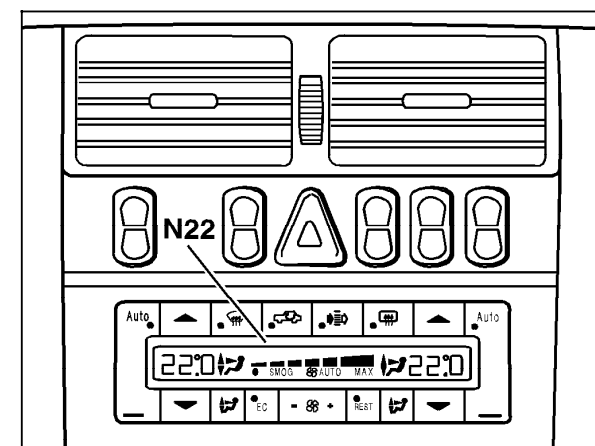
Test step/Test sequence	Test condition	Nominal value	Possible cause/Remedy ¹⁾
⇒ 5.0 Economy in heating mode	Temperature selection "HI" Press EC	Air venting from footwell and side outlets left/right. Leak air from defroster outlets. Maximum heat output.	23 ⇒ 14.0, 15.0, 18.0, 19.0 32 ⇒ Testing A, B, C
⇒ 6.0 Residual engine heat utilization	Ignition: OFF Press REST Selected temperature > 79 °F (26 °C)	Heated air from footwell and side outlets, leak air from defroster outlets. Blower runs at low speed.	32 ⇒ Testing A, B, C, 23 ⇒ 14.0, 15.0, 16.0, 17.0, 18.0, 19.0, 23.0

¹⁾ Observe Preparation for Test, see 22.

Diagnosis – Reading Actual Values (via A/C Pushbutton Control Module [N22])



1. The display window or the HHT will show in sequence the actual temperature readings, refrigerant pressure, blower control voltage and software status of the A/C pushbutton control module (N22).
2. The temperature control is maintained during the duration of the test.



P83.30-0289-01

Diagnosis – Reading Actual Values (via A/C Pushbutton Control Module [N22])


Preparation for Test

1. Review 11, 12, 13, 14, 15, 20, 21, 22, 31, 32, 41, 42
2. Ignition: **ON**
3. Press **AUTO**.
4. Set both temperature selectors to 72 °F.
5. Press **REST** for > 5 secs.
6. The left display will alternately show the number "1" and the in-car temperature (e.g. 72 °F)
7. By pressing **AUTO** the next highest test step is displayed (see table).
8. Press **REST** to end test program.




The display will show "E" (Error) if there is a short or open circuit, negative sensor values will be shown in the left display (e.g. "-").

Diagnosis – Reading Actual Values (via A/C Pushbutton Control Module [N22])

Display code in N22 window 	Possible cause	Test step/Remedy ¹⁾
1 01	In-car temperature sensor (B10/4)	23 ⇒ 4.0
2 02	Outside temperature indicator temperature sensor (B14)	23 ⇒ 21.0
3 03	Heater core temperature sensor left (B10/1)	23 ⇒ 7.0
4 04	Heater core temperature sensor right (B10/1)	23 ⇒ 8.0
5 05	Evaporator temperature sensor (B10/6)	23 ⇒ 5.0
6 06	ECT sensor (DFI, IFI) (B11/4)	23 ⇒ 21.0
7 07	Refrigerant pressure in bar, e.g. 4 corresponds to 4 bar	23 ⇒ 9.0
8 08	Refrigerant temperature sensor (B12/1), e.g. 73 corresponds to 73 °F	23 ⇒ 6.0
9 -	Not used	-
10 13	Blower control voltage, e.g. 0.8 (min) - 6.0 (max) corresponds to .8 - 6 V	23 ⇒ 17.0
11 10	Emissions sensor (B31) e.g. 3.1 corresponds to 3.1 V	23 ⇒ 12.0
12 09	Sun sensor (B32) e.g. 4.2 corresponds to 4.2 V	23 ⇒ 10.0
20 -	Control current for auxiliary fan e.g. 7 corresponds to 7 mA	23 ⇒ 13.0
21 12	Engine speed, e.g. 99 (x 100) corresponds to 9900 rpm	23 ⇒ 21.0

1) Observe Preparation for Test, see 22.

Diagnosis – Reading Actual Values (via A/C Pushbutton Control Module [N22])

Display code in N22 window 	Possible cause	Test step/Remedy ¹⁾
22 11	Vehicle speed 155 (km/h)	23 ⇒ 21.0
23 14	Terminal 58d e.g. 99.0 corresponds to 99 % battery voltage	-
24 -	Battery voltage e.g. 12.8 = 12.8 V	-
40 12	Software status e.g. 31	-
41 12	Hardware status e.g. 08	-

¹⁾ Observe Preparation for Test, see 22.

Diagnosis – Individual Flap Test (via A/C Pushbutton Control Module [N22])



1. The display window in the A/C pushbutton control module (N22) will show the test step.
Pressing the various buttons will activate the individual vacuum actuators (refer to test table).
The LED on the depressed button lights up.
2. The temperature control is maintained during the duration of the test.

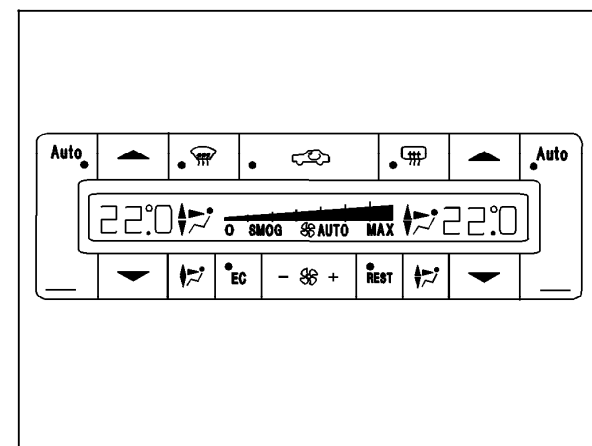



Figure 1

P83.40-0410-01

Diagnosis – Individual Flap Test (via A/C Pushbutton Control Module [N22])

Preparation for Test

1. Review 11, 12, 13, 14, 15, 20, 21, 22, 31, 32, 41, 42
2. Engine: **At Idle**
3. Press left and right **AUTO** buttons.
4. Set temperature selector to 72 °F.
5. Manually open the side and middle air vents.
6. Press **REST** and  for > 5 secs.
7. The left display will show „0” and the right display will show “L0”.
8. By pressing **AUTO** on the left side, the next highest test step is activated. To switch from “L0” to “H1” press **AUTO** on the right side (see table).
9. Press **REST** to end test program.



Two stage vacuum actuators function at full stroke (100%) only, if the long stroke (80%) and the short stroke (20%) are pressed.

Pressing the short stroke (20%) by itself does not change the flap position.

The blower motor will be powered with 6V during the individual flap test.

Diagnosis – Individual Flap Test (via A/C Pushbutton Control Module [N22])

Diagnostic Trouble Code (DTC)	Activated flap ³⁾	Test condition	Right display	Nominal value/Air output	Test step/Remedy ¹⁾
0	All	Press right AUTO	LO HI	No flaps are activated (closed). All flaps opened (activated).	32 A, B, C
01	Left diverter flap ¹⁾	Press right AUTO	LO HI	Left center outlet closed. Left center outlet opened, cold air.	32 A, B, C
2	Right diverter flap ¹⁾	Press right AUTO	LO HI	Right center outlet closed. Right center outlet opened, cold air.	32 A, B, C
3	Left blend air flap ¹⁾	Press right AUTO	LO HI	Left center outlet closed. Left center outlet, warm air.	32 A, B, C
4	Right blend air flap ¹⁾	Press right AUTO	LO HI	Right center outlet, closed. Right center outlet, warm air.	32 A, B, C
5	Left defroster flap long stroke ²⁾	Press right AUTO	LO HI	Side defroster leak air. Side defroster maximum air.	32 A, B, C

¹⁾ The left and right defroster outlets will also be activated (long and short stroke).

²⁾ The right defroster outlet will also be activated (long and short stroke).

³⁾ The left defroster outlet will also be activated (long and short stroke).

Diagnosis – Individual Flap Test (via A/C Pushbutton Control Module [N22])

Diagnostic Trouble Code (DTC)	Activated flap ³⁾	Test condition	Right display	Nominal value/Air output	Test step/Remedy ¹⁾
6	Left defroster flap long and short stroke ²⁾	Pushbutton right AUTO	LO HI	Left defroster outlet closed. Left defroster outlet opened.	32 A, B, C
7	Right defroster flap, long stroke ³⁾	Pushbutton right AUTO	LO HI	Right defroster flap open, leak air. Right defroster flap opened.	32 A, B, C
8	Right defroster flap, long and short stroke ³⁾	Pushbutton right AUTO	LO HI	Right defroster flap closed. Right defroster flap opened.	32 A, B, C
9	Main air flap long stroke ⁴⁾	Pushbutton right AUTO	LO HI	Fresh air flow. Recirculated air 80%.	32 A, B, C
10	Main air flap long and short stroke ⁴⁾	Pushbutton right AUTO	LO HI	Fresh air flow. Recirculated air 100%.	32 A, B, C
11	Left footwell air flap long stroke ¹⁾	Pushbutton right AUTO	LO HI	Left footwell air flap closed Left footwell air flap opened, leak air.	32 A, B, C

1) The left and right defroster outlets will also be activated (long and short stroke).

2) The right defroster outlet will also be activated (long and short stroke).

3) The left defroster flap will also be activated (long and short stroke).

4) The left and right blend air flaps will also be activated.

Diagnosis – Individual Flap Test (via A/C Pushbutton Control Module [N22])

Diagnostic Trouble Code (DTC)	Activated flap ³⁾	Test condition	Right display	Nominal value/Air output	Test step/Remedy ¹⁾
12	Left footwell flap, long and short stroke ¹⁾	Pushbutton right AUTO	LO HI	Left footwell flap, leak air. Left footwell flap, opened.	32 A, B, C
13	Right footwell flap, long stroke ¹⁾	Pushbutton right AUTO	LO HI	Right footwell flap, closed. Right footwell flap opened, leak air	32 A, B, C
14	Right footwell flap, long and short stroke ¹⁾	Pushbutton right AUTO	LO HI	Right footwell flap, leak air. Right footwell flap, opened.	32 A, B, C
15	All flaps	Pushbutton right AUTO	LO HI	No flaps are activated (closed). All flaps are activated (opened).	32 A, B, C

¹⁾ The left and right defroster outlets will also be activated (long and short stroke).

Diagnosis – Diagnostic Trouble Code (DTC) Memory



- The A/C pushbutton control module (N22) has DTC memory and data output. The diagnostic trouble codes and data are displayed via the temperature display window. The stored DTC's will remain in memory even with the vehicle battery disconnected.
- The DTC memory differentiates continuously between current and intermittent faults.
- All DTC's can also be read with the Hand-Held Tester (HHT).

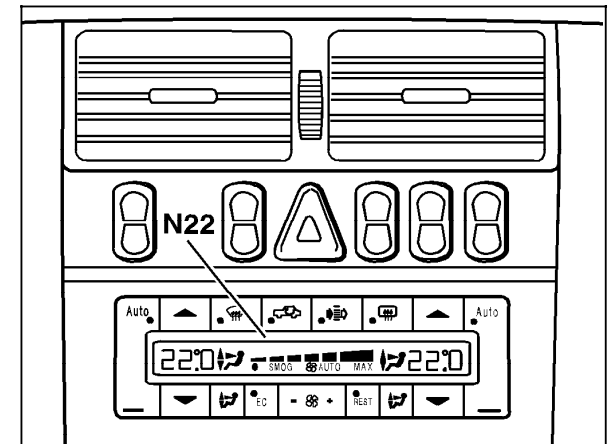



Figure 1

P83.30-0289-01

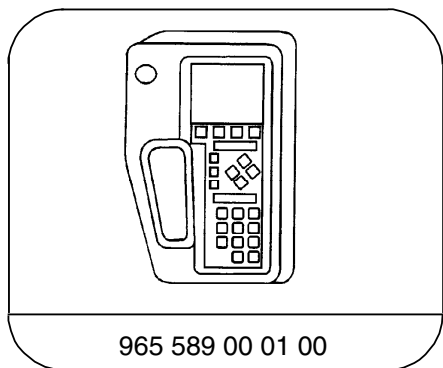
Diagnosis – Diagnostic Trouble Code (DTC) Memory

Preparations for DTC Readout

1. Connect HHT, see section 0 and readout DTC's.
2. Review 11, 12, 13, 14, 15, 20, 21, 22, 31, 32, 41, 42
3. Ignition: **ON**
4. Temperature selector left "HI", right "LO".
5. Within 20 seconds press **REST** and **EC** simultaneously for more than 5 seconds.
6. The LED in  flashes and the display shows "di R".
7. Press **AUTO** repeatedly until all DTC's (refer to DTC table) are displayed. Record each DTC as it is displayed.
8. Each malfunction (short circuit, open circuit, etc.) has a specific DTC assigned to it.
The letter "E" (Error) is displayed in the left of the display and the DTC is displayed in the right of the display. By pressing the right **AUTO** button the next DTC stored in memory will be displayed.
9. To erase: Only possible after all DTC's are read out.
Simultaneously press both **AUTO** > 2 secs. "d" will be displayed in the left side of the display window and "FF" on the right side.
To cancel erase: By pressing **AUTO** the current faults will appear again.
10. Set temperature selector to normal setting.
11. Turn ignition **OFF** to end test.

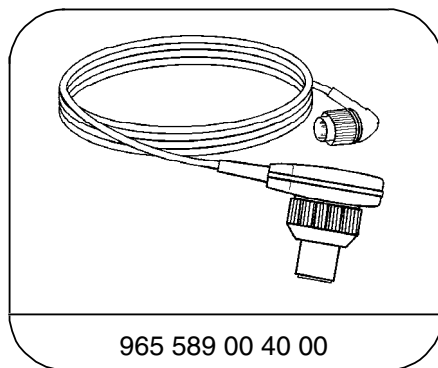
Diagnosis – Diagnostic Trouble Code (DTC) Memory

Special Tools



965 589 00 01 00


Hand-Held-Tester



965 589 00 40 00


Test cable

Diagnosis – Diagnostic Trouble Code (DTC) Memory

Diagnostic trouble code (DTC) N22 	Possible cause	Test step/Remedy ¹⁾
- -	No malfunction in system	—
B1226 003	In-car temperature sensor (B10/4)	23⇒ 4.0
B1227 004	Outside temperature indicator temperature sensor (B14)	23⇒ 21.0
B1228 005	Heater core temperature (B10/1)	23⇒ 7.0
B1229 006	Heater core temperature (B10/1)	23⇒ 8.0
B1230 007	Evaporator temperature sensor (B10/6)	23⇒ 5.0
B1231 008	ECT sensor (B11/4)	23⇒ 21.0
B1232 009	Refrigerant pressure sensor (B12)	23⇒ 9.0
B1233 010	Refrigerant temperature sensor (B12/1)	23⇒ 6.0
B1234 011	Sun sensor (B32)	23⇒ 10.0
B1235 012	Emissions sensor (B31)	23⇒ 12.0
B1241 013	Refrigerant fill	23⇒ 9.0, 6.0
B1416 014	Coolant circulation pump (M13)	23⇒ 15.0

¹⁾ Observe Preparation for Test, see 22.

Diagnosis – Diagnostic Trouble Code (DTC) Memory

Diagnostic trouble code (DTC)	Possible cause	Test step/Remedy ¹⁾
N22 		
B1417 019	Duovalve (Y21y1), left	23⇒ 16.0
B1418 020	Duovalve (Y21y2), right	23⇒ 16.0
B1419 021	Electromagnetic clutch (A9k1)	23⇒ 19.0
B1420 022	Idle speed increase	-
B1421 023	Pulse module (N65)	23⇒ 13.0
B1422 024	Series interface (K1) connection to instrument cluster (A1)	23⇒ 21.0
B1423 025	Switchover valve block (Y11)	23⇒ 18.0
B1424 026	Activated charcoal filter actuator (A32m2) open	23⇒ 20.0
B1425 027	Activated charcoal filter actuator (A32m2) closed	23⇒ 20.0
B1432 028	Non-USA DTC	-
B1459 029	Series interface (K2) connection to instrument cluster (A1)	23⇒ 23.0
B1462 030	Wide open throttle (WOT) position signal: diesel engines	-

¹⁾ Observe Preparation for Test, see 22.

Electrical Test Program – Component Locations

Component locations in passenger compartment

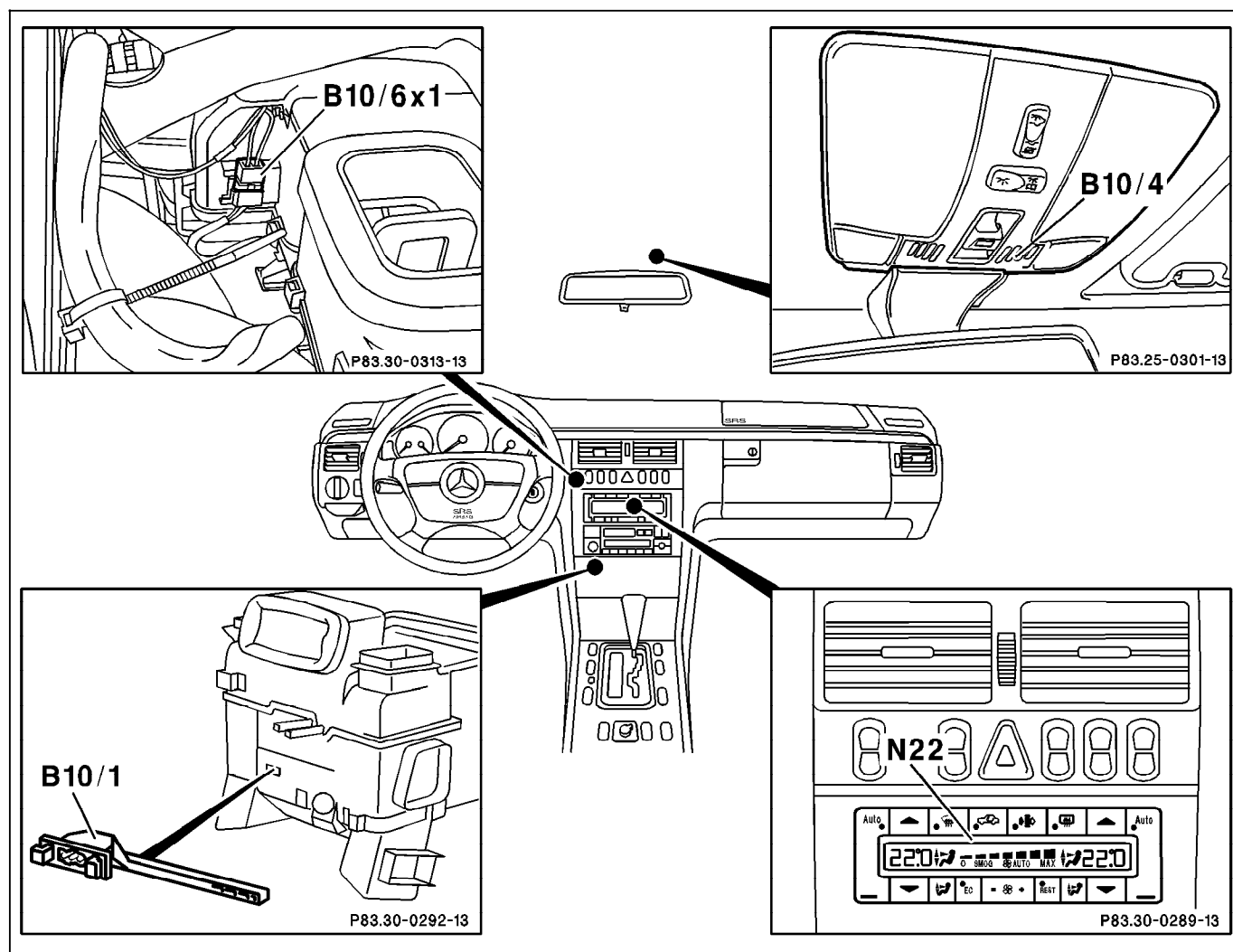


Figure 1

- B10/1 Heater core temperature sensor
- B10/4 In-car temperature sensor with aspirator
- B10/6x1 Evaporator temperature sensor connector
- N22 A/C pushbutton control module

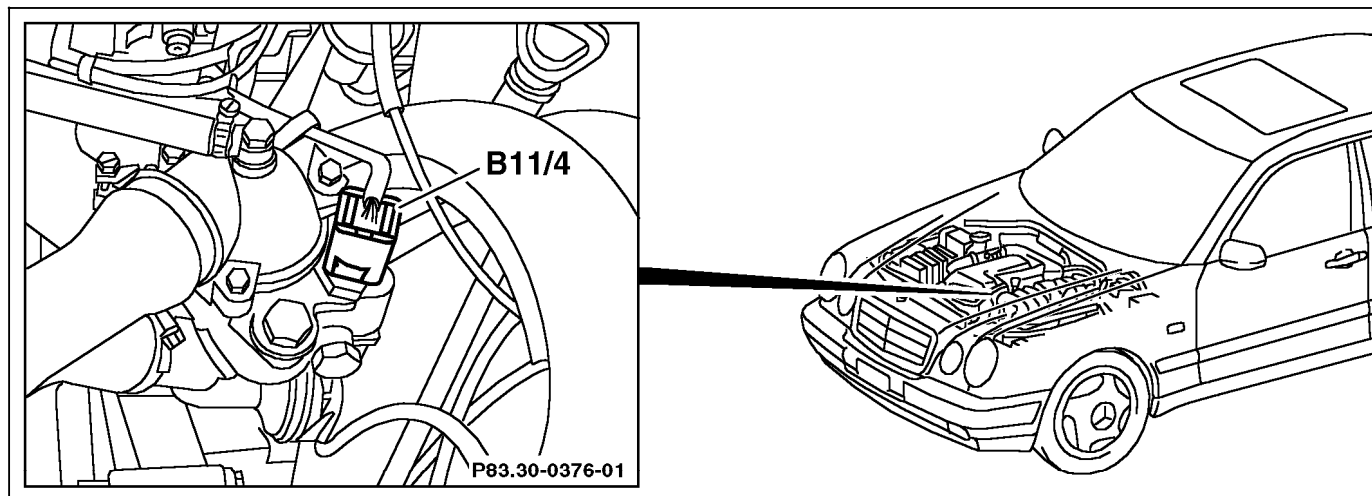
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Electrical Test Program – Component Locations

Component locations in engine compartment

Figure 2

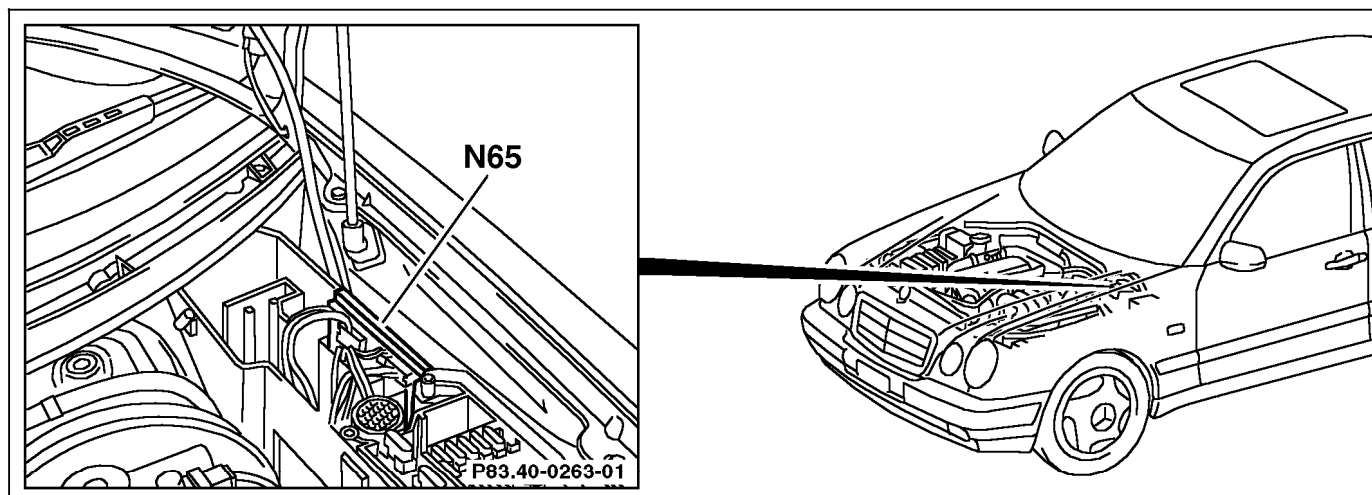
B11/4 CT sensor



P83.40-0457-04

Figure 3

N65 Pulse module
(traction systems, HCS, ATA, AAC)



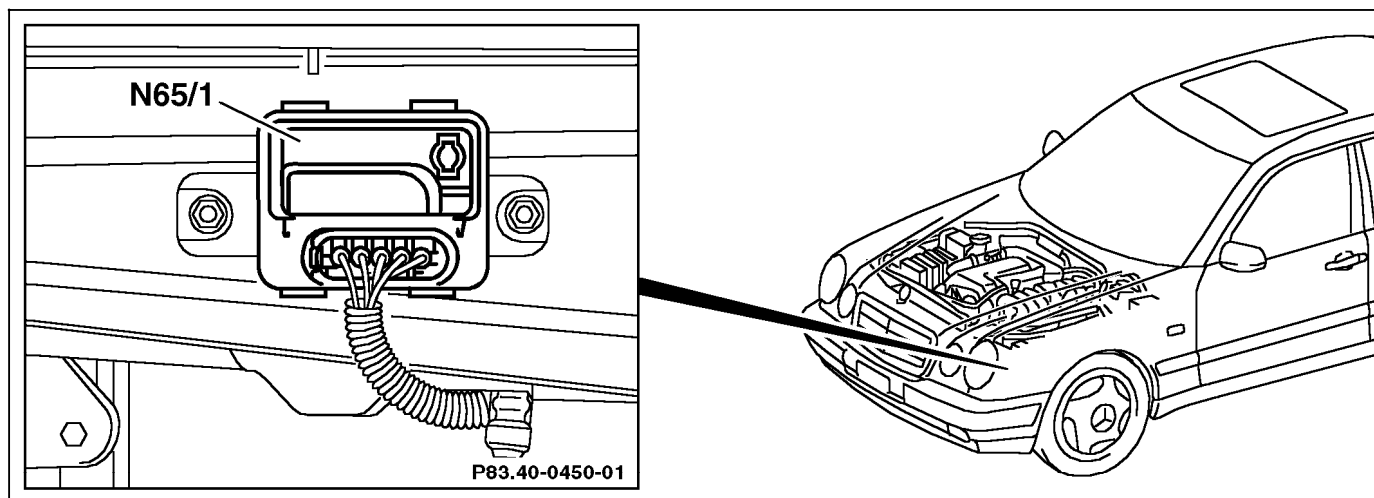
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Electrical Test Program – Component Locations

Component locations in engine compartment

Figure 4

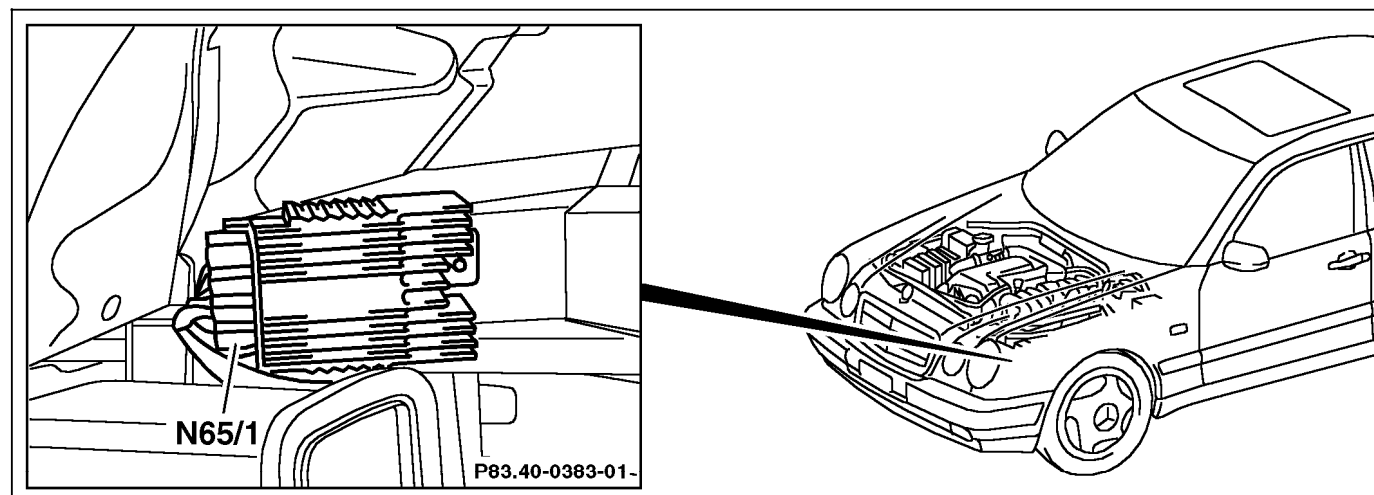
N65/1 AIR control module



P83.40-0456-04

Figure 5

N65/1 AIR control module



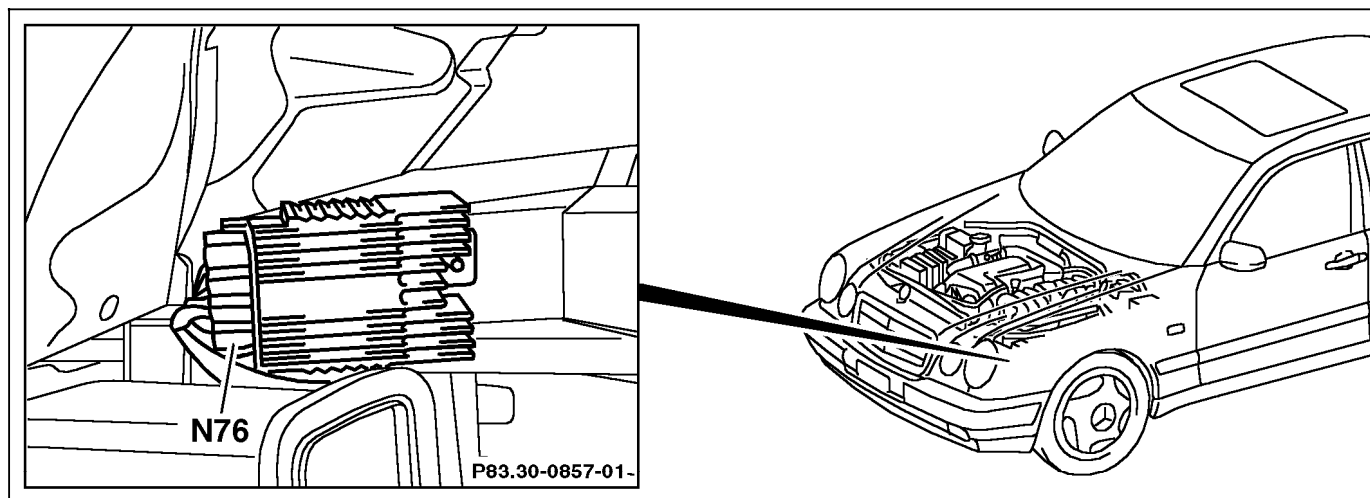
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Electrical Test Program – Component Locations

Component locations in engine compartment

Figure 6

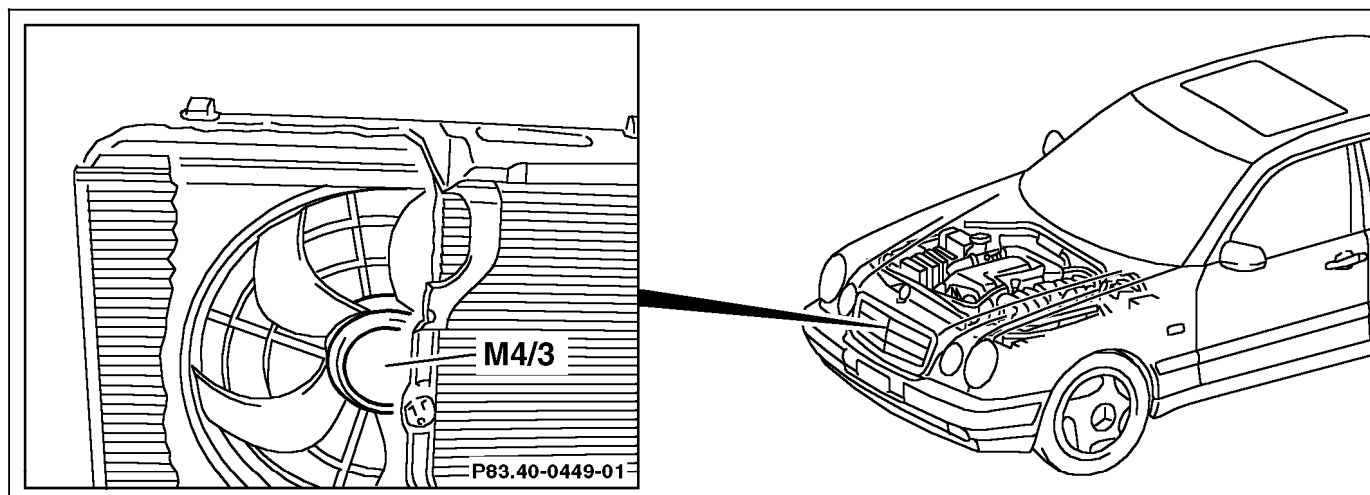
N76 Engine/climate control electric cooling fan control module



P83.40-0446-04

Figure 7

M4/3 Engine/climate control electric cooling fan



P83.40-0448-04

Electrical Test Program – Component Locations

Component locations in engine compartment

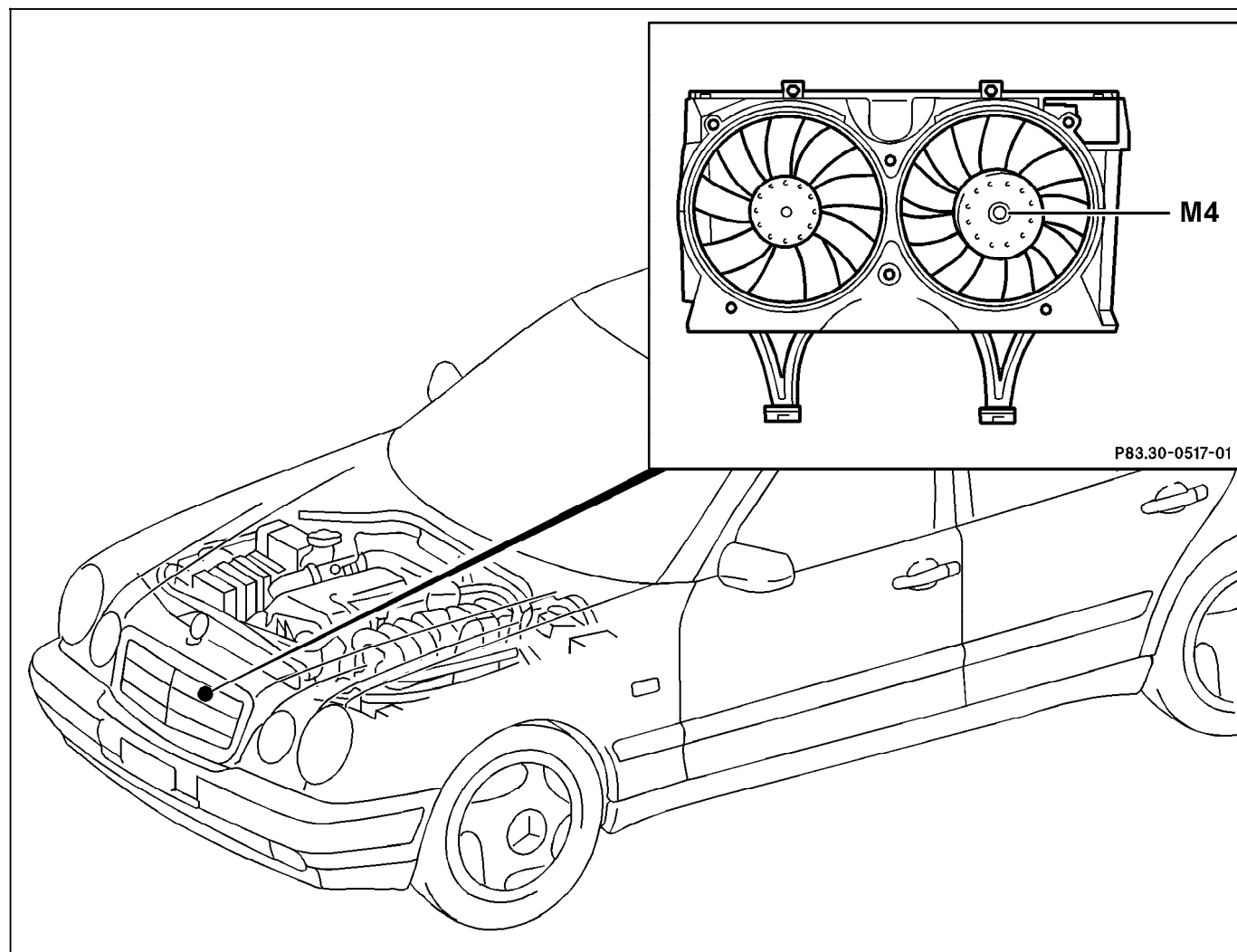


Figure 8

M4 Auxiliary fan

Electrical Test Program – Component Locations

Component locations in engine compartment

Figure 9

M13 Coolant circulation pump

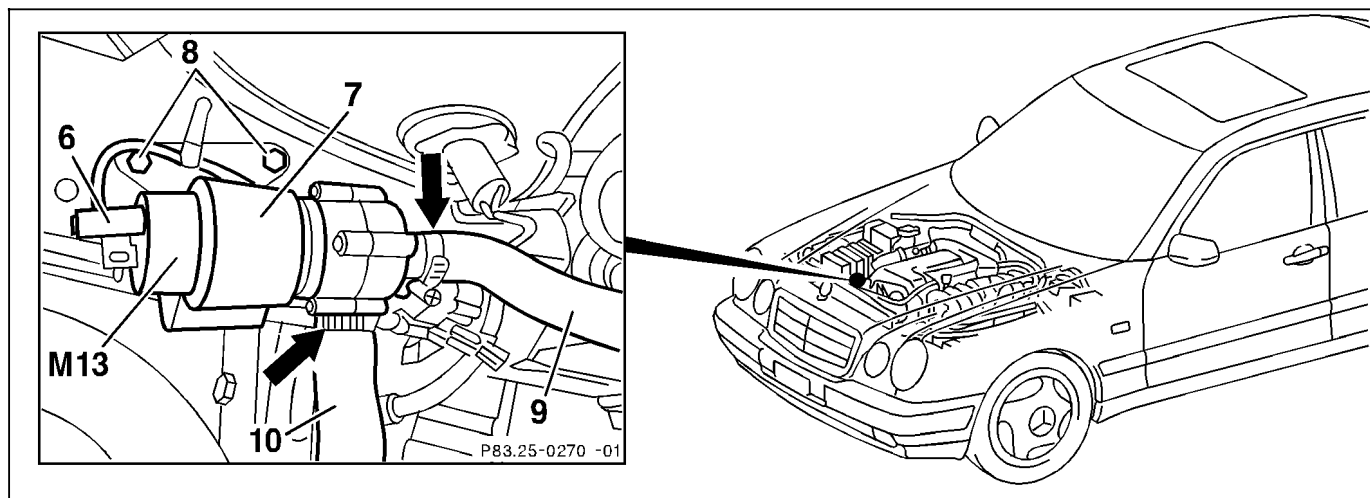
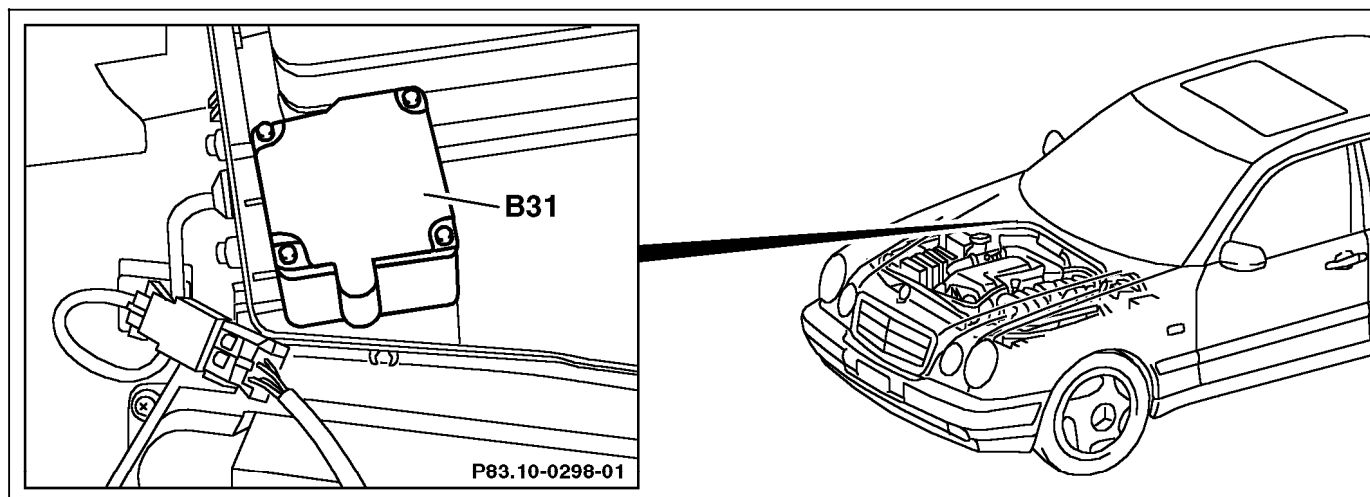


Figure 10

B31 Emissions sensor (up to 5/98)

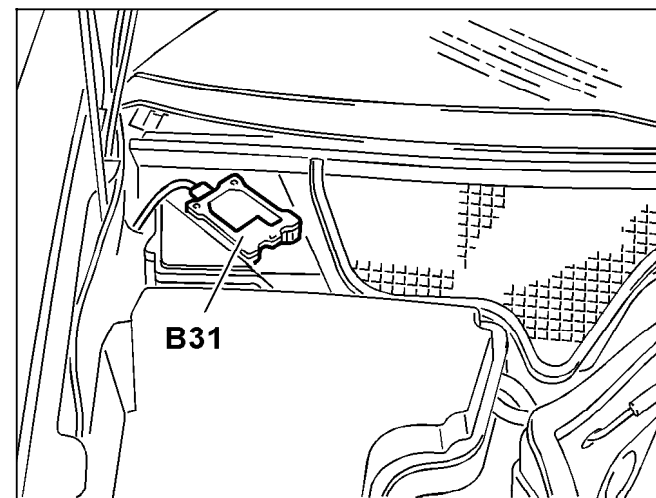


Electrical Test Program – Component Locations

Component locations in engine compartment

Figure 11

B31 Emissions sensor (as of 6/98)



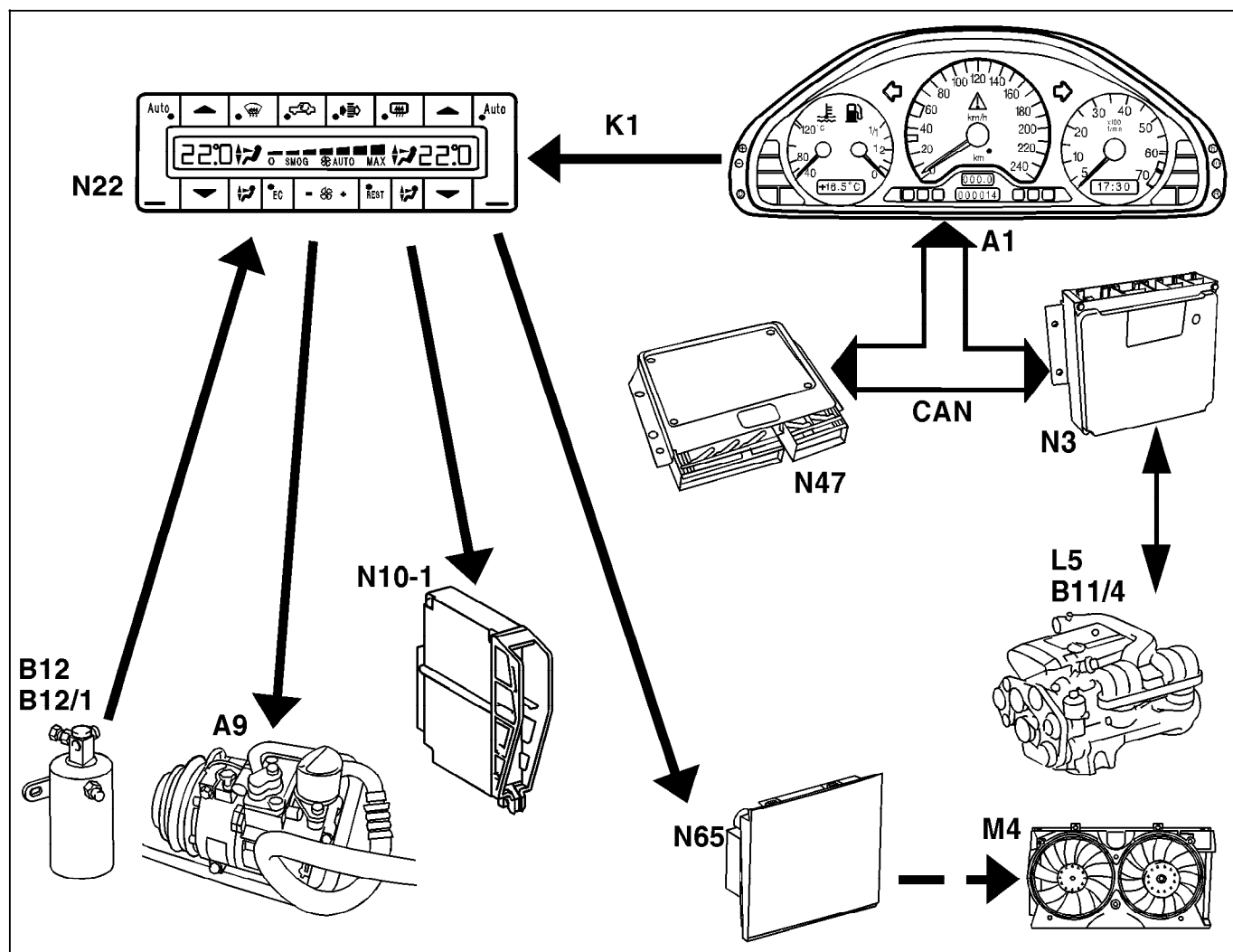
P83.40-2034-01

Electrical Test Program – Connection of Components

Connection of Components
Model 210
Engines 104, 606 up to 8/96
Engine 119 up to 9/97

Figure 1

- A1 Instrument cluster
- A9 A/C compressor
- B11/4 CT sensor
- B12 Refrigerant pressure sensor
- B12/1 Refrigerant temperature sensor
- L5 CKP sensor
- M4 Auxiliary fan
- N3 CFI control module
- N47 Traction systems control module
- N10-1 Combination control module (CF, windshield wiper, rear window defroster)
- N22 AAC pushbutton control module
- N65 Pulse module (traction systems, HCS, ATA, AAC)



P83.40-0435-06

Electrical Test Program – Connection of Components

Connection of Components
Model 210 as of 9/96 to 2/97
Engines 104, 606

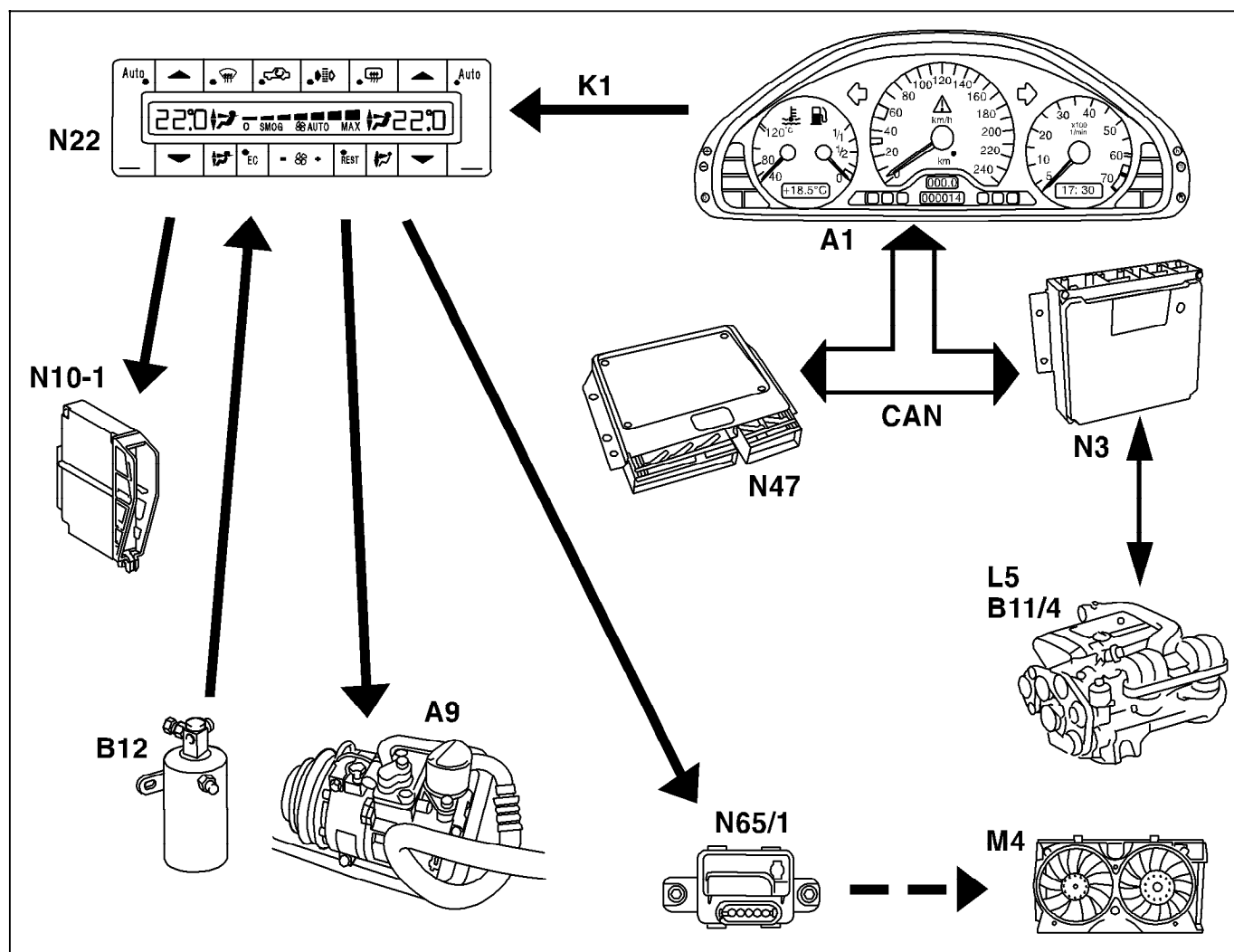


Figure 2

- A1 Instrument cluster
- A9 A/C compressor
- B11/4 CT sensor
- B12 Refrigerant pressure sensor
- B12/1 Refrigerant temperature sensor
- L5 CKP sensor
- M4 Auxiliary fan
- N3 CFI control module
- N47 Traction systems control module
- N10-1 Combination control module (CF, windshield wiper, rear window defroster)
- N22 AAC pushbutton control module
- N65/1 A/R control module

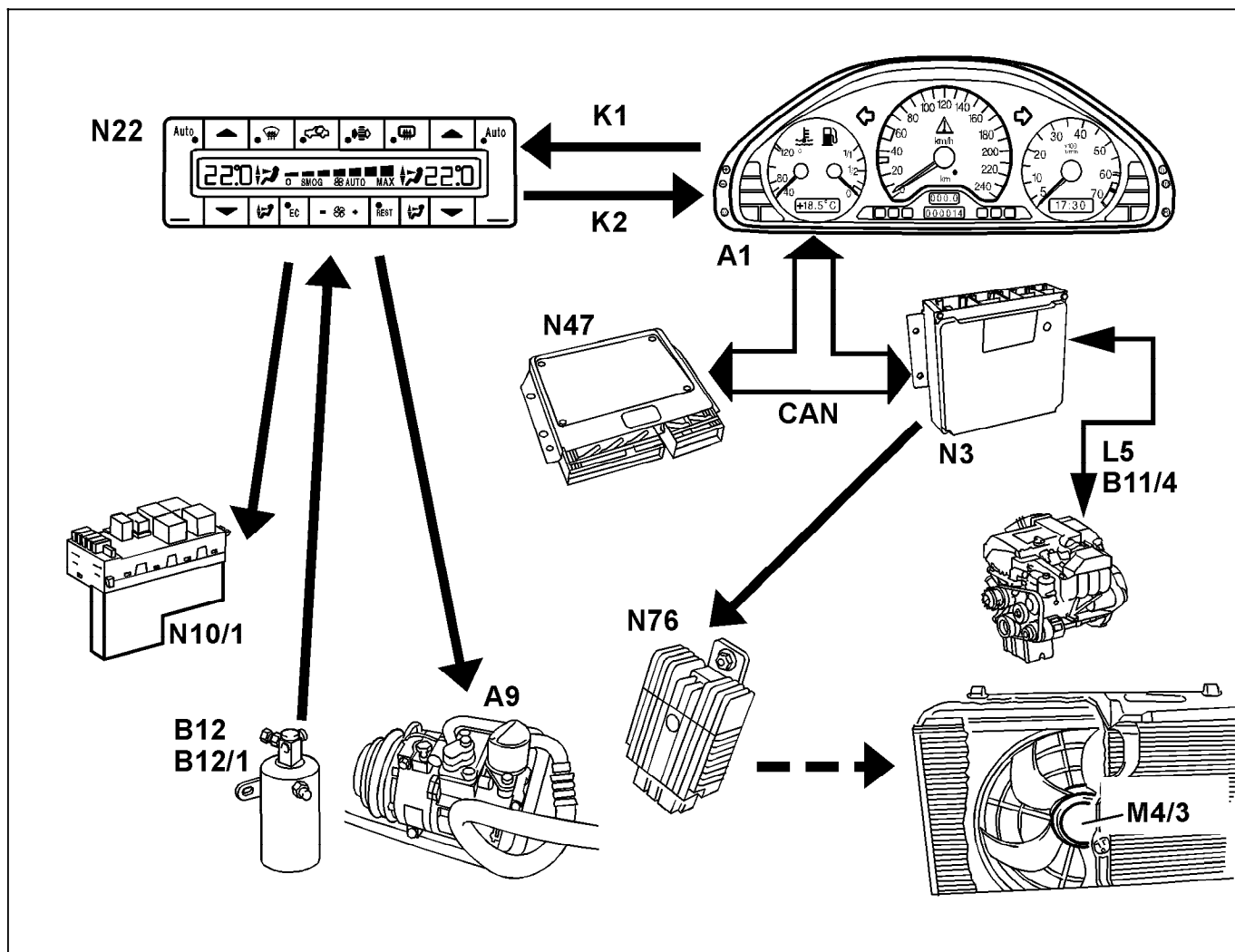
P83.40-2071-06

Electrical Test Program – Connection of Components

Connection of Components
Model 210
Engine 112 as of 6/98

Figure 3

- A1 Instrument cluster
- A9 A/C compressor
- B11/4 CT sensor
- B12 Refrigerant pressure sensor
- B12/1 Refrigerant temperature sensor
- L5 CKP sensor
- M4/3 Engine/climate control electric cooling fan
- N3 CFI control module
- N47 Traction systems control module
- N10/1 Signal pick-up and activation module (SAM) left front
- N22 AAC pushbutton control module
- N76 Engine/climate control electric cooling fan control module



P83.40-0412-06

Electrical Test Program – Connection of Components

Connection of Components
Model 210
Engine 113, 606 as of 3/97
Engine 112 up to 5/98

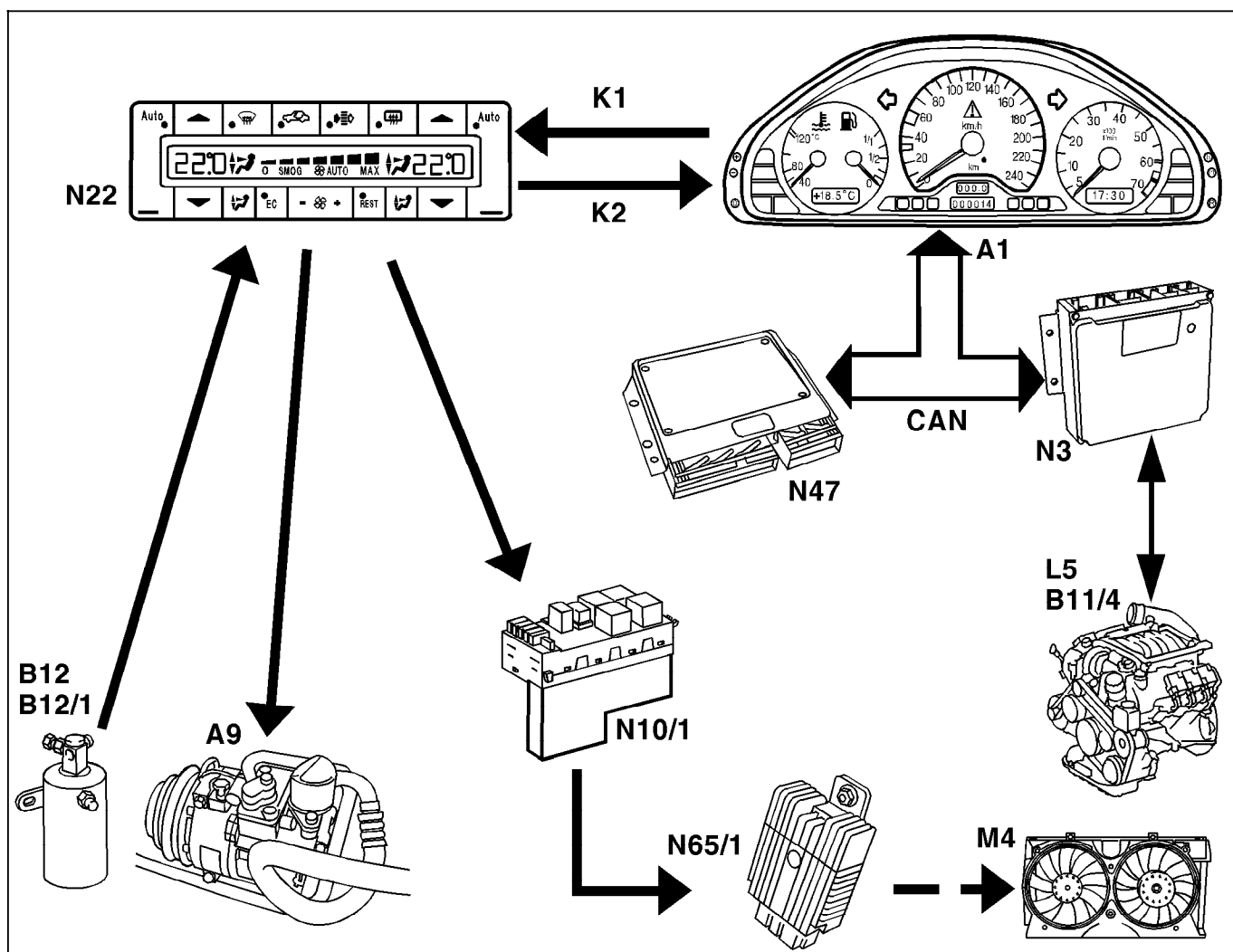


Figure 4

- A1 Instrument cluster
- A9 A/C compressor
- B11/4 CT sensor
- B12 Refrigerant pressure sensor
- B12/1 Refrigerant temperature sensor
- L5 CKP sensor
- M4/3 Engine/climate control electric cooling fan
- N3 CFI control module
- N47 Traction systems control module
- N10/1 Signal pick-up and activation module (SAM) left front
- N22 AAC pushbutton control module
- N65/1 AIR control module

P83.40-0433-06

Electrical Test Program – Connection of Components

Connection of Components for
Auxiliary fan (M4) regulation
Model 210
Engine 104, 606 up to 8/96
Engine 119 up to 9/97

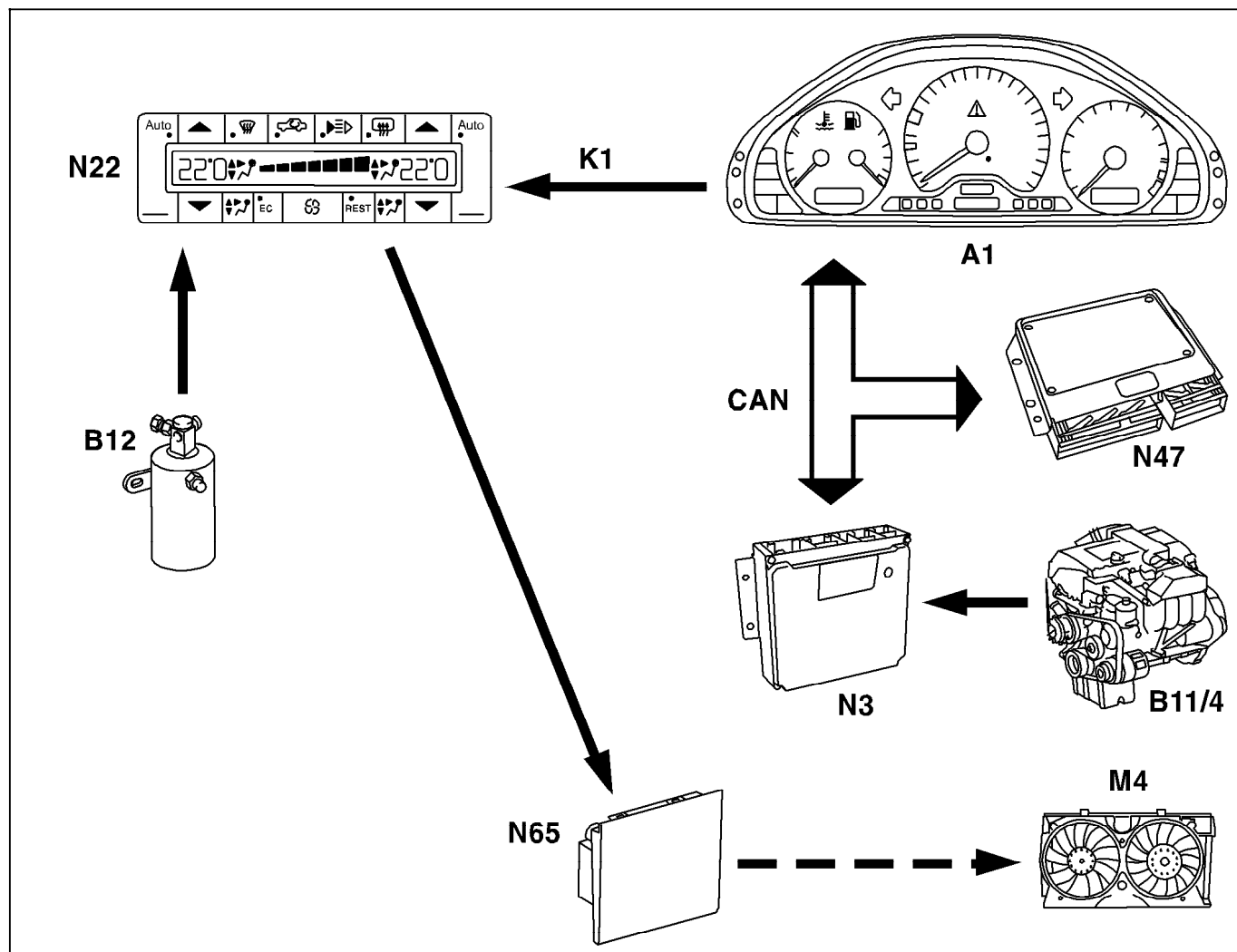


Figure 5

- A1 Instrument cluster
- B11/4 CT sensor.
- B12 Refrigerant pressure sensor
- M4 Auxiliary fan
- N3 CFI control module
- N47 Traction systems control module
- N65 Pulse module (traction systems, HCS, ATA, AAC)

P83.40-2081-06

Electrical Test Program – Connection of Components

Connection of Components for
Auxiliary fan (M4) regulation
Model 210 as of 9/96 up to 2/97
Engines 104 and 606

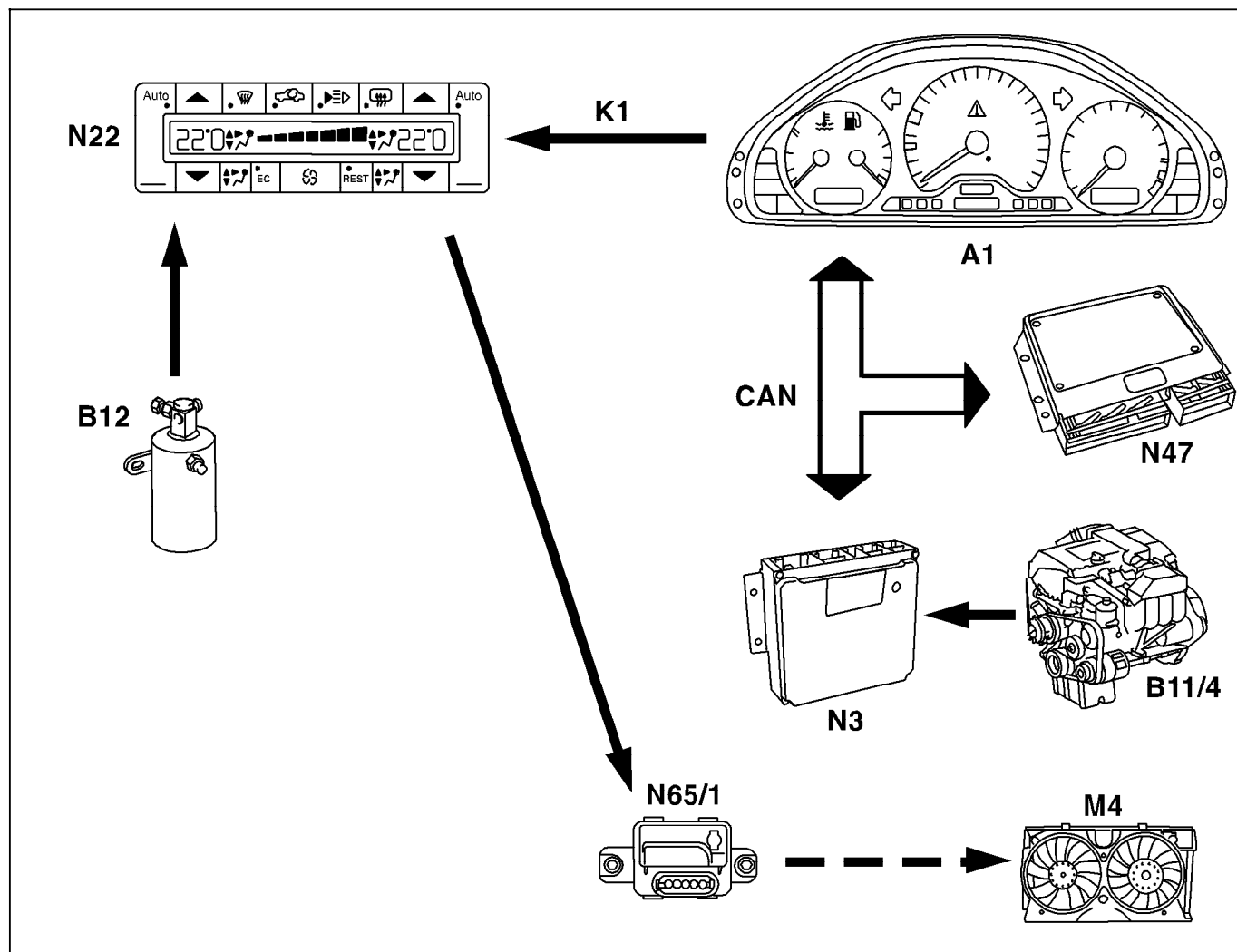


Figure 6

- A1 Instrument cluster
- B11/4 CT sensor.
- B12 Refrigerant pressure sensor
- M4 Auxiliary fan
- N3 CFI control module
- N22 AAC pushbutton control module
- N47 Traction systems control module
- N65/1 AIR control module

P83.40-2083-06

Electrical Test Program – Connection of Components

Connection of Components for
Auxiliary fan (M4) regulation
Model 210
Engines 113 and 606 up to 3/97
Engine 112 up to 5/98

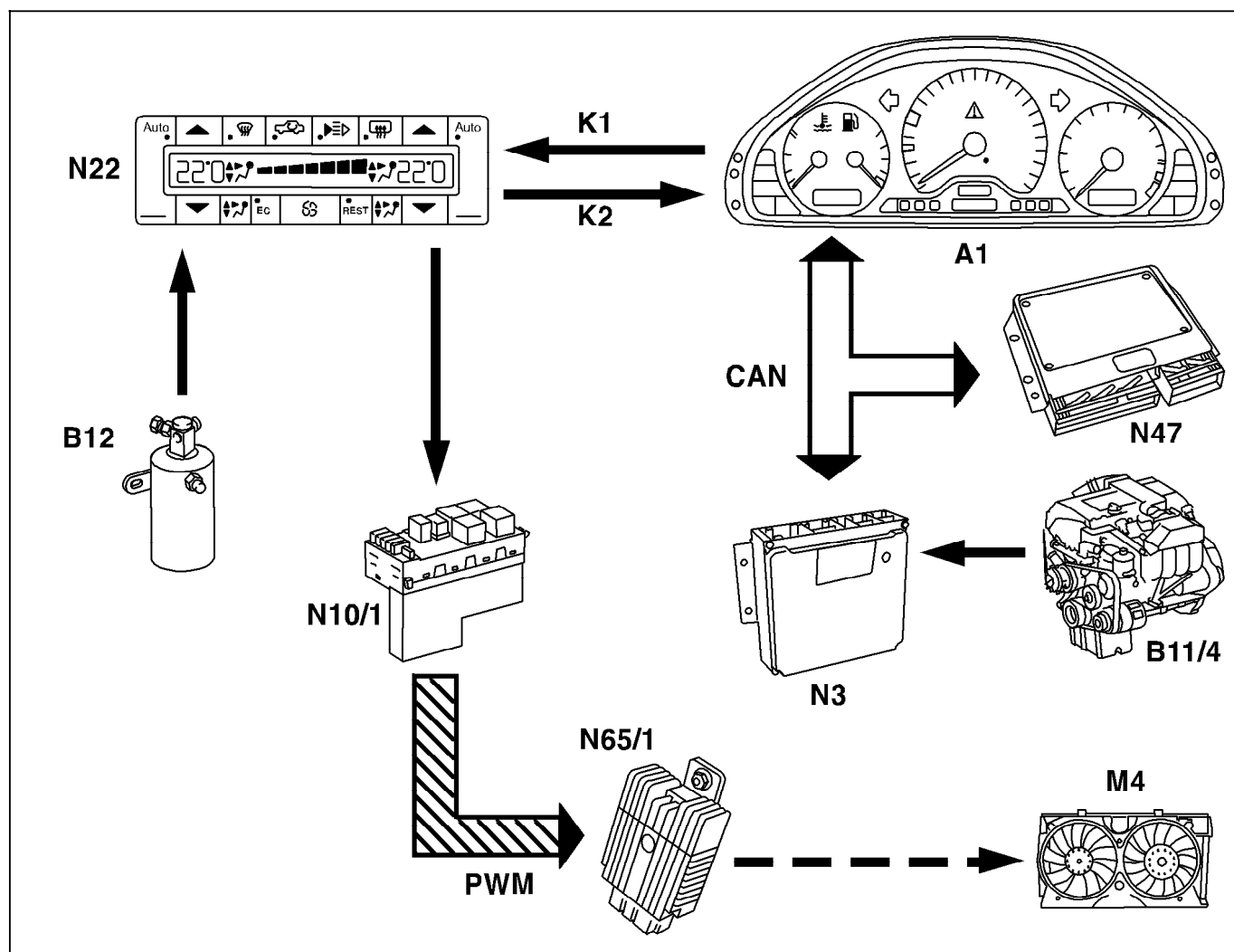


Figure 7

- A1 Instrument cluster
- B11/4 CT sensor.
- B12 Refrigerant pressure sensor
- M4/3 Engine/climate control electric cooling fan
- N3 CFI control module
- N10/1 Signal pick-up and activation module (SAM) left front
- N22 AAC pushbutton control module
- N47 Traction systems control module
- N65/1 AIR control module

P83.40-2080-06

Electrical Test Program – Connection of Components

Connection of Components for
Engine/climate control electric
cooling fan (M4/3) regulation
Model 210
Engine 112 as of 6/98

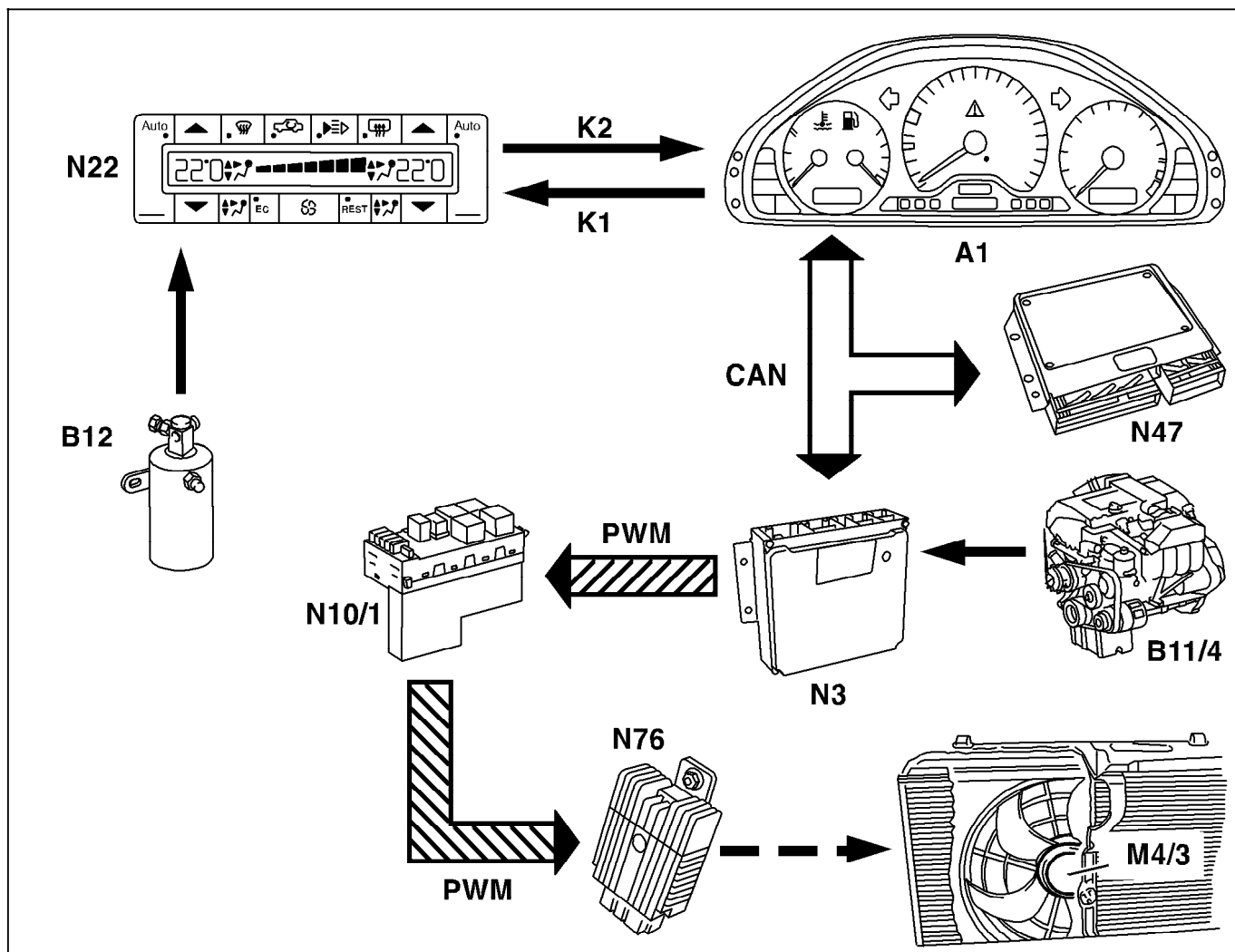


Figure 8

- A1 Instrument cluster
- B11/4 CT sensor.
- B12 Refrigerant pressure sensor
- M4/3 Engine/climate control electric cooling fan
- N3 CFI control module
- N10/1 Signal pickup- and activation module (SAM) left front
- N22 AAC pushbutton control module
- N47 Traction systems control module
- N76 Engine/climate control electric cooling fan control module

P83.40-2079-06

Electrical Test Program – Connection of Components

Connection of Components for Temperature Regulation Model 210

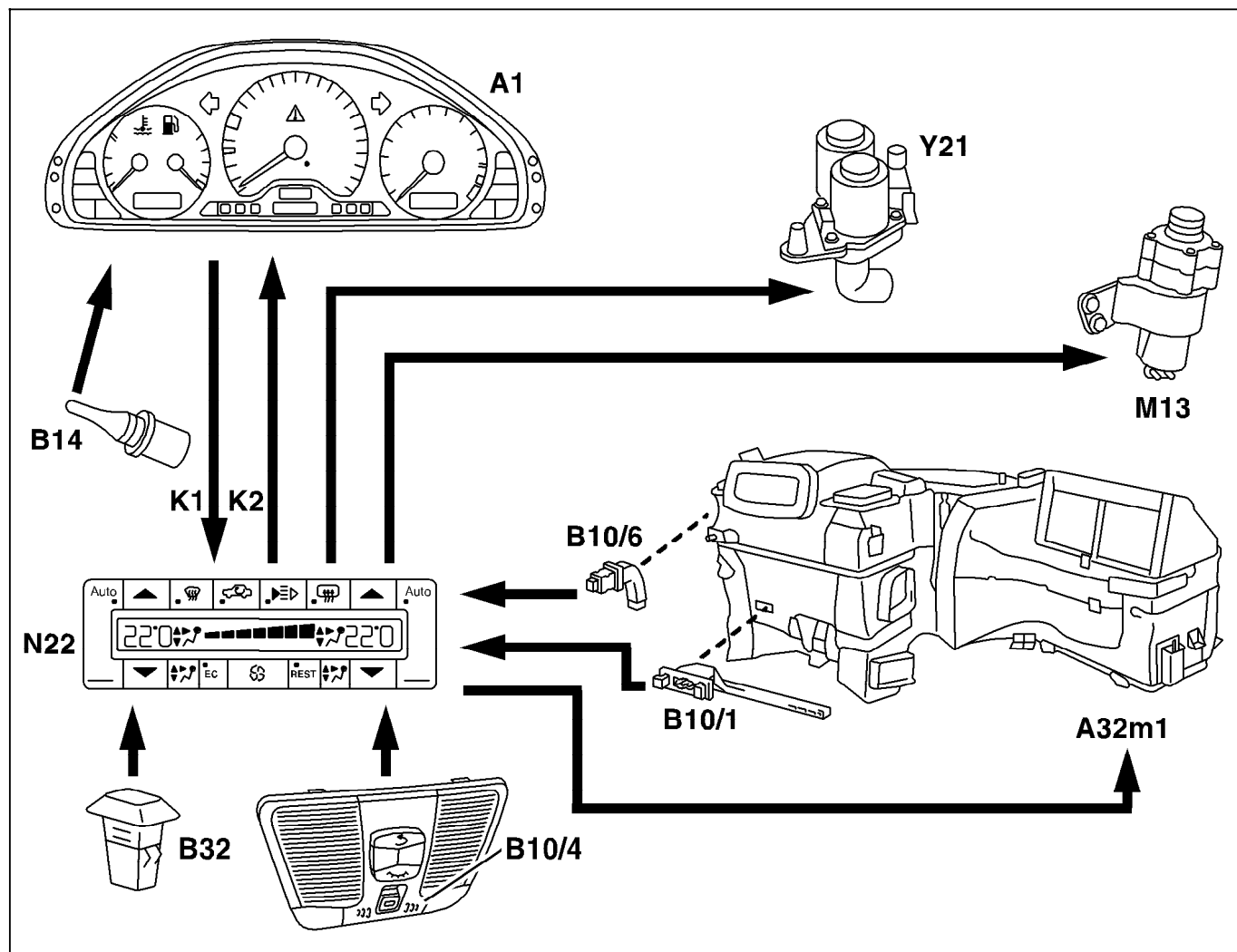


Figure 9

- A1 Instrument cluster
- A32m1 Blower motor
- B10/1 Heater core temperature sensor
- B10/4 In-car temperature sensor
- B10/6 Evaporator temperature sensor
- B14 Outside temperature indicator temperature sensor
- B32 Sun sensor
- M13 Coolant circulation pump
- N22 AAC pushbutton control module
- Y21 Duovalve

P83.40-2077-06

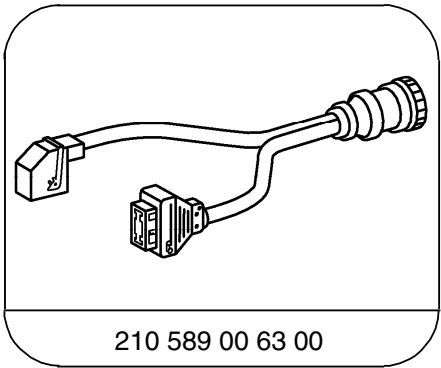
Electrical Test Program – Preparation for Test

1. Review 11, 12, 13, 14, 15, 20, 21, 22, 31, 32, 41, 42
2. Upon completion of test, erase DTC memory from A/C pushbutton control module (see 15).
3. Remove A/C pushbutton control module (N22), see AR83.40-P-6350C

Electrical wiring diagrams:
Electrical Troubleshooting Manual, Model 210

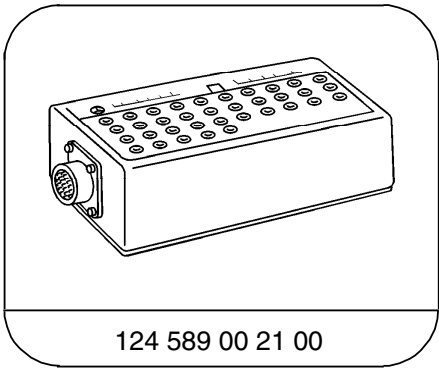


The second column of the TEST section will show both the DTC for the HHT and the display window of the A/C pushbutton control module for each test step.



210 589 00 63 00

29-pin test cable



124 589 00 21 00

35-pin socket box

Test equipment; See MBUSA Standard Service Equipment Program

Description	Brand, model, etc.
Digital multimeter	Fluke models 23, 77 III, 83, 85, 87

Electrical Test Program - Preparation for Test

Connection Diagram – Socket Box

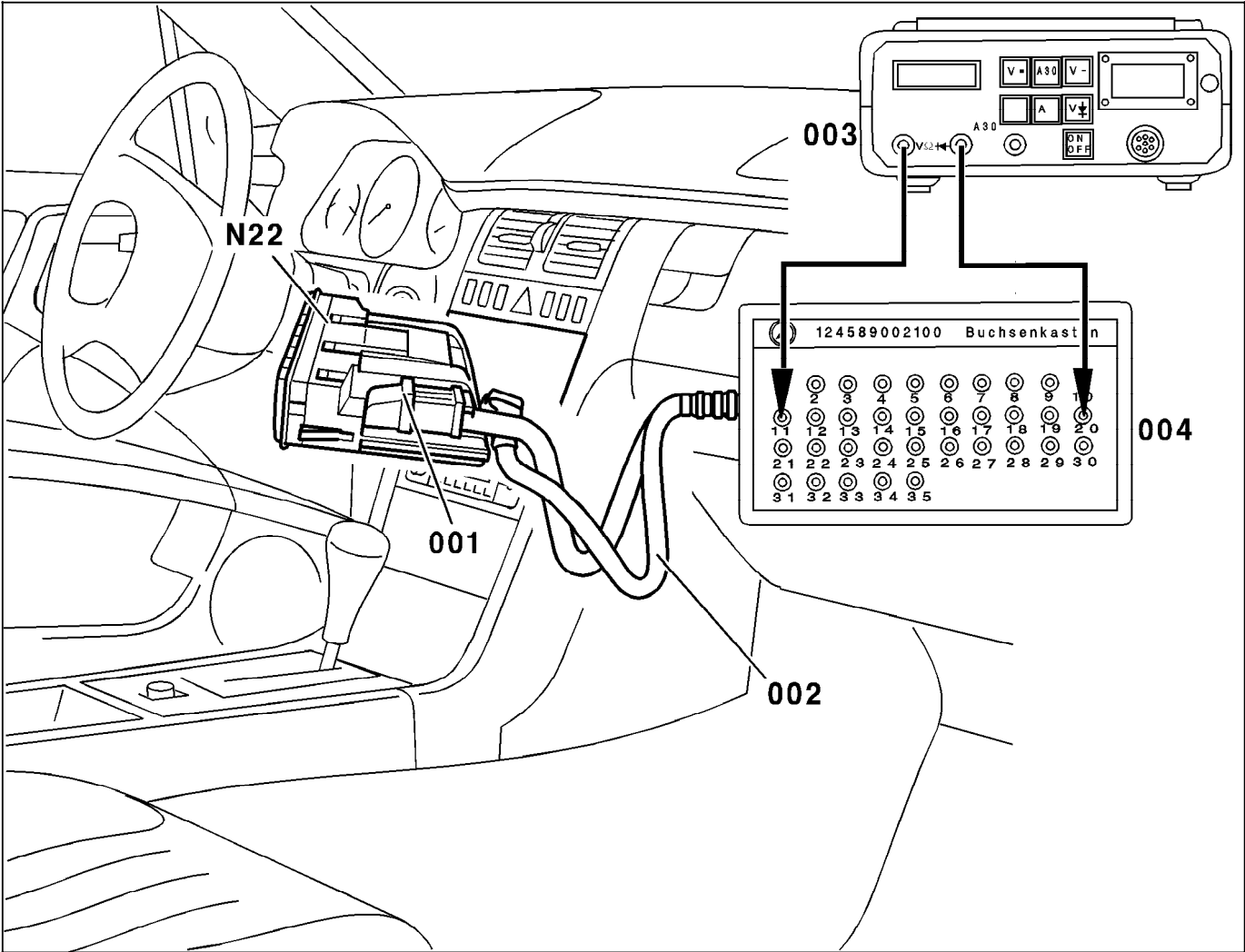


Figure 1


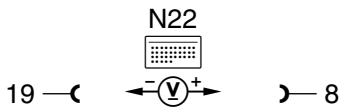

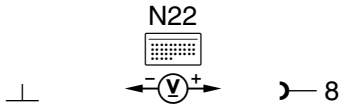

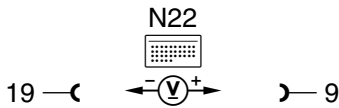

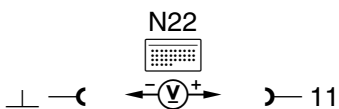

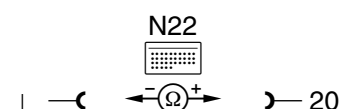


- 001 Right connector, A/C pushbutton control module
- 002 Test cable
- 003 Multimeter
- 004 Socket box
- N22 AAC pushbutton control module

P83.40-0278-06








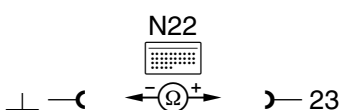


3.5 Air Conditioning (A/C)

Model 210


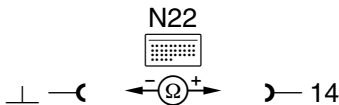


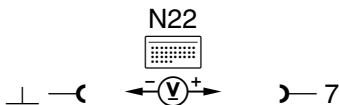

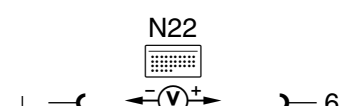

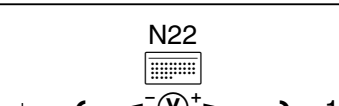

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0		AAC pushbutton control module (N22) Voltage supply Circuit 30		 on right connector	11 – 14 V	Wiring, ⇒ 1.1, Circuit 31
1.1		Circuit 30		 on right connector	11 – 14 V	Wiring, Circuit 31
2.0		Voltage supply Circuit 15		 on right connector Ignition: ON	11 – 14 V	Wiring.
3.0		Voltage supply Circuit 15x		 on left connector Ignition: ON	11 – 14 V	Wiring.
4.0	B1226 003	In-car temperature sensor (B10/4) Resistance		Ignition: OFF  on left connector Disconnect N22 from  .	$^{\circ}\text{C} \approx \text{k}\Omega$ $10 \approx 19.0 - 21.0$ $20 \approx 11.9 - 13.0$ $30 \approx 7.7 - 8.4$ $45 \approx 4.2 - 4.6$	Wiring, B10/4


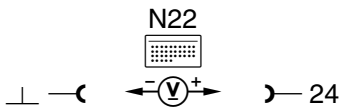

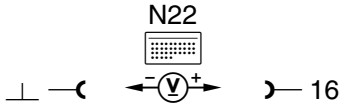

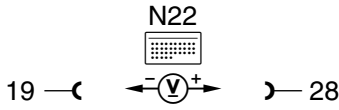

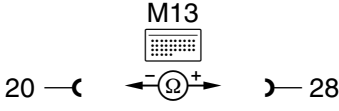


Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
5.0	B1230 007	Evaporator temperature sensor (B10/6) Resistance		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
6.0	B1233 B1241 010 013	Refrigerant temperature sensor (B12/1) Resistance		Ignition: OFF  on left connector Disconnect N22 from  .	°C ≙ kΩ 20 ≙ < 13 40 ≙ < 5.5 50 ≙ < 3.7 60 ≙ < 2.5 70 ≙ < 1.8	Wiring, B12/1
7.0	B1228 005	Heater core temperature sensor (B10/1), left Resistance		Ignition: OFF  on left connector Disconnect N22 from  .	°C ≙ kΩ 10 ≙ 19.0 – 21.2 20 ≙ 11.9 – 13.2 30 ≙ 7.7 – 8.4 45 ≙ 4.2 – 4.6	Wiring, B10/1




















Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
8.0	81229 006	Heater core temperature sensor (B10/1), right Resistance		Ignition: OFF  on left connector Disconnect N22 from  .	°C ± kΩ 10 ± 19.0 – 21.2 20 ± 11.9 – 13.2 30 ± 7.7 – 8.4 45 ± 4.2 – 4.6	Wiring, B10/1
9.0	81232 81241 009 013	Refrigerant pressure sensor (B12) Voltage supply		 on left connector. Ignition: ON	4.75 – 5.25 V	Wiring, B12, N22
10.0	81234 011	Sun sensor (B32) Voltage supply		 on left connector. Ignition: ON	0 – 4.5 V	Wiring, N22
11.0		Diagnostic output Voltage		 on left connector. Ignition: ON	11 – 14 V	Wiring, N22


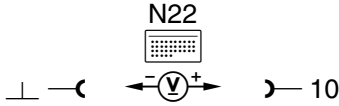

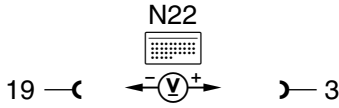

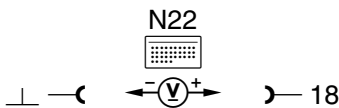

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
12.0	81235 012	Emissions sensor (B31) Voltage		 on left connector. Ignition: ON	4 – 6 V	Wiring, N22
13.0	81421 023	Auxiliary fan (M4) Voltage		 on right connector Ignition: ON Press both AUTO > 10 secs. Ignition: OFF (when done)	> 2.0 V M4 runs.	Wiring, N22, N65
14.0		A/C Pushbutton control module (N22), 12 V Output Voltage		Ignition: ON  on right connector.	11 – 14 V	Wiring, N22
15.0	81416 014	Coolant circulation pump (M13) Resistance		 on right connector Ignition: OFF Disconnect N22 from  .	2 – 4 Ω	Wiring, M13

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
16.0	81417 019 81418 020	Duovalve (Y21) Resistance (right/left)	 21 —(—  —) 12	Ignition: OFF Disconnect N22 from  .	30 – 45 Ω	Wiring, Y21
17.0		Blower regulator (A32n1) Activation Voltage	 19 —(—  —) 1	 on right connector Ignition: ON  MAX > 0.7 V MIN > 0.5 V		Wiring, A32
18.0	81423 025	Switchover valve block (Y11), Voltage	 6 —(—  —) 28	 on right connector Ignition: ON	< 1 V	Wiring.
19.0	81419 021	A/C compressor (A9) Activation Voltage	 19 —(—  —) 25	 on right connector Engine: At Idle A/C compressor:  A/C compressor: 	< 1 V 11 – 14 V	Wiring, N22
20.0	81424 026 81425 027	Activated charcoal filter actuator (A32m2) Resistance	 13 —(—  —) 22	Ignition: OFF Disconnect N22  .	50 – 80 Ω	Wiring, A32m2, N22

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
21.0	81422 024	Serial interface (instrument cluster) (K1) Voltage		 on right connector. Ignition: ON	6 – 8 V	Wiring.
22.0		REST Voltage		 on right connector Ignition: ON	11 – 14 V	Wiring.
23.0	81459 059	Serial interface (instrument cluster) (K2) Voltage		 on left connector Ignition: ON	6 – 8 V	Wiring.

Pneumatic Test Program – Component Locations

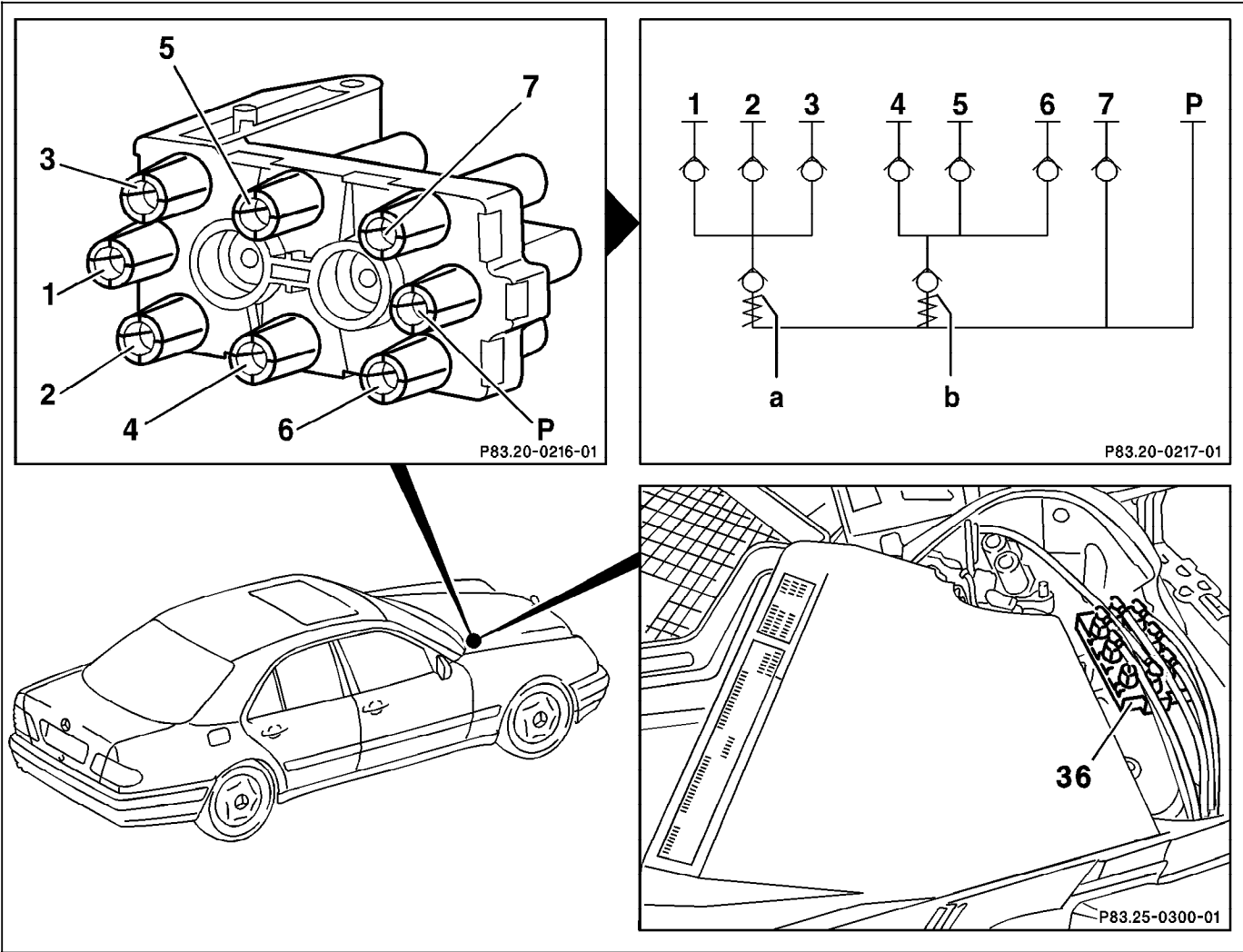


Figure 1

36 Vacuum distributor block

P83.40-0268-06

Pneumatic Test Program – Component Locations

Pneumatic Components Locations
as of M.Y. 1997

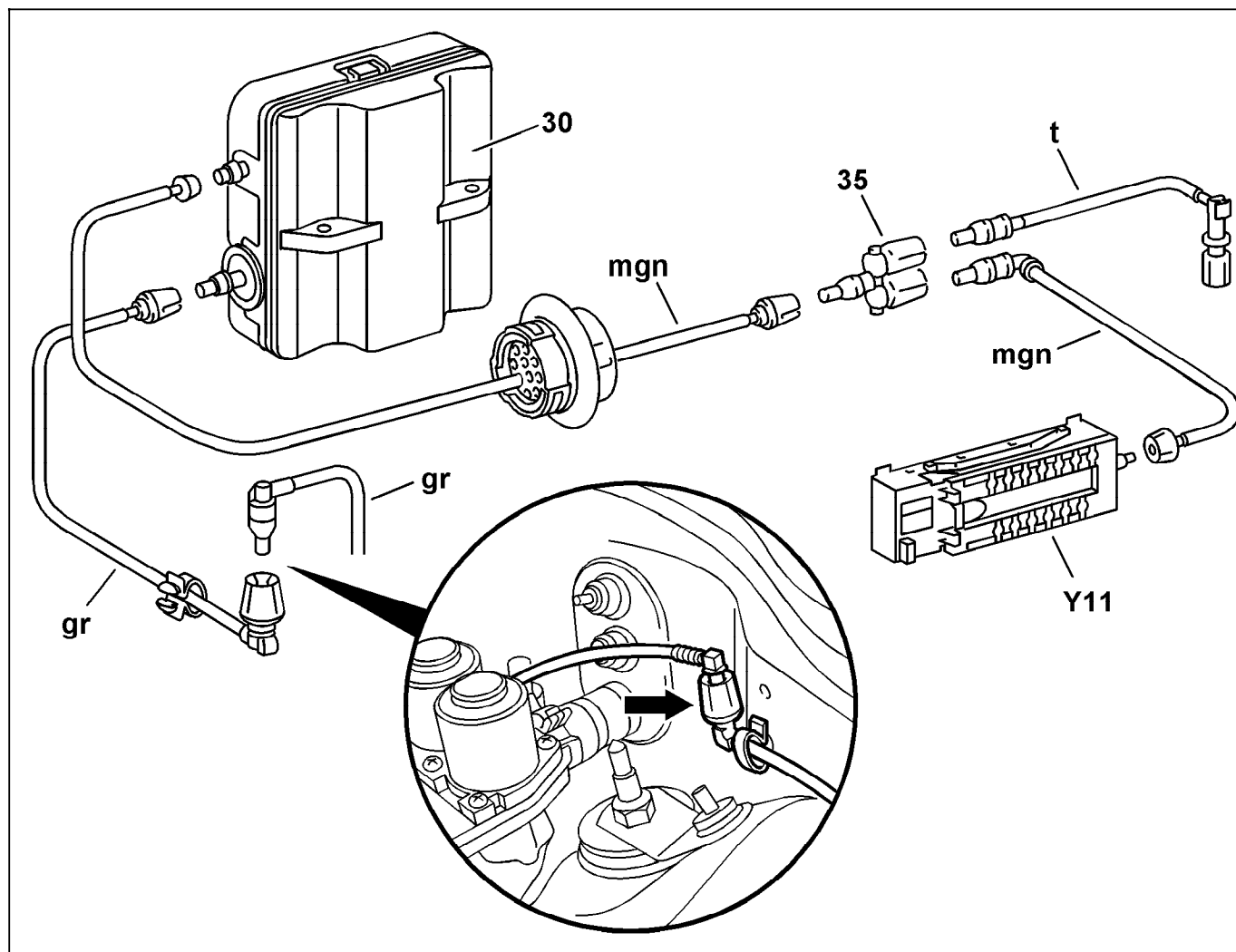


Figure 2

- 30 Vacuum reservoir
- 35 Vacuum connector
- Y11 Switchover valve block

- gr Grey
- mgn Medium green
- t transparent

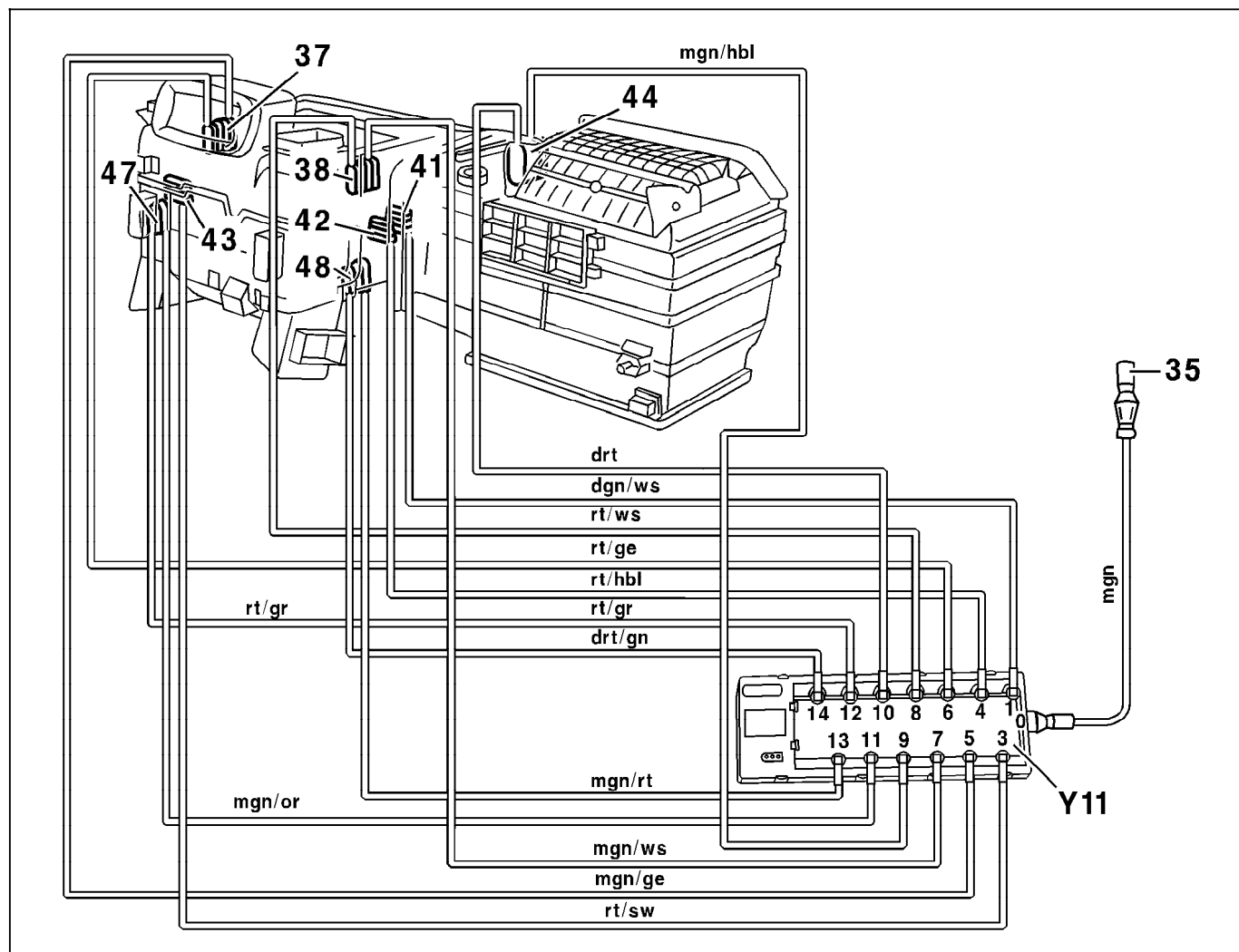
P83.30-0708-06

Pneumatic Test Program – Component Locations

Figure 3

- 35 Connector (passenger compartment)
- 37 Left defroster flap vacuum actuator
- 38 Right defroster flap vacuum actuator
- 41 Diverter flap vacuum actuator
- 42 Right center outlet tempering flap vacuum actuator
- 43 Left center outlet tempering flap vacuum actuator
- 44 Fresh/recirculating air flap vacuum actuator
- 47 Left footwell flap vacuum actuator
- 48 Right footwell flap vacuum actuator
- Y11 Switchover valve block (8 connector)

- hbl Light blue
- drt Dark red
- ge Yellow
- mgn Medium green
- rt Red
- ws White
- dgn Dark green



P83.40-0264-06

Pneumatic Test Program - Test

Preparation for Test

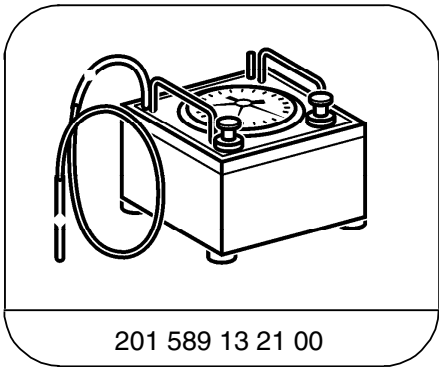
A. **Pneumatic test: vacuum distributor block, vacuum reservoir, switchover valve block (Y11)**

- 1. Review 11, 12, 13, 14, 15, 20, 21, 22, 31, 32, 41, 42
- 2. Disconnect all vacuum lines at vacuum distributor block (36).
- 3. Check gray vacuum line to intake manifold for leaks.



Permissible leakage of the elements with vacuum lines at 400 mbar vacuum per minute is 30 mbar.

Special Tools



Tester

Test equipment; See MBUSA Standard Service Equipment Program

Description	Brand, model, etc.
Connector	129 805 04 44

Pneumatic Test Program – Test



A. Vacuum Distributor Block, Vacuum Reservoir, Valve Block (Y11) Test

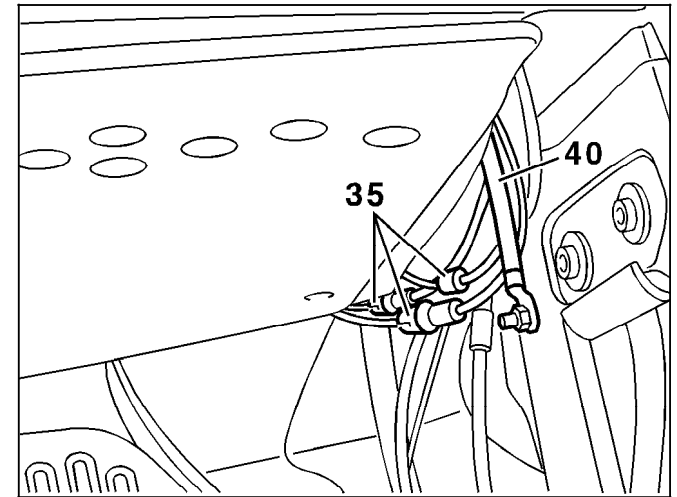
⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0	Entire vacuum distributor block	Connection “P” on vacuum tester.	Evacuate system with 300 mbar vacuum.	30 mbar pressure increase in 1 minute.	Vacuum distributor block, ⇒ 1.1
1.1	Vacuum distributor block, check valve “a”	Connection “1” on vacuum tester.	Evacuate system with 300 mbar vacuum.	30 mbar pressure increase in 1 minute.	Vacuum distributor block, ⇒ 1.2
1.2	Vacuum distributor block, check valve “b”	Connection “4” on vacuum tester.	Evacuate system with 300 mbar vacuum.	30 mbar pressure increase in 1 minute.	Vacuum distributor block.
2.0	Vacuum reservoir with vacuum line	Red/gray vacuum line (connection 3) on vacuum tester.	Evacuate system with 300 mbar vacuum.	30 mbar pressure increase in 1 minute.	Vacuum lines, Vacuum reservoir.
3.0	Switchover valve block (Y11)	Ignition: OFF medium green line (connection 2) on vacuum tester.	Evacuate system with 300 mbar vacuum.	30 mbar pressure increase in 1 minute.	Vacuum lines, Y11.

Pneumatic Test Program – Test

Preparation for Test

B. Vacuum system

1. Ignition: **ON**
2. Press **REST** and  > 5 secs.
3. Medium green line (connection “5”) on vacuum tester.
4.  (fan) speed will increase.



P83.25-0229-01

Figure 2

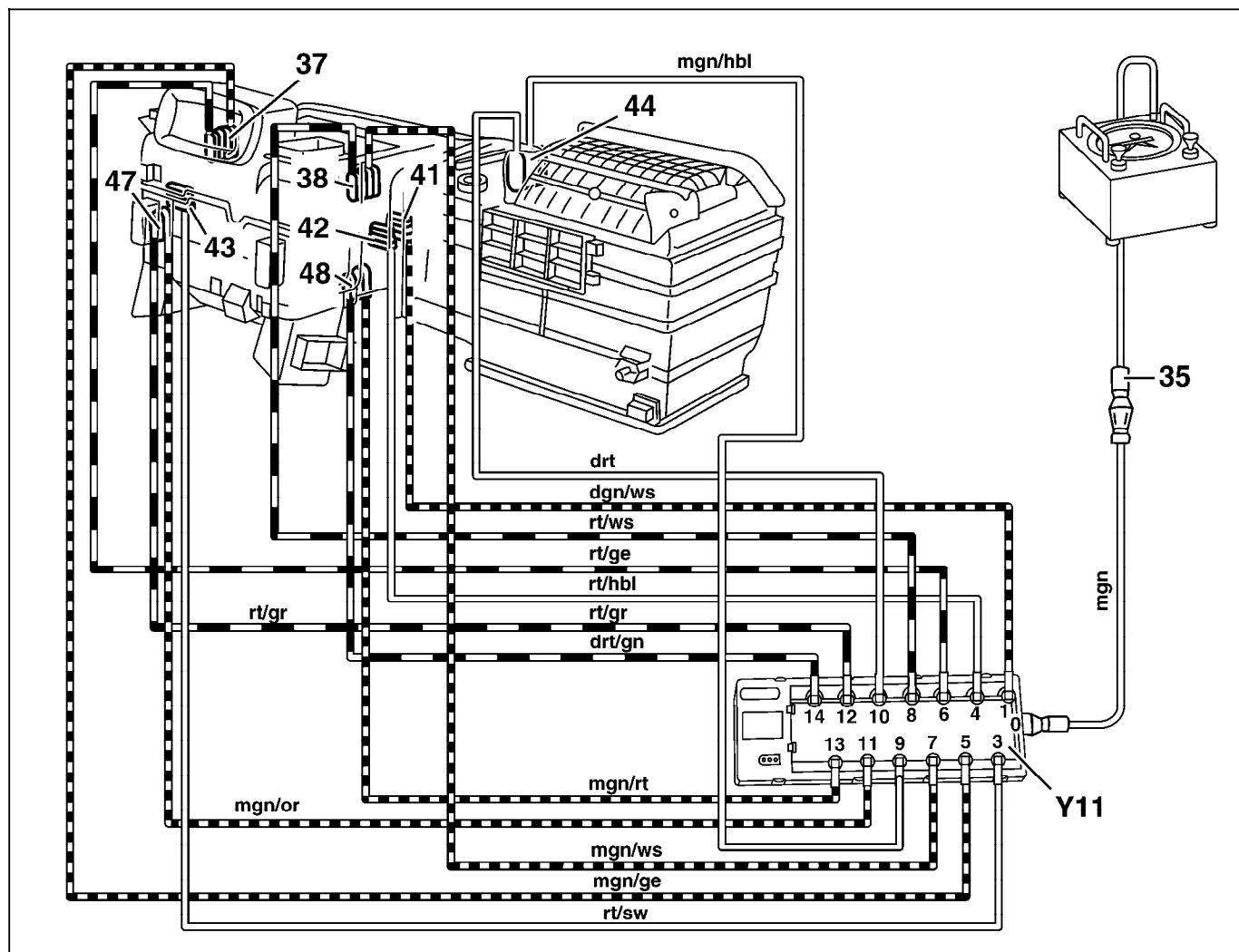
35 Cockpit vacuum separation point

Pneumatic Test Program – Component Locations

B. Vacuum system test A

1. Left display \square : vacuum actuators 37, 38, 47 and 48 (medium green and red vacuum lines) with vacuum applied.
2. Left display I and 2: vacuum actuator 41 (medium green vacuum line) with vacuum applied.
3. If vacuum on gauge drops: remove lines from valve block (Y11) and then individually test lines and vacuum actuators.
4. Replace any defective vacuum actuator(s) or pneumatic line(s).

ibu	Light blue	mgn	Medium green
drd	Dark red	gy	Grey
ye	Yellow	rd	Red
gn	Green	wt	White
		dgn	Dark green



P83.40-0273-76

Pneumatic Test Program – Component Locations

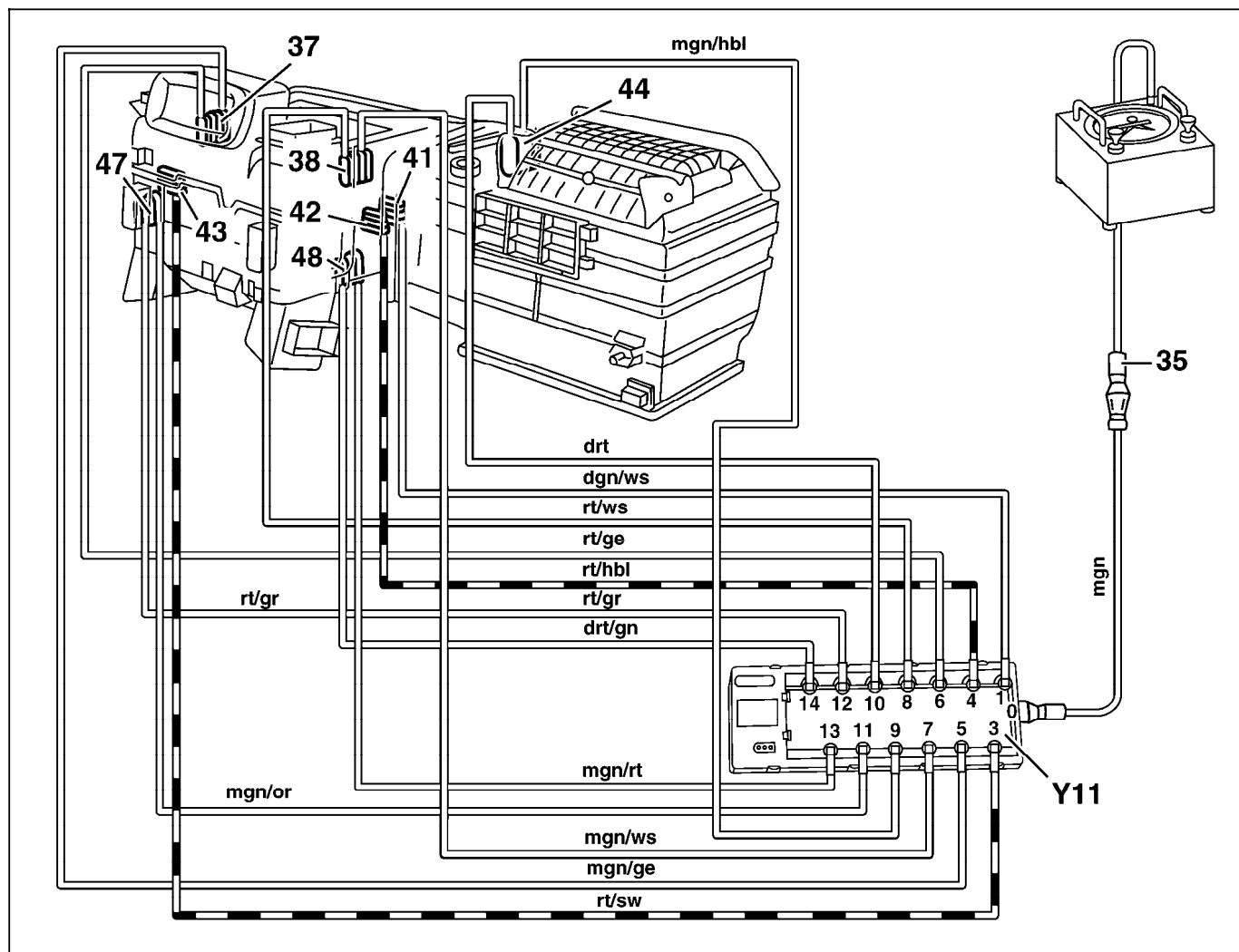
B. Vacuum system test B

1. Left display 3 and 4: vacuum actuators 42 and 43 (red vacuum line). In addition vacuum actuators 37 and 38 (see B. vacuum diagram 1) on following page.
2. If vacuum on gauge drops: remove lines from valve block (Y11) and then individually test lines and vacuum actuators.
3. Replace any defective vacuum actuator(s) or pneumatic line(s).

lbu	Light blue	mgn	Medium green
drd	Dark red	gy	Grey
ye	Yellow	rd	Red
gn	Green	wt	White
		dgn	Dark green

Vacuum diagram 2

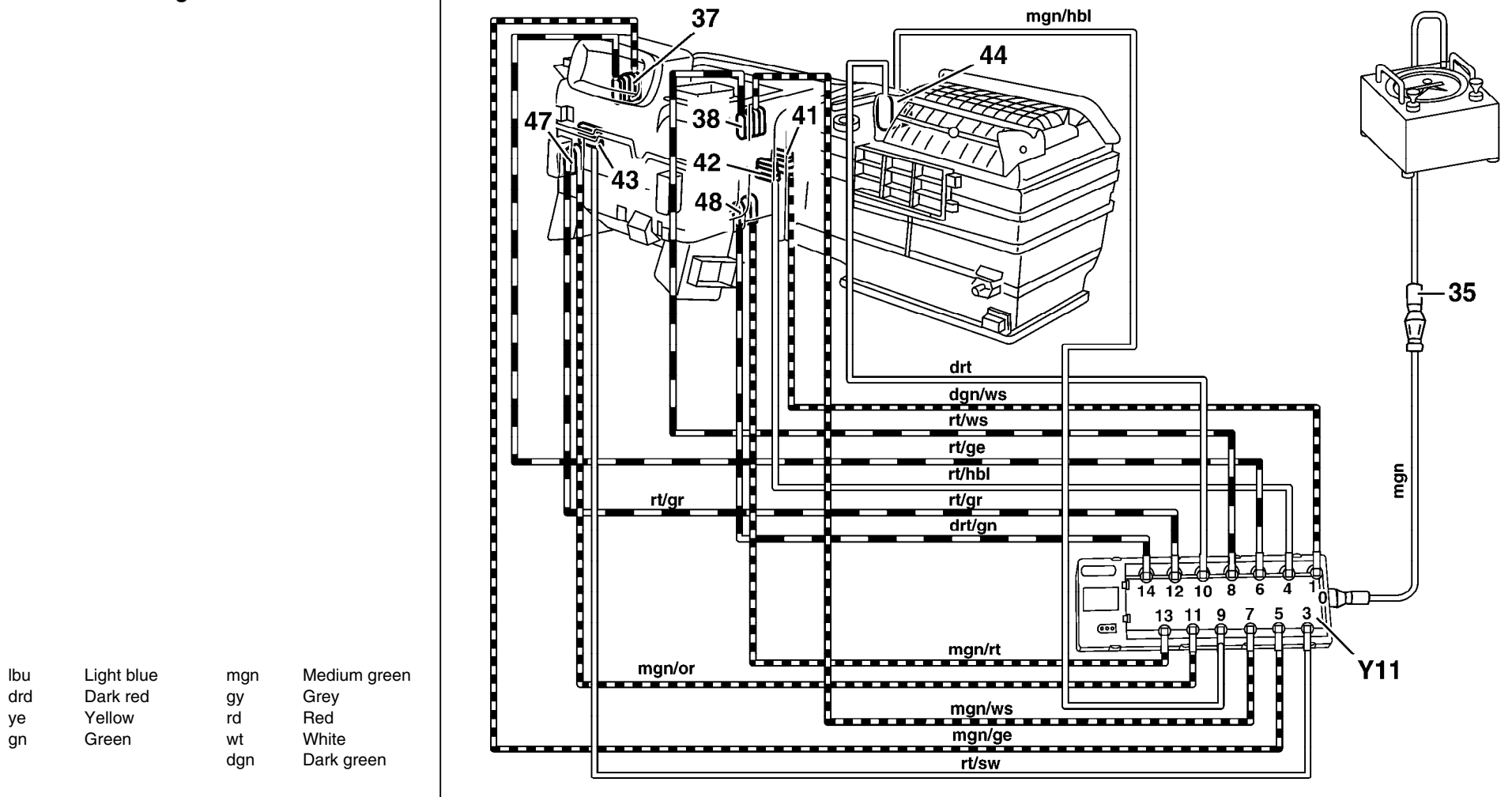
Vacuum diagram 2



P83.40-0274-76

Pneumatic Test Program – Component Locations

B. Vacuum diagram 1



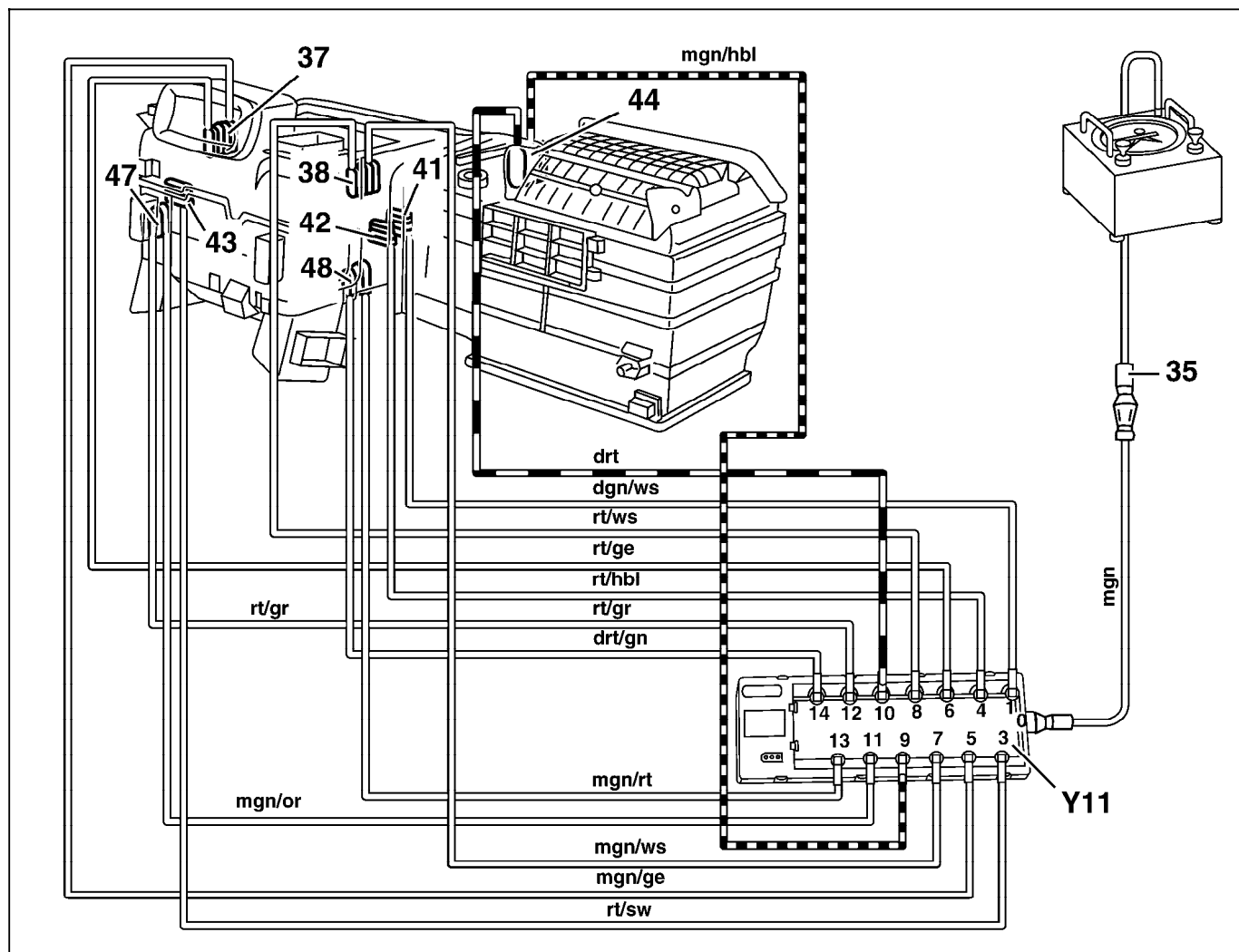
P83.40-0273-76

Pneumatic Test Program – Component Locations

B. Vacuum system test C

1. Left display I and II: vacuum actuators 44 (dark red and medium green vacuum lines). In addition vacuum actuators 42 and 43 see (vacuum diagram 2) on following page.
2. If vacuum on gauge drops: remove lines from valve block (Y11) and then individually test lines and vacuum actuators.
3. Replace any defective vacuum actuator(s) or pneumatic line(s).

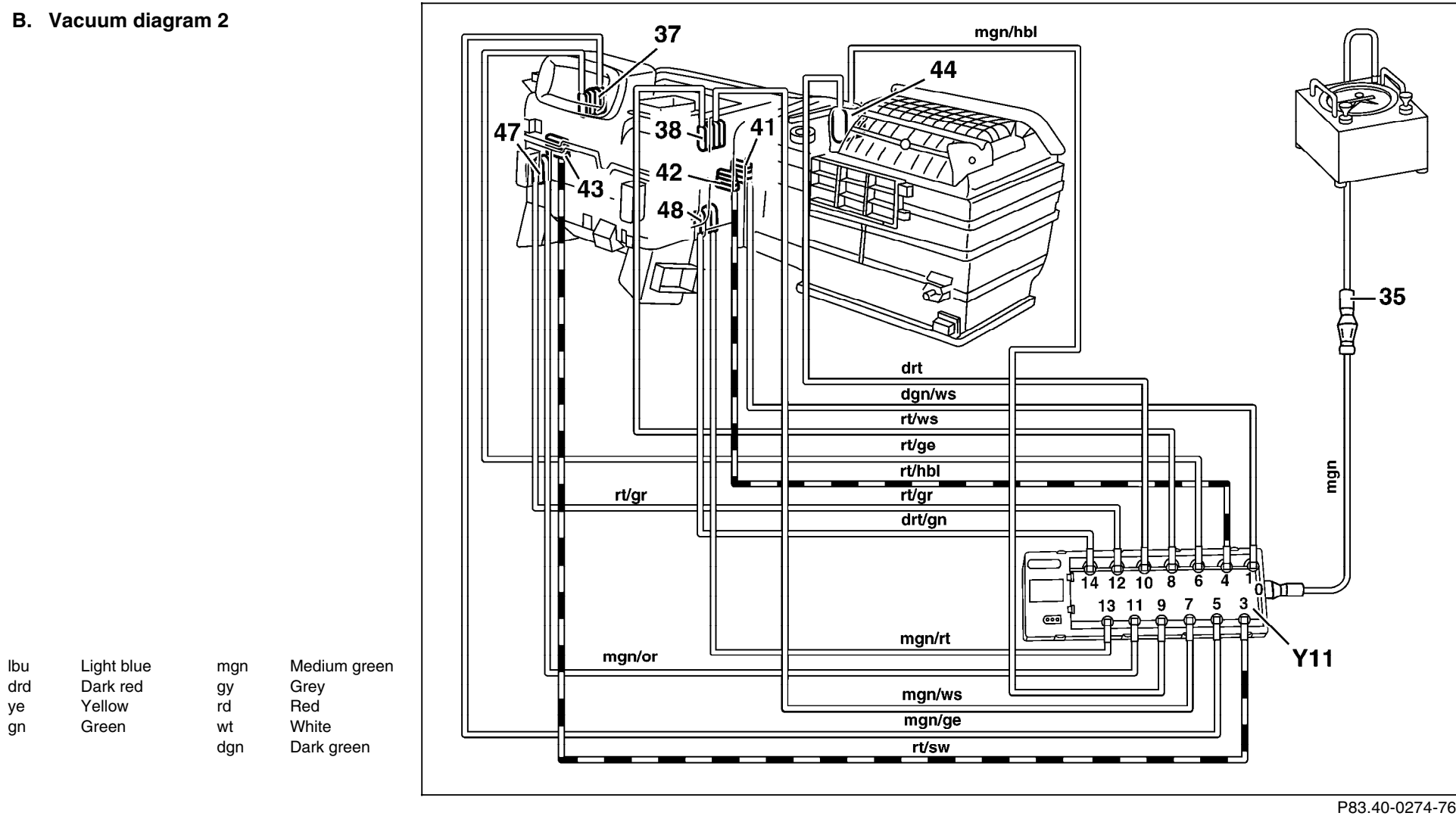
lbu	Light blue	mgn	Medium green
drd	Dark red	gy	Grey
ye	Yellow	rd	Red
gn	Green	wt	White
		dgn	Dark green



P83.40-0275-76

Pneumatic Test Program – Component Locations

B. Vacuum diagram 2

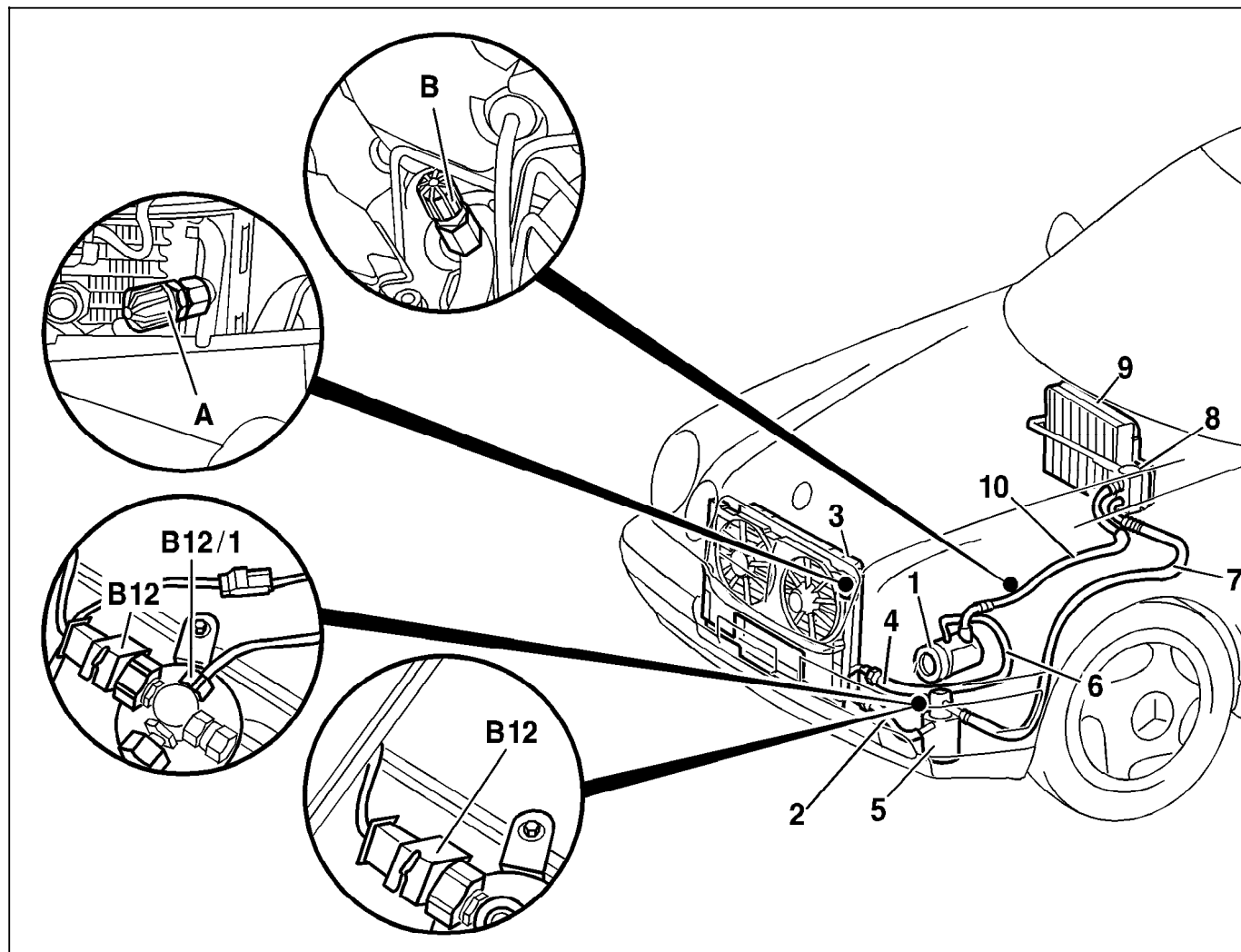


P83.40-0274-76

Refrigeration System Test Program – Component Locations

Figure 1

- A High pressure connection
- B Low pressure connection
- B12 Refrigerant pressure sensor
- B12/1 Refrigerant temperature sensor (with automatic air conditioning only)
- 1 A/C compressor
- 2 High pressure vapor line to condenser
- 3 Condenser
- 4 High pressure liquid line to Receiver/dryer
- 5 Receiver/dryer
- 6 High pressure line to evaporator
- 7 Low pressure line to evaporator
- 8 Expansion valve
- 9 Evaporator
- 10 Low pressure line to A/C compressor



P83.40-0272-06

Refrigerant System Test Program - Preparation for Test

1. Prior to hooking up and using test equipment: review section 0
2. Review 11, 12, 13, 14, 15, 20, 21, 22, 31, 32, 41, 42
3. Review special tools, see below.
4. Perform complete Function Test, see: 11/1
5. Refrigerant fill level must be correct (refer to fill level chart).
6. Connect gauges to low and high pressure test connections.
7. Engine at operating temperature.
8. Center and side air outlets open.
9. Test duration > 3 minutes.
10. Press **AUTO** button (should illuminate).
11. Vehicle should not be parked in the sun before or during the test.
12. Open doors and windows.

Test equipment; See MBUSA Standard Service Equipment Program

Description	Brand, model, etc.
Multimeter ¹⁾	Fluke models 23, 83, 85, 87 with thermocouple Module 80TK
Manifold gauge set (for R134a only)	Local purchase
R134a Recovery/Recycling/Recharging Service Equipment	Local purchase

¹⁾ Available through the MBUSA Standard Equipment Program.

Refrigerant System - Test



- Pushbutton control module display "LO".
- Blower motor at highest setting.
- Air distribution 
- Press 
- Engine speed 1500 rpm
- Read diagram

Figure 1

- 1) Relative humidity
 TA Ambient temperature (°C)
 A Center air outlet temperature (°C)
 B Low pressure (bar)
 C High pressure (bar)
 D Refrigerant temperature (°C)

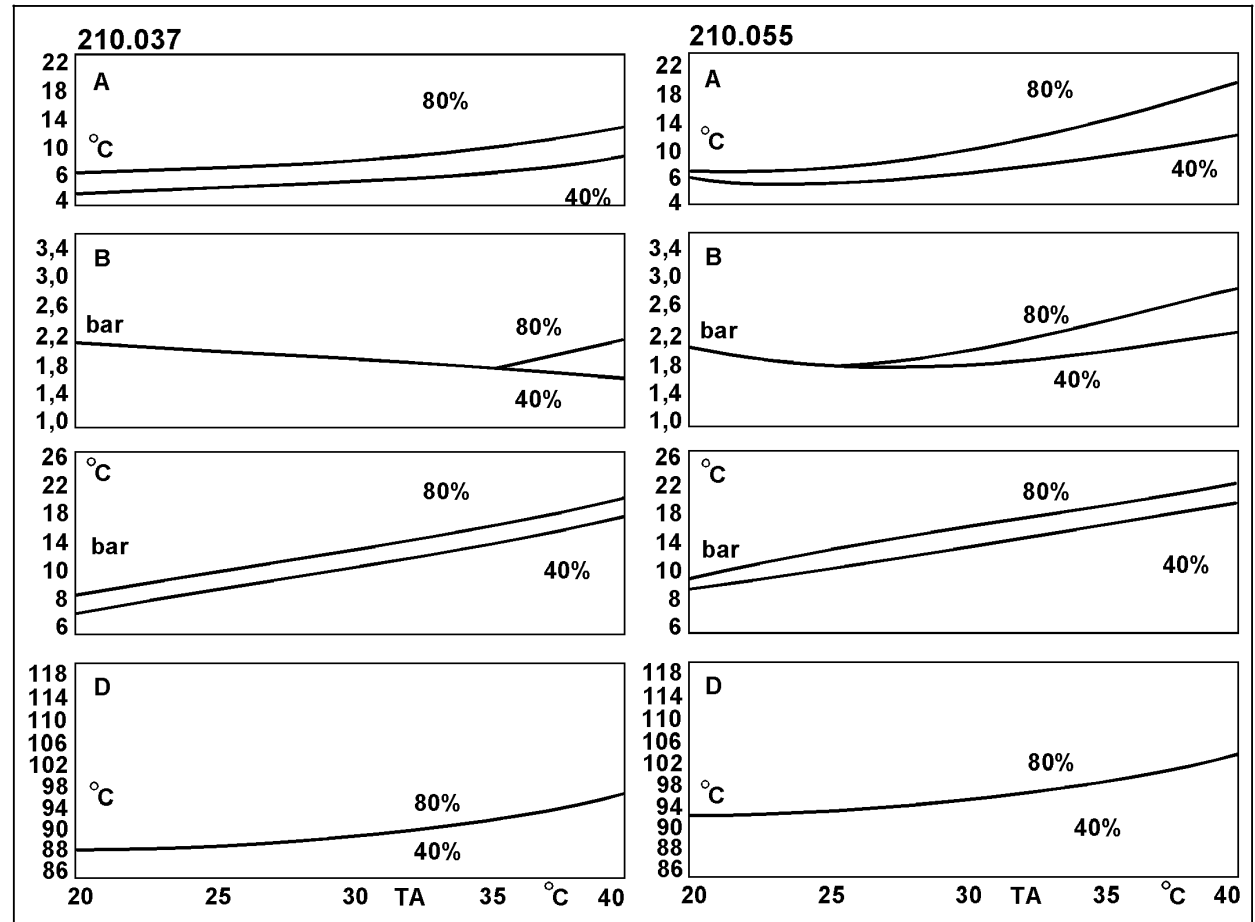
Note:

If the values such as

- Center air outlet temperature,
- Low refrigerant pressure,
- High refrigerant pressure,
- Refrigerant temperature




are obtained, the system is in order.

Tolerances of $\pm 20\%$ are permissible. If the deviations are larger, continue with the test program 42/3.



P83.40-0350-06

Refrigeration System Test Program – Test

Test condition	Low pressure (bar, B)	High pressure (bar, C)	Center air outlet temperature (A)	Auxiliary fan	Damaged component (cause of failure)	Remedy
Blower at highest setting Display "LO", Center and side air outlets open, Engine speed 3000 rpm.	1 bar higher as in diagram 42/2	As in diagram 42/2	> as in diagram 42/2	Possibly for a short period	A/C compressor (Insufficient delivery capacity)	Replace A/C compressor (AR83.55-P-5300F)
Blower at middle output setting. Press  Engine speed 1500 rpm	> as in diagram 42/2	17 - 22 bar	Starting at 5 - 8 °C increasing depending on ambient temp.	I or II stage depending on pressure and temperature	Expansion valve (continuously open)	Replace expansion valve (AR83.30-P-5520E)
Display "HI", Press  Engine speed 1500 rpm	Pulsates	< as in diagram 42/2	Heated air	Only via engine coolant temperature	Expansion valve (continuously closed) Low pressure lines (insufficient flow)	Replace expansion valve (AR83.30-P-5520E)
Display "HI", Blower stage 3, Press  Engine speed 1500 rpm	< as in diagram	significantly > as in diagram pressure A	as in diagram 42/2	On (runs).	High pressure line blocked; up to refrigerant pressure sensor (B12)	High pressure line(s)