3.6 Model 140 as of MY 1996

Diagnosis – Function Test

Preparation for Test

1. Check condition of fuses.

2. Check in - car temperature sensor by placing a small piece of paper (approx. ” sq.) over aspirator blower vent grille with ignition “ON” (arrow, Figure 1). 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 approx. 1 minute.

3. Run engine at operating temperature (80 °C) during entire test (ensure that the shift lever is in “P” and that the parking brake is engaged).

4. Manually open the center and side air outlets.

5. Outside air temperature > 15 °C

6. EC button on A/C pushbutton control module (N19) is **not** illuminated

7. Manually open the center and side air outlets

8. Ensure that the button is not depressed.

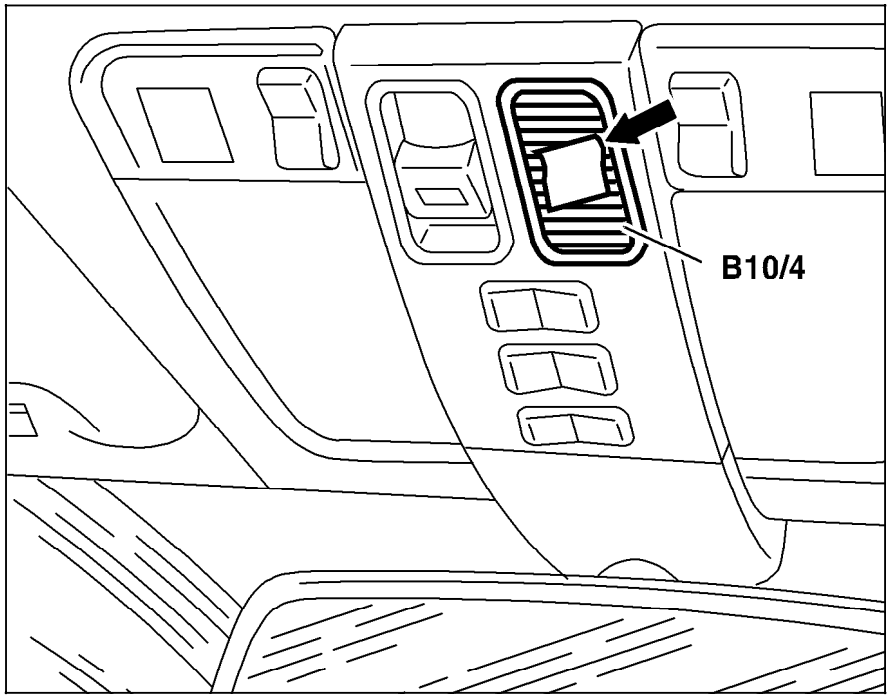


Figure 1 P83.40-2052-11

B10/4 In - car temperature sensor

Diagnosis – Function Test

The Test Condition(s) can be performed on the driver or passenger side controls or also the rear controls on vehicles equipped with rear A/C.

Test step/Test scope	Test condition	Nominal value	Possible cause/Remedy [1]
⇒ 1.0 **Defrost**	Display 22 °C Press . Fan speed wheel set to AUTO.	Blower runs with increased speed. Air venting from upper outlets. A/C compressor engaged. Maximum heat output. Charcoal filter off, 100% fresh air.	23 ⇒ 1.0, 2.0, 3.0, 14.0, 15.0, 16.0 18.0, 19.0, 20.0, 21.0
⇒ 2.0 **Total ventilation in cooling mode**	Display LO. Fan speed wheel set to AUTO.	Blower runs with increased speed. Air venting from center outlets. A/C compressor engaged. No heat output.	23 ⇒ 15.0, 16.0, 18.0, 19.0, 20.0 33/2
⇒ 3.0 **Normal ventilation in regulating mode**	Fan speed wheel set to AUTO. Set temperature selector to passenger compartment temperature.	Blower speed decreases. Air venting from lower outlets, leak air from upper outlets. A/C compressor engaged. Tempered air exhaust. Simultaneous cycling of duovalve and coolant circulation pump.	23 ⇒ 16.0, 18.0, 19.0, 20.0, 21.0, 22.0, 24.0, 25.0, 26.0, 27.0, 33/2, 33/3

[1] Observe Preparation for Test, see 22.

Diagnosis – Function Test

Test step/Test scope	Test condition	Nominal value	Possible cause/Remedy [1]
⇒ 4.0 **Center air outlet "warm"**	Display HI. Press warm air switch on center outlet (red). Fan speed wheel set to AUTO.	Heated air from center outlets. Blower speed increases.	23 ⇒ 17.0, 23.0, 24.0, 33/3
⇒ 5.0 **Center air outlet "cool"**	Display HI. Press cool air switch on center outlet (blue). Fan speed wheel set to AUTO. Press AUTO button.	Cooled air from center outlet.	23 ⇒ 17.0, 23.0, 25.0, 33/2
⇒ 6.0 **Economy in heating mode**	Display HI. Press EC button. Fan speed wheel set to AUTO.	Cool/warm air switch on center outlet **OFF** Air venting from lower and side outlets, leak air from upper outlets. Maximum heat output.	23 ⇒ 17.0, 23.0, 24.0, 25.0, 33/2, 33/3

[1] Observe Preparation for Test, see 22.

Diagnosis – Function Test

VEHICLES WITH REAR A/C

Press both AUTO buttons, fan speed wheel set to AUTO, both temperature selector wheels set in “white” area **BEFORE** proceeding with Test Conditions.

Test step/Test scope	Test condition	Nominal value	Possible cause/Remedy [1]
⇒ 7.0 **Rear A/C ON**	Both temperature selector wheels in “white” area. Ensure that the rear A/C fan speed wheel is not set to “0” (Off). Push air distribution slide to the top.	No air venting from beneath seat outlets. Rear A/C blower running. Air venting from outlets.	See 23/11-15
⇒ 8.0 **Cooling operation**	Ensure that the rear A/C fan speed wheel is not set to “0” (Off). Set both temperature selector wheels to “blue” detent. Push air distribution slide to the bottom.	Rear A/C blower running. Cool air venting from outlets. Cool air venting from beneath seat outlets.	See 23/11-15

[1] Observe Preparation for Test, see 22.

Diagnosis – Function Test

Test step/Test scope	Test condition	Nominal value	Possible cause/Remedy [1]
⇒ 9.0 **Heating operation**	Ensure that the rear A/C fan speed wheel is not set to “0” (Off). Set both temperature selector wheels to “red” detent. Push air distribution slide to the bottom Push air distribution slide to the top.	Rear A/C blower running. Warm air venting from beneath seat outlets. Warm air venting from outlets in center console.	See 23/11-15
⇒ 10.0 **Full heat operation**	Display in N22: HI Ensure that the rear A/C fan speed wheel is not set to “0” (Off). Temperature selector wheels front A/C panel set to “red” detent. Push air distribution slide to the top.	 Rear A/C blower running. Warm air venting from beneath seat outlets and from center console outlets.	See 23/11-15

[1] Observe Preparation for Test, see 22.

Diagnosis – Reading Sensor Values

1. The display window will show in sequence the actual temperature sensor readings, refrigerant pressure, blower control voltage, software status of the control module.

2. The temperature control is maintained during the duration of the test.

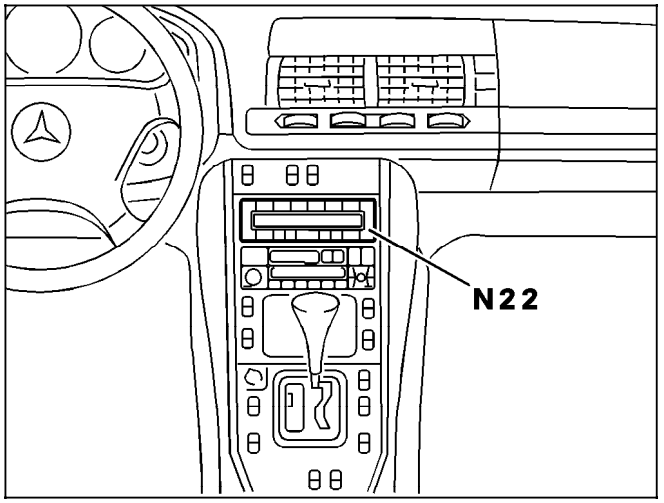


Figure 1

P83.40-0304-01

Diagnosis – Reading Sensor Values

Preparation for Test

1. Ignition: **ON**
2. Press AUTO.
3. Set both temperature selectors to 72 °F.
4. Press REST for > 5 secs.
5. The left display will alternately show the number "1" and the in-car temperature (e.g. 72 °F) is indicated on the right display (refer to table).
6. By pressing AUTO the next highest test step is displayed (see table).
7. Press REST to end test program.

Note:

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

Diagnosis – Reading Sensor Values

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 sensor (B10/5) up to MY 1997, Outside temperature indicator temperature sensor (B14) up to MY 1996	23 ⇒ 10.0 23 ⇒ 30.0
3	03	Left heater core temperature sensor (B10/2)	23 ⇒ 7.0
4	04	Right heater core temperature sensor (B10/3)	23 ⇒ 8.0
5	06	Evaporator temperature sensor (B10/6)	23 ⇒ 5.0
6	05	ECT sensor (DFI, IFI) (B11/4), or right ECT sensor (11/10)	23 ⇒ 9.0 23 ⇒ 30.0
7	07	Refrigerant pressure in bar, e.g. 4 corresponds to 4 bar	23 ⇒ 11.0
8	08	Refrigerant temperature sensor (B12/1), e.g, 73 = 73 °F	23 ⇒ 6.0
9	-	Not used	-
10	13	Blower control voltage, e.g. 0.8 (min) - 6.0 (max) corresponds to 0.8 - 6.0 V	23 ⇒ 19.0
11	10	Emissions sensor (B31) e.g. 3.1 corresponds to 3.1 V	23 ⇒ 14.0
12	09	Sun sensor (B32) e.g. 4.2 corresponds to 4.2 V	23 ⇒ 12.0
20	-	Control current for auxliary fan e.g. 6.1 corresponds to 6.1 mA (max 10mA)	23 ⇒ 15.0
21	12	Engine speed, e.g. 00 . . 99 (x 100) corresponds to 9900 rpm	23 ⇒ 29.0 up to MY 1997, 23 ⇒ 30.0 as of MY 1997

[1] Observe Preparation for Test, see 22.

Diagnosis – Reading Actual Values (via A/C Pushbutton Control Module [N22/3])

Display code in N22 window		Possible cause	Test step/Remedy [1]
22	11	Vehicle speed 155 (km/h)	23 ⇒ 27.0 up to MY 1997, 23 ⇒ 30.0 as of MY 1997
23	14	Terminal 58d e.g. 99.0 corresponds to 99 % battery voltage	23 ⇒ 30.0 as of MY 1997
24	-	Battery voltage e.g. 12.5 corresponds to 12.5 V	-
30	18	Left rear heater core temperature sensor (B10/9)	23 ⇒3.0
31	19	Right rear heater core temperature sensor (B10/10)	23 ⇒4.0
32	20	Rear evaporator temperature sensor (B10/11)	23 ⇒2.0
33	17	Rear blower control voltage, e.g. 08 (min) - 6.0 (max) corresponds to .08 - 6.0 V	23 ⇒5.0
34	-	Left temperature sensor (rear)	23 ⇒7.0
35	-	Right temperature sensor (rear)	23 ⇒6.0
38	-	Software status e.g. 37 (N22/3)	-
39	-	Hardware statuse.g. 37 (N22/3)	-
40	[2]	Software status e.g. 6.5 (N22) correspondes to 65	-
41	[2]	Hardware status e.g. 8 (N22)	-

[1] Observe Preparation for Test.

[2] Control Module Version Menu

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

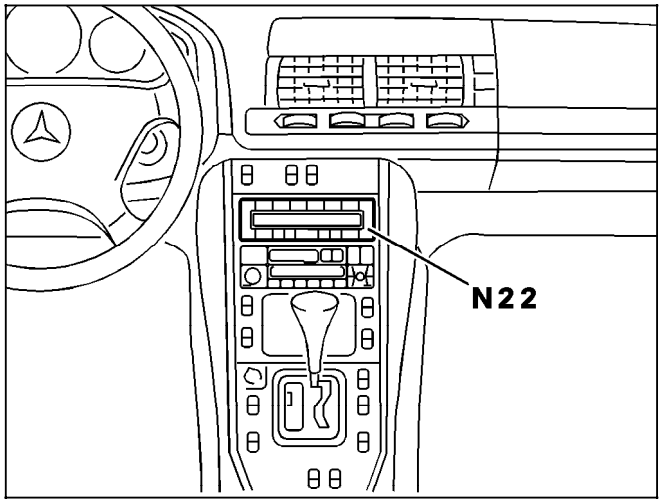
Display code in N22 window		Possible cause	Test step/Remedy [1]
42	-	Version code 1. Numerical value	14
43	-	Version code 2. Numerical value	14
-	15	Compressor emergency shutoff signal	-
-	16	Compressor WOT shutoff	-

[1] Observe Preparation for Test.

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. The LED on the depressed button lights up.

2. The temperature control is maintained during the duration of the test.



P83.40-0304-01

Figure 1

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

Preparation for Test

1. Review 11, 12, 13, 14, 15, 21, 22, 23, 31, 32, 41
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 will show "LO"
8. By pressing left AUTO , the next highest test step is displayed. To switch from "LO" to "HI" press right AUTO (see table).
9. Press REST to end test program.

Note:
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 moter will operate on 6 V during the 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	HI	Flaps closed (air to windshield).	33/2, 33/3
			LO	All flaps opened (no air to windshield).	
1	Left diverter flap 1)	Press right AUTO	LO	Left center outlet closed.	33/2, 33/3
			HI	Left center outlet opened.	
2	Right diverter flap 1)	Press right AUTO	LO	Right center outlet closed.	33/2
			HI	Right center outlet opened.	
3	Left blend air flap 1)	Press right AUTO	LO	Left center outlet closed.	33/3
			HI	Left center outlet opened (heated air).	
4	Right blend air flap 1)	Press right AUTO	LO	Right center outlet closed.	33/3
			HI	Right center outlet opened (heated air).	
5	Left defroster flap long stroke 2)	Press right AUTO	LO	Side defroster leak air.	33/3
			HI	Side defroster maximum air.	

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)	Press right AUTO	LO HI	Left defroster outlet closed. Left defroster outlet opened.	32/2
7	Right defroster flap long stroke 3)	Press right AUTO	LO HI	Right defroster outlet opened, leak air. Right defroster outlet opened.	33/2
8	Right defroster flap, long and short stroke 3)	Press right AUTO	LO HI	Right defroster flap closed. Right defroster flap opened.	33/2
9	Main air flap long stroke 4)	Press right AUTO	LO HI	Fresh air. Recirculated air 80%.	33/2
10	Main air flap long and short stroke 4)	Press right AUTO	LO HI	Fresh air. Recirculated air 100%.	33/4

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)
11	Left footwell flap, long stroke 1)	Pushbutton right AUTO	LO HI	Left footwell flap, closed. Left footwell flap opened, leak air	33/1
12	Left footwell flap, long and short stroke 1)	Pushbutton right AUTO	LO HI	Left footwell flap, leak air. Left footwell flap, opened.	33/2
13	Right footwell flap, long stroke 1)	Pushbutton right AUTO	LO HI	Right footwell flap, closed. Right footwell flap opened, leak air	33/2
14	Right footwell flap, long and short stroke 1)	Pushbutton right AUTO	LO HI	Right footwell flap, leak air. Right footwell flap, opened.	33/2
15	All flaps	Pushbutton right AUTO	LO HI	All flaps closed. All flaps opened.	33/2

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

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

Version Coding

Programming

1. Turn ignition **ON**.
2. Left display “HI“, right display “LO“.
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 = >) in order to select desired value (refer to table on next page).
6. To enter value 1, Press **EC** > 1sec.
7. To access value 2, press **EC**:
   ”P2” flashes in left side of display window (value 2). Right side of display window: (e.g.) “02“.
8. Press the right temperature selector (blue = <; red = >) in order to select desired value (refer to table on next page).
9. To enter (value 2) press **EC** > 1sec.
10. Turn ignition **OFF:** A/C returns to normal operation.
11. Reset right and left temperature selectors to normal settings.

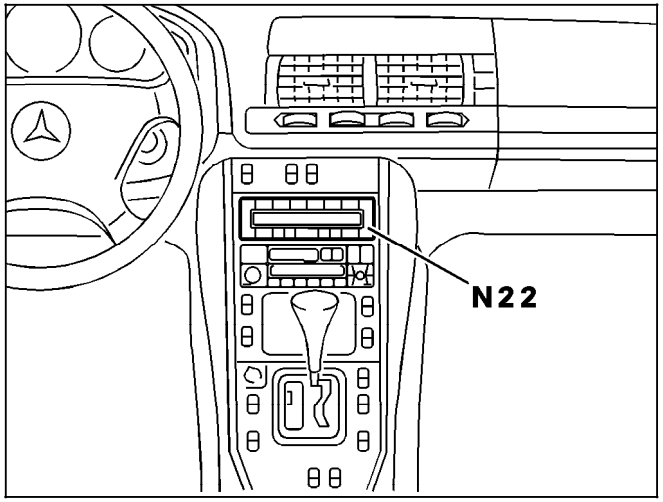


Figure 1 P83.40-0304-01

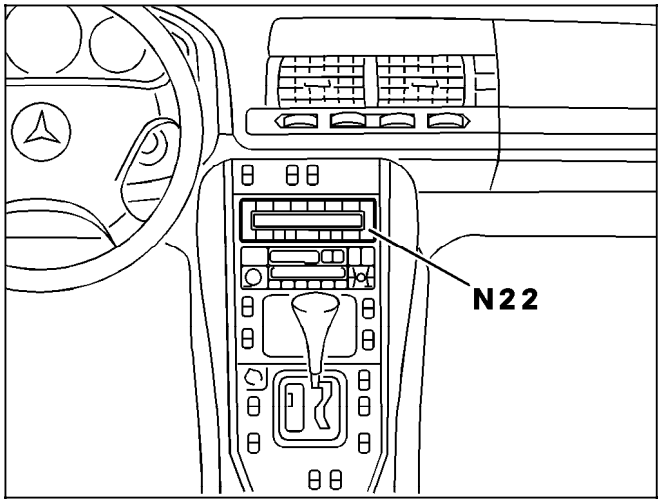
Version Coding

1. Numerical Value [1]	Preliminary setting
C00	new, not yet programmed A/C pushbutton control module
00	Model 140 (as of MY 1997)
01	°F displayed (up to MY 1997)
03	°C displayed (up to MY 1997)
72	Serial interface K1 and K2 programmed (as of MY 1997)
2. Numerical Value [1]	Engine version
01	M 104 (up to MY 1997)
02	M 119 (up to MY 1997)
03	M 120 (up to MY 1997)
04	OM 603 (up to MY 1997)
+8 to the engine version	Blower motor bar graph switched on in AUTO mode
+128 to the engine version	SM06 – display readout switched off

[1] Version coding menu.

Diagnosis – Diagnostic Trouble Code Memory

- The A/C pushbutton control module (N22) has DTC memory and data output. The diagnostic trouble codes and data are displayed via the display window. The stored DTC‘s will remain in memory even with the vehicle battery disconnected.
- The DTC memory differentiates between current and intermittent faults.
- All DTC‘s can also be read with the Hand-Held Tester (HHT).
- Connect HHT as indicted in section 0.



P83.40-0304-01

Figure 1

Diagnosis – Diagnostic Trouble Code Memory

Preparation for Test

1. Ignition: **ON**

2. Left display "HI", right display "LO".

3. Within 20 secs., press REST and EC simultaneously for > 5 secs.

4. The LED in flashes and the display window reads OFF.

5. Press right AUTO > 1 sec. If there are no DTC's: E is displayed in the left side of the display window and FF is displayed in the right side. If DTC's are stored in memory: Ebl is displayed in the left side of the display window and the DTC (e.g. 416) is displayed in the right side (record each DTC as it is displayed).

6. Each malfunction (short circuit, open circuit, etc.) has a specific DTC (the DTC is displayed in the right side of the display window, Ebl is displayed in the left side).
   By pressing AUTO the next DTC is displayed (see table).

7. To Erase: (all DTC's must first be read out) press right and left AUTO > 2 secs., d will be displayed in the left side of the display window and FF in the right side.

   To cancel erase: press right AUTO, the current faults will appear again (compare to DTC readout recorded earlier).

   Delete DTC's as often as necesarry until E is displayed in the left side of the display window and FF is displayed in the right side.

8. Set temperature selector to normal setting.

9. Ignition **OFF** to end test.

Diagnosis – Diagnostic Trouble Code Memory

Display code in N22 window		Possible cause	Test step/Remedy [1]
FF	-	No malfunction in system	–
026	B1026	CAN communication with rear A/C	Wiring
226	B1226	In-car temperature sensor (B10/4)	23⇒ 4.0
227	B1227	Outside temperature indicator temperature sensor (B14)	23⇒ 10.0
228	B1228	Left heater core temperature sensor (B10/2)	23⇒ 7.0
229	B1229	Right heater core temperature sensor (B10/3)	23⇒ 8.0
230	B1230	Evaporator temperature sensor (B10/6)	23⇒ 5.0
231	B1231	ECT sensor (DFI, IFI) (B11/4)	23⇒ 9.0
232	B1232	Refrigerant pressure sensor (B12)	23⇒ 11.0
233	B1233	Refrigerant temperature sensor (B12/1)	23⇒ 6.0
234	B1234	Sun sensor (B32)	23⇒ 12.0
235	B1235	Emissions sensor (B31)	23⇒ 14.0
241	B1241	Refrigerant fill	23⇒ 6.0, 11.0
416	B1416	Coolant circulation pump (A31m1)	23⇒ 17.0

[1] Observe Preparation for Test.

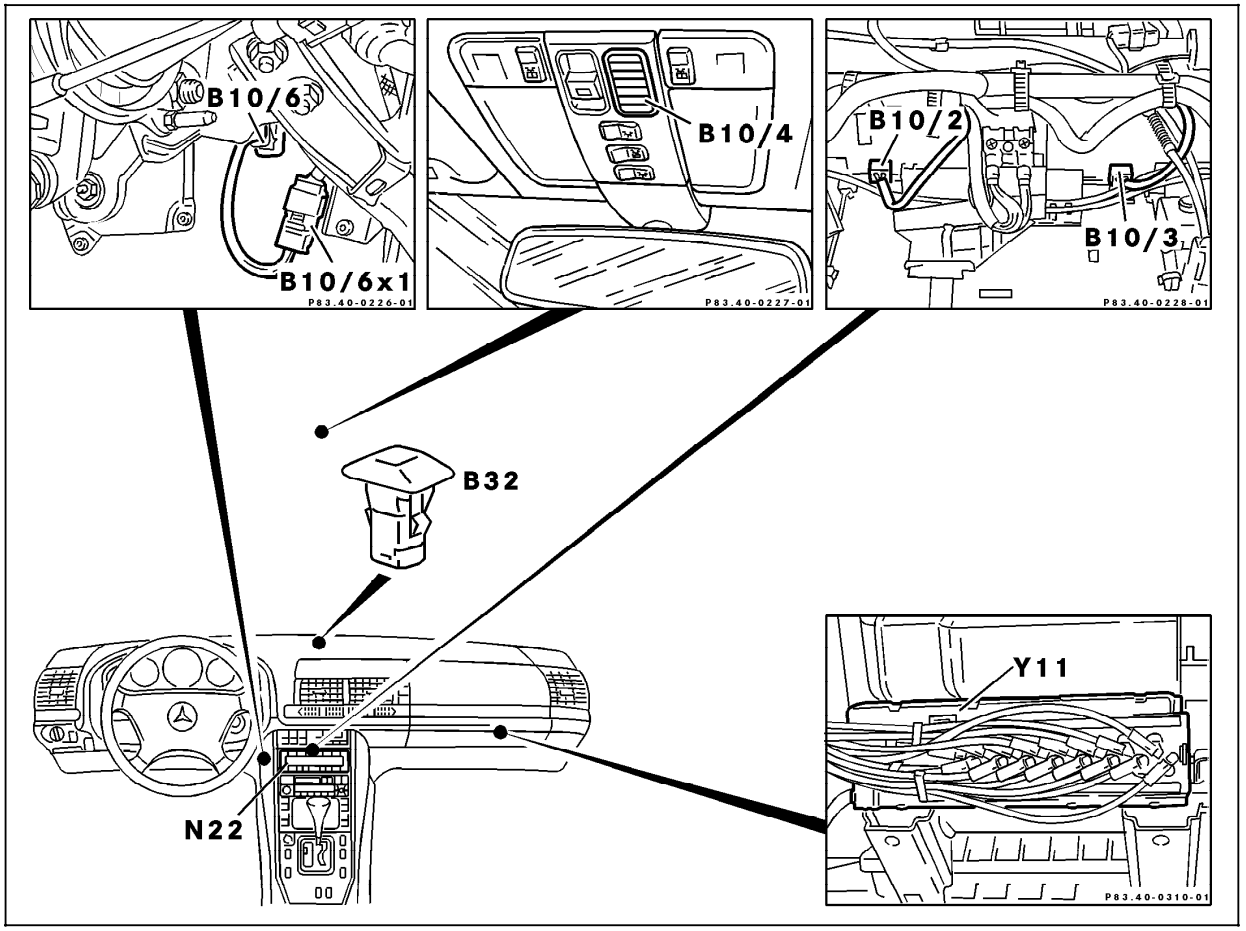
Diagnosis – Diagnostic Trouble Code Memory

Display code in N22 window		Possible cause	Test step/Remedy [1]
Ebl 417	B1417	Left-side water valve (Y21y1)	23 ⇒ 18.0
Ebl 418	B1418	Right-side water valve (Y21y2)	23 ⇒ 18.0
Ebl 419	B1419	Electromagnetic clutch (A9k1)	23 ⇒ 21.0
Ebl 420	B1420	Idle speed increase	-
Ebl 421	B1421	AIR control module (N65/1)	23 ⇒ 15.0
Ebl 422	B1422	Serial interface (K1) to instrument cluster (A1)	23 ⇒ 30.0
Ebl 423	B1423	Switchover valve block (Y11)	23 ⇒ 20.0
Ebl 424	B1424	Activated charcoal filter actuator(A32m2) open	23 ⇒ 22.0
Ebl 425	B1425	Activated charcoal filter actuator (A32m2) closed	23 ⇒ 22.0
Ebl 432	B1432	Auxiliary heater-NON-USA (continue to next test step)	-
Ebl 459	B1459	Serial interface (K2) to instrument cluster (A1)	23 ⇒ 31.0
Ebl 460	B1460	LED - Center air outlet “Warm“	23 ⇒ 24.0
Ebl 461	B1461	LED - Center air outlet “Cold“	24 ⇒ 25.0
Ebl 462	B1462	Wide open throttle (WOT) position (diesel engines)	-

[1] Observe Preparation for Test, see 22.

Electrical Test Program – Component Locations

Electrical Components in Passenger Compartment



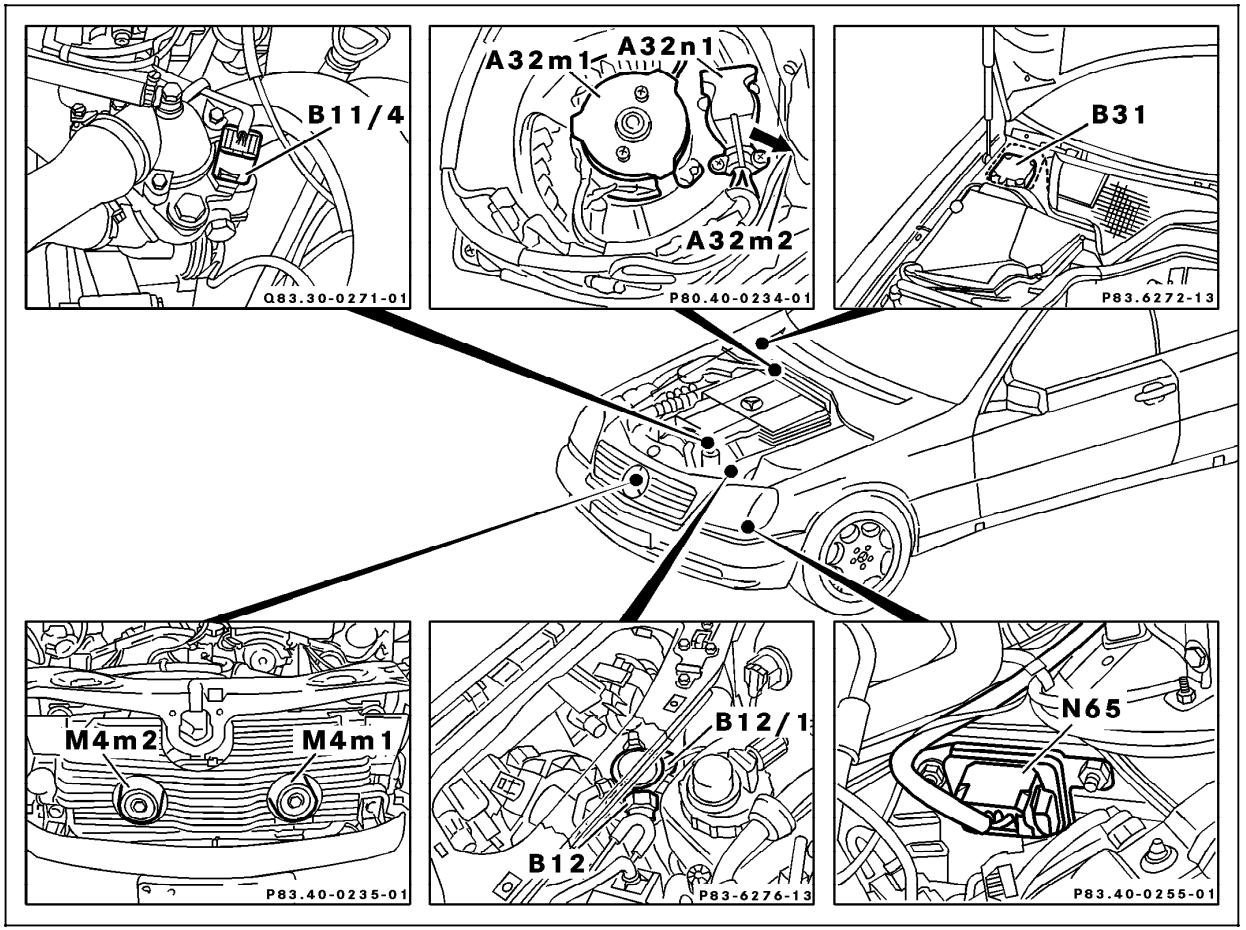
P83.40-0305-06

Figure 1

B10/2	Left heater core temperature sensor
B10/3	Right heater core temperature sensor
B10/4	In-car temperature sensor with aspirator
B10/6	Evaporator temperature sensor
B10/6x1	Evaporator temperature sensor connector
B32	Sun sensor
N22	A/C pushbutton control module
Y11	Valve block (15 connections, multiplex)

Electrical Test Program – Component Locations

Electrical Components in Engine Compartment



P83.40-0306-06

Figure 2

A32m1	Blower motor
A32m2	Activated charcoal filter actuator
A32n1	Blower regulator
B11/4	ECT sensor
B12	Refrigerant pressure sensor
B12/1	Refrigerant temperature sensor
B31	Emissions sensor
M4m1	Left auxiliary fan
M4m2	Right auxiliary fan
N65/1	AIR control module

Electrical Test Program – Preparation for Test

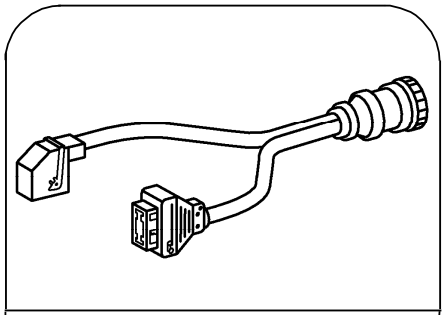
1. Review 11, 12, 13, 14, 15, 21, 22, 23, 31, 32, 41

Electrical wiring diagrams:
Electrical Troubleshooting Manual, Model 140

2. Remove A/C pushbutton control module (N22).

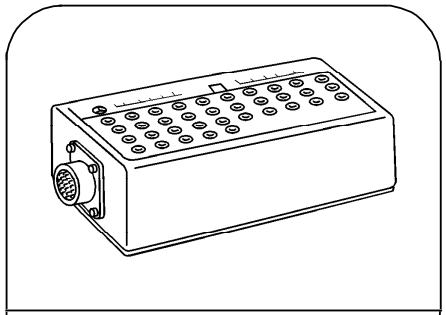
Upon completion of test, erase DTC memory from A/C pushbutton control module (see 15).
Electrical Test Program: Rear A/C only, starts on 23/11

Special Tools



210 589 00 63 00

29-pin test cable



124 589 00 21 00

35-pin socket box

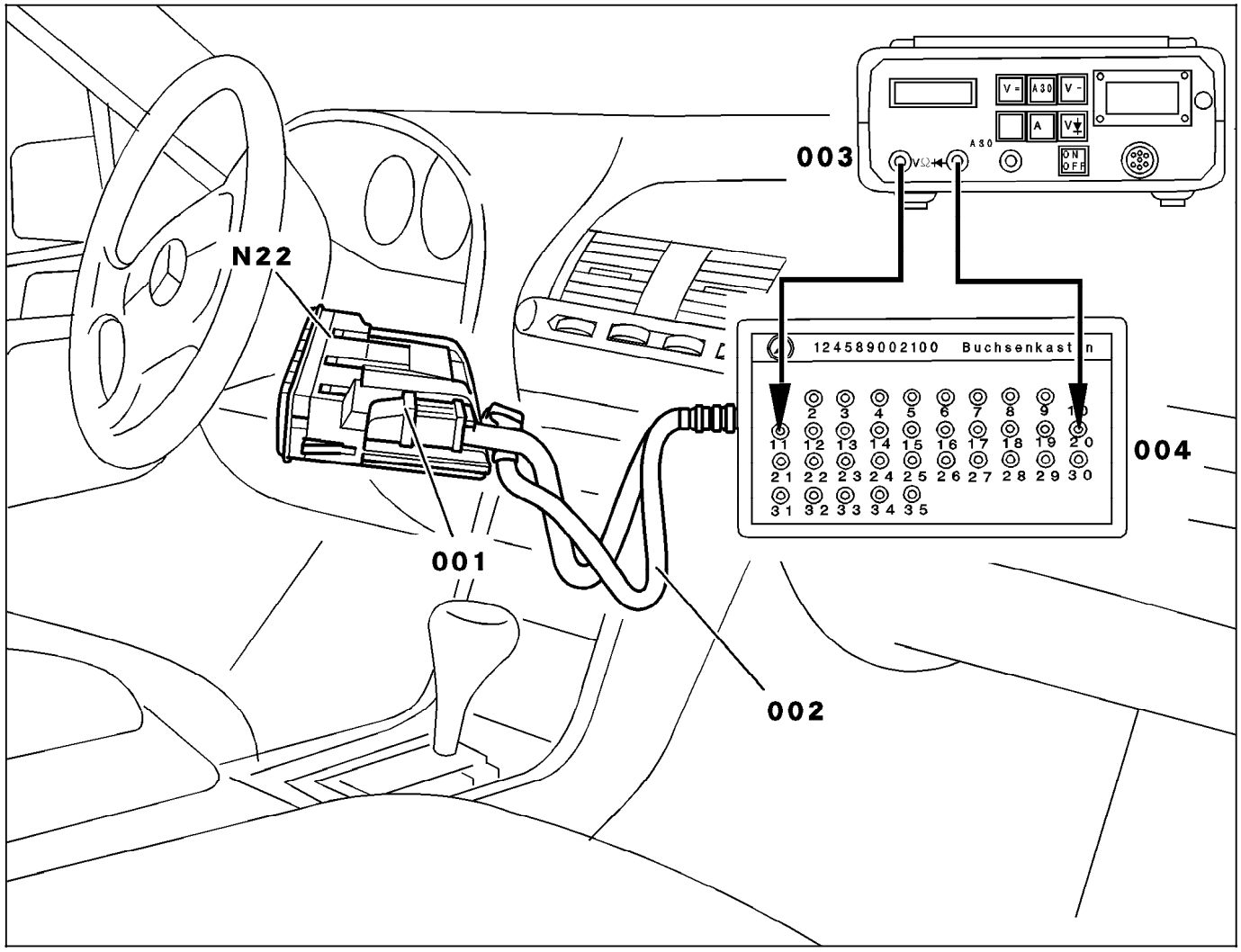
Test equipment; See MBUSA Standard Service Equipment Program

Description	Brand, model, etc.
Multimeter [1]	Fluke models 23, 77 III, 83, 85, 87

[1] Available through the MBUSA Standard Equipment Program.

Electrical Test Program - Preparation for Test

Electrical Components in Passenger Compartment Front A/C



P83.40-0311-06

Figure 1

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

Electrical Test Program - Preparation for Test

Connection diagram for testing the electrical resistance of the following sensors:

- In-car temperature sensor with aspirator
- Evaporator temperature sensor
- Refrigerant temperature sensor
- Left heater core temperature sensor
- Right heater core temperature sensor
- ECT sensor
- Outside temperature sensor

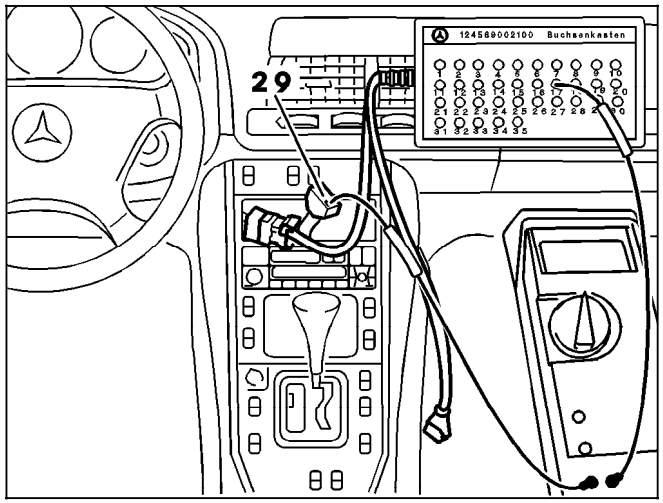
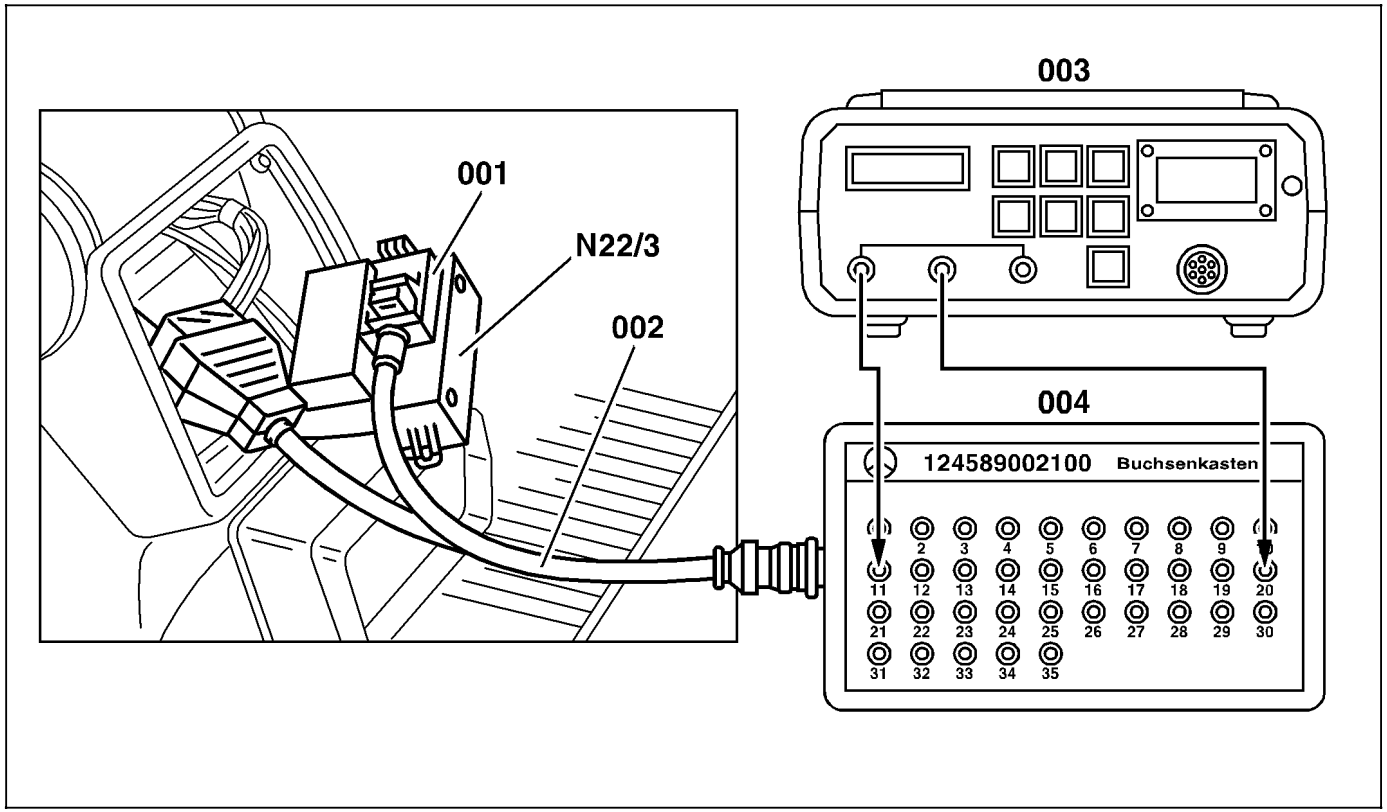


Figure 2

P83.40-0307-01

Electrical Test Program - Preparation for Test

Rear A/C

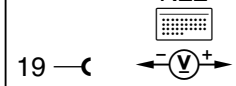
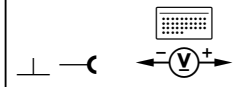
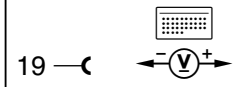
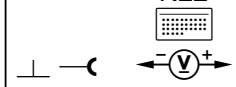
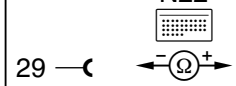


P83.50-2018-05

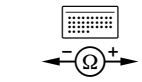
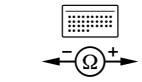
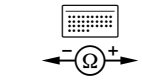
Figure 3

N22/3	Rear A/C pushbutton control module
001	Right connector, A/C pushbutton control module
002	Test cable
003	Multimeter
004	Socket box

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0		**A/C pushbutton control module (N22)** Voltage supply Circuit 30	N22  19 — 8	on right connector	11 – 14 V	Wiring, Circuit 31, ⇒ 1.1
1.1		**Circuit 30**	N22  ⊥ — 8		11 – 14 V	Wiring.
2.0		**Voltage supply** **Circuit 15**	N22  19 — 9	on right connector Ignition: **ON**	11 – 14 V	Wiring.
3.0		**Voltage supply** **Circuit 15x**	N22  ⊥ — 11	on **left** connector Ignition: **ON**	11 – 14 V	Wiring.
4.0	B1226	**In-car temperature sensor (B10/4) with aspirator** Resistance	N22  29 — 20	Ignition: **OFF** on left connector Disconnect N22 from .	°C ≙ kΩ 10 ≙ 19.0 – 21.0 20 ≙ 11.9 – 13.0 30 ≙ 7.7 – 8.4 45 ≙ 4.2 – 4.6	Wiring, B10/4

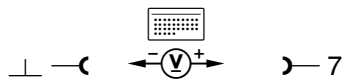
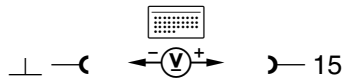
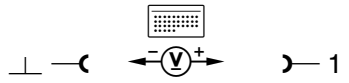
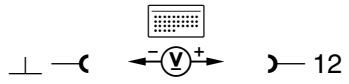
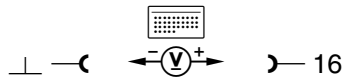
Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
5.0	B1230	**Evaporator temperature sensor (B10/6)** Resistance	N22  29 — 22	Ignition: **OFF** on left connector Disconnect N22 from .	°C ≙ kΩ 0 ≙ 7.3 – 10 10 ≙ 4.2 – 6.0 20 ≙ 2.8 – 3.9 30 ≙ 1.7 – 2.6 45 ≙ 1.0 – 1.5	Wiring, B10/6
6.0	B1233	**Refrigerant temperature sensor (B12/1)** Resistance	N22  29 — 13	Ignition: **OFF** on left connector Disconnect N22 from .	° C k Ω 20 < 13 40 < 5.5 50 < 3.7 60 < 2.5 70 < 1.8	Wiring, B12/1
7.0	B1228	**Heater core temperature sensor (B10/2), left** Resistance	N22  29 — 23	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, B10/2

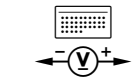
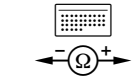
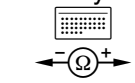
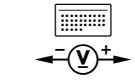
Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
8.0	B1229	**Heater core temperature sensor (B10/3), right** Resistance	N22 29 — Ω — 14	Ignition: **OFF** on left connector Disconnect N22 from .	°C = Ω kΩ 10 = 19.0 – 21.2 20 = 11.9 – 13.2 30 = 7.7 – 8.4 45 = 4.2 – 4.6	Wiring, B10/3
9.0	B1231	**ECT sensor (B11/4 or B11/10)** Resistance (up to MY 1997)	N22 29 — Ω — 24	Ignition: **OFF** on left connector Disconnect N22 from .	°C = Ω kΩ 20 = 5.0 – 8.0 60 = 1.0 – 1.5 85 = .45 – .65 100 = .3 – .4 120 = .19 – .22	Wiring, B11/4 or B11/10
10.0	B1227	**Outside temperature sensor (B10/5)** Resistance (up to MY 1997)	N22 29 — Ω — 21	Ignition: **OFF** on left connector Disconnect N22 from .	°C = Ω kΩ 10 = 5.2 – 5.8 20 = 2.6 – 2.9 30 = 2.0 – 2.4 45 = 1.3 – 1.7	Wiring, B11/4 or B11/10

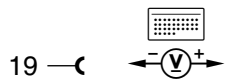
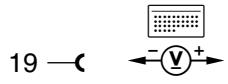
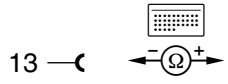
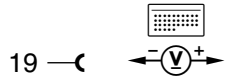
Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
11.0	B1232	**Refrigerant pressure sensor (B12)** Voltage supply	N22  ⊥ — 7	on left connector. Ignition: **ON**	4.75 – 5.25 V	Wiring, B12, N22
12.0		**Sun sensor (B32)** Voltage supply	N22  ⊥ — 15	on left connector. Ignition: **ON**	0 – 4.5 V	Wiring, N22
13.0		**Diagnostic output** Voltage	N22  ⊥ — 1	on left connector. Ignition: **ON**	11 – 14 V	Wiring, N22
14.0	B1235	**Emissions sensor (B31)** Voltage	N22  ⊥ — 12	on left connector. Ignition: **ON**	4 – 6 V	Wiring, N22
15.0	B1421	**Auxliary fan (M4)** Voltage	N22  ⊥ — 16	on right connector Ignition: **ON** Press AUTO > 10 secs. **End**: ignition **OFF**	> 2 V Auxliary fan (M4) on.	Wiring, N22, N65

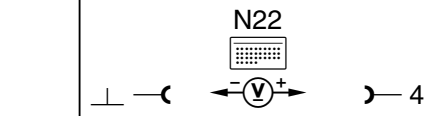
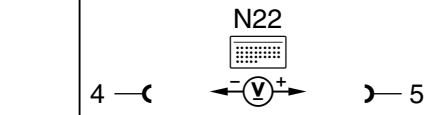
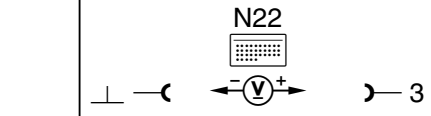
Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
16.0		**A/C Pushbutton control module (N22), 12 V output** Voltage	N22  19 — 28	Ignition: **ON** on right connector.	11 - 14 V	Wiring, N22
17.0	B1416	**Coolant circulation pump (A31m1)** Resistance	N22  20 — 28	on right connector Ignition: **OFF** Disconnect N22 from .	2 - 4 Ω	Wiring, A31m1
18.0	B1417 B1418	**Left/right duovalve (A31y1, A31y2)** Resistance	A31y1 A31y2  21 — 12	Ignition: **OFF** on right connector Disconnect N22 from .	8 - 30 Ω	Wiring, A32
19.0		**Blower regulator (A32n1) Control** Voltage	N22  19 — 1	on right connector Ignition: **ON** MIN MA	 > 0.7 V > 0.5 V	Wiring, A31y1, A31y2

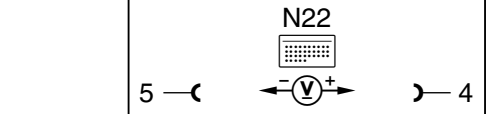
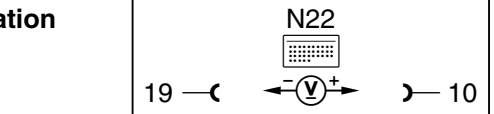
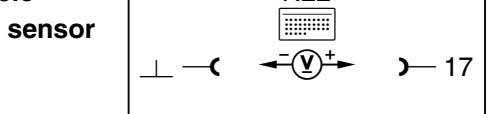
Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
20.0	B1423	**Switchover valve block (Y11), (15 connections multiplex)** Voltage	N22  19 — 28	on right connector Ignition: **ON**	< 3 V	Wiring.
21.0	B1419	**A/C compressor (A9) activation** Voltage	N22  19 — 25	on right connector Engine: **At Idle** A/C compressor: EC A/C compressor:	< 1 V 11 – 14 V	Wiring, N22
22.0	B1424 B1425	**Activated charcoal filter actuator (A32m2)** Resistance	N22  13 — 22	Ignition: **OFF** Disconnect N22	50 - 80 Ω	Wiring, A32m2, N22
23.0		REST Voltage	N22  19 — 28	on right connector. Ignition: **OFF** Press REST (illuminates)	11 - 14 V	Wiring.

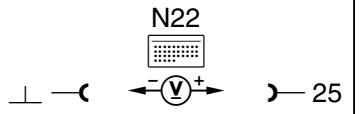
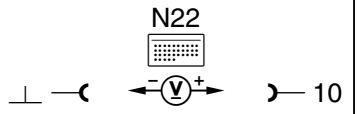
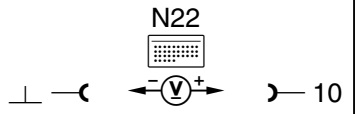
Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
24.0		**Warm/cool air switch (S24/1)** Warm air		on left connector. Ignition: **ON** Press AUTO Press and hold warm air button (red): **ON**	4.75 - 5.25 V 1.5 - 3 V S24/1: LED "**WARM**" is illuminated.	Wiring, S24/1 N22 ⇒ 1.1
24.1		**LED** Warm air		Ignition: **ON** S24/1: (warm air) **OFF** S24/1: (warm air) **ON**	< 1 V LED is **OFF** < 6 V LED is **ON**	Wiring, S24/1 N22
25.0		**Warm/cool air switch (S24/1)** Cool air		on left connector. Ignition: **ON** Press AUTO Press and hold cool air button (blue): **ON**	4.75 - 5.25 V 1.5 - 3 V S24/1: LED "**COLD**" is illuminated	Wiring, S24/1 N22/1 ⇒ 1.1

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
25.1		**LED** Cool air	N22  5 — 4	Ignition: **ON** S24/1: (cold air) **OFF** S24/1: (cold air) **ON**	 < 1 V LED is **OFF** < 6 V LED is **ON**	Wiring, S24/1 N22
26.0		**Idle speed stabilization**	N22  19 — 10	on left connector. Engine: **at Idle** Press	< 1 V 10 - 12 V	Wiring, N22
27.0		**Left front axle vehicle speed signal (VSS) sensor**	N22  ⊥ — 17	Raise front vehicle Ignition: **ON** Shift lever: **N** Spin left front wheel by hand for > 1 sec.	> 3 V ~	Wiring, See D.M., Chassis and Drivetrain, Vol. 2, section 6.2, 23
28.0		Not applicable to U.S version vehicles.				

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
29.0		**Engine RPM**		Engine: **at Idle** on left connector	Gasoline engine: 5 - 7.5 V Diesel engine: 5 - 0.5 V	Wiring.
30.0		**Serial Interface (K1)**		on left connector Ignition: **ON**	< 10 V	Wiring.
31.0		**Serial Interface (K2)**		on right connector Ignition: **ON**	> 3 V ~	Wiring.

Electrical Test Program – Test – This page left blank intentionally

Electrical Test Program – Test (Rear A/C)

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0		**Voltage supply, circuit 15**	N22/3 20 — (V) — 1	Ignition: **ON**	11-14 V	Wiring, ⇒ 1.1
1.1		**Voltage supply, circuit 15**	N22/3 ⊥ — (V) — 1		11-14 V	Wiring.
2.0	B1240	**Evaporator temperature sensor (B10/6)**	N22/3 4 — (Ω) — 18	Ignition: **OFF** Disconnect N22/3 from ⌨.	°C = Ω kΩ 0 = 7.3– 10.0 10 = 4.2 – 6.0 20 = 2.8 – 3.9 30 = 1.7 – 2.6 45 = 1.0 – 1.5	Wiring, B10/6, N22/3
3.0	B1236	**Left rear heater core temperature sensor (B10/9)** Resistance	N22/3 4 — (Ω) — 14	Ignition: **OFF** Disconnect N22/3 from ⌨.	°C = Ω kΩ 10 = 19.0 – 21.2 20 = 11.9 – 13.2 30 = 7.7 – 8.4 45 = 4.2 – 4.6	Wiring, B10/9, N22/3

Electrical Test Program – Test (Rear A/C)

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
4.0	B1237	**Right rear heater core temperature sensor (B10/10)**	N22/3 4 — Ω — 16	Ignition: **OFF** Disconnect N22/3 from ⌨.	°C ≙ kΩ 10 ≙ 19.0 – 21.2 20 ≙ 11.9 – 13.2 30 ≙ 7.7 – 8.4 45 ≙ 4.2 – 4.6	Wiring, B10/10, N22/3
5.0		**Potentiometer, rear A/C blower speed selector wheel (N22/3)**	N22/3 20 — V — 11	Ignition: **ON** Potentiometer setting: **MIN** (0 not engaged) **MAX**	 < 1 V (infinitely variable) > 4 V	N22/3
6.0	B1239	**Right potentiometer (temperature selector wheel) N22/3**	N22/3 20 — V — 15	Ignition: **ON** Temperature selector wheel in: **Blue** area **Red** area	 < 1 V (infinitely variable) > 4 V	Wiring, N22/3

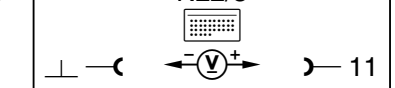
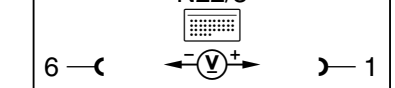
Electrical Test Program – Test (Rear A/C)

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
7.0	B1238	**Left potentiometer (temperature selector wheel) N22/3**	N22/3 20 — (-) (V) (+) — 17	Ignition: **ON** Temperature selector wheel in: **Blue** area **Red** area	 < 1 V (infinitely variable) > 4 V	Wiring, N22/3
8.0	B1430	**Rear refrigerant shut-off valve (Y67)**	N22/3 9 — (-) (V) (+) — 1	Rear A/C: **ON** Rear A/C: **OFF**	11-14 V < 1 V	Wiring, N22/3
9.0	B1427	**Coolant circulation pump (A31/1m1)**	A31/1m1 2/1 — (-) (Ω) (+) — 2/2	Ignition: **ON** Connector 2 disconnected from A31/1m1	2 – 4 Ω	Wiring, A31/1m1, N22/3
10.0	B1429	**Right duovalve (A31/1y2)** Voltage	N22/3 5 — (-) (V) (+) — 1	Ignition: **ON** Both temperature selector wheels at: **Red** detent **Blue** detent	 < 1 V 11 – 14 V	Wiring, ⇒ 10.1

Electrical Test Program – Test (Rear A/C)

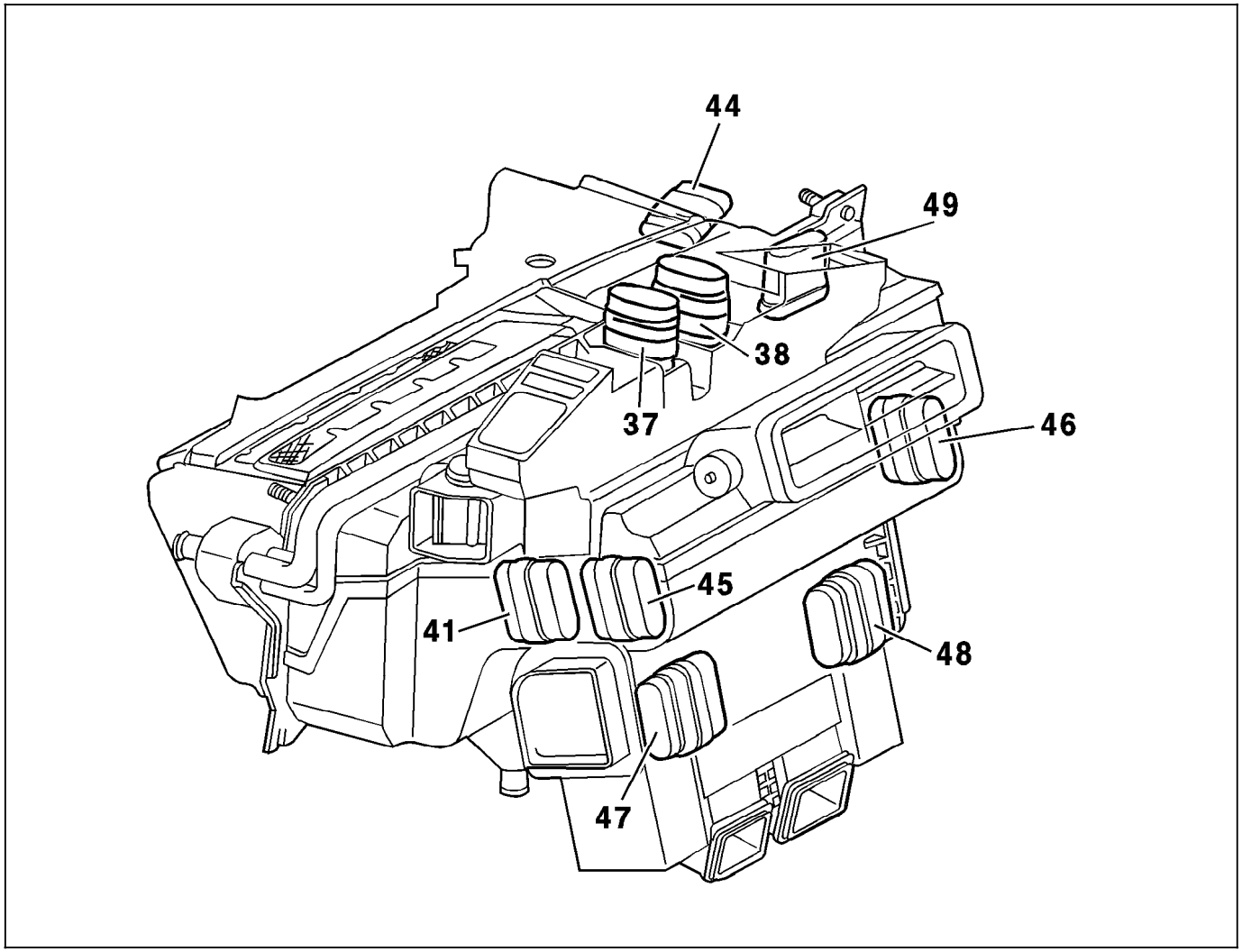
⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
10.1		Resistance	N22/3 5 — Ω — 7	Ignition: **OFF** Disconnect N22/3 from .	20 – 35 Ω	A31/1y2, N22/3
11.0	81428	**Left duovalve (A31/1y1)** Voltage	N22/3 7 — V — 1	Ignition: **ON** Both temperature selector wheels at: **Red** detent **Blue** detent	 < 1 V 11 – 14 V	Wiring, ⇒ 11.1
11.1		Resistance	N22/3 5 — Ω — 7	Ignition: **OFF** Disconnect N22/3 from .	20 – 35 Ω	A31/1y1, N22/3

Electrical Test Program – Test (Rear A/C)

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
12.0		**Rear A/C electronic blower regulator (N29/2)**	N22/3  ⊥ — 11	Ignition: **ON** Blower speed wheel set to: **MIN** (not 0) **MAX**	 < 1 V > 5 V, blower motor running	Wiring, N29/2 Rear blower motor (M2/1)
13.0		**Rear tunnel flap vacuum valve (Y67/1)**	N22/3  6 — 1	 Rear A/C: OFF Rear A/C: ON	 < 1 V > 9 V	Wiring, Y67/1

Pneumatic Test Program – Component Locations

Vacuum Actuators



P83.40-0238-06

Figure 1

37	Right defroster flap vacuum actuator
38	Left defroster flap vacuum actuator
41	Diverter flap, left center air outlet vacuum actuator
44	Main air flap, front vacuum actuator
45	Blend air flap, left center air outlet vacuum actuator
46	Blend air flap, right center air outlet vacuum actuator
47	Left footwell flap vacuum actuator
48	Right footwell flap vacuum actuator
49	Air recirculation flap vacuum actuator

Pneumatic Test Program – Preparation for Test

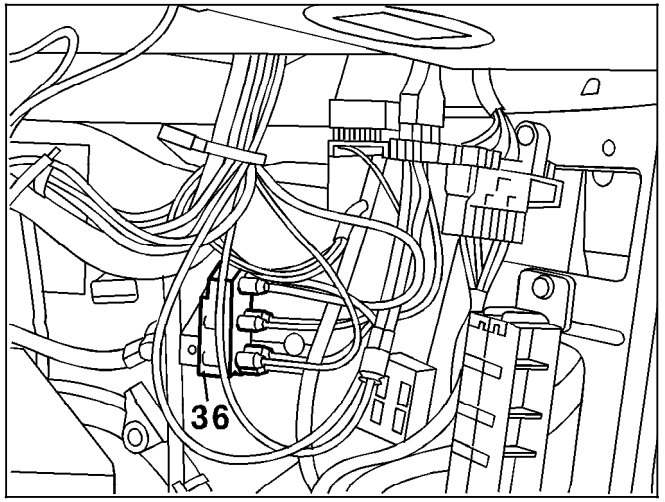
1. Review 11, 12, 13, 14, 15, 20, 21, 22, 31, 32, 41,

2. Disconnect and plug connection 5 (Y11 – switchover valve block) from the vacuum distribution block (36).

3. Connect vacuum/pressure tester to the disconnected pneumatic line.

4. Permissible leakage of the actuators with pneumatic lines at 400 mbar vacuum per minute is 30 mbar.

5. Using the left display pushbutton on N22, the test steps are selected, see 33



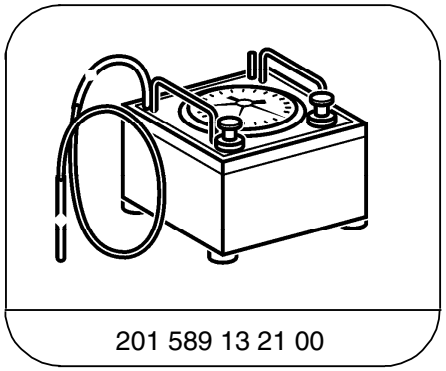
P83.40-0281-01

Figure 1

36 Vacuum distribution block

Electrical Test Program – Preparation for Test

Special Tools



201 589 13 21 00

Tester

Test equipment; See MBUSA Standard Service Equipment Program

Description	Brand, model, etc.
Plug	000 987 29 45
Connector	129 800 95 15

Pneumatic Test Program – Test

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0	**Vacuum actuators** Left/right defroster flap vacuum actuators (37, 38), diverter flap left center air outlet vacuum actuator (41) and left/right footwell flap vacuum actuators (47, 48). Review 32 as well.		Evacuate system with 400 mbar vacuum. **Left display code 0:** Vacuum actuators 37, 38, 47 and 48 and vacuum lines (vacuum line colors medium green and red) with vacuum applied. **Left display code 1 and 2:** Vacuum actuator 41 and vacuum line (vacuum line color dark green) with vacuum applied. i See Vacuum diagram 1, 33/4	30 mbar pressure increase in 1 minute. 30 mbar pressure increase in 1 minute.	Remove vacuum lines from Y11 and test each vacuum actuator with its vacuum line. Replace leaking actuators and or leaking vacuum lines.

Pneumatic Test Program – Test

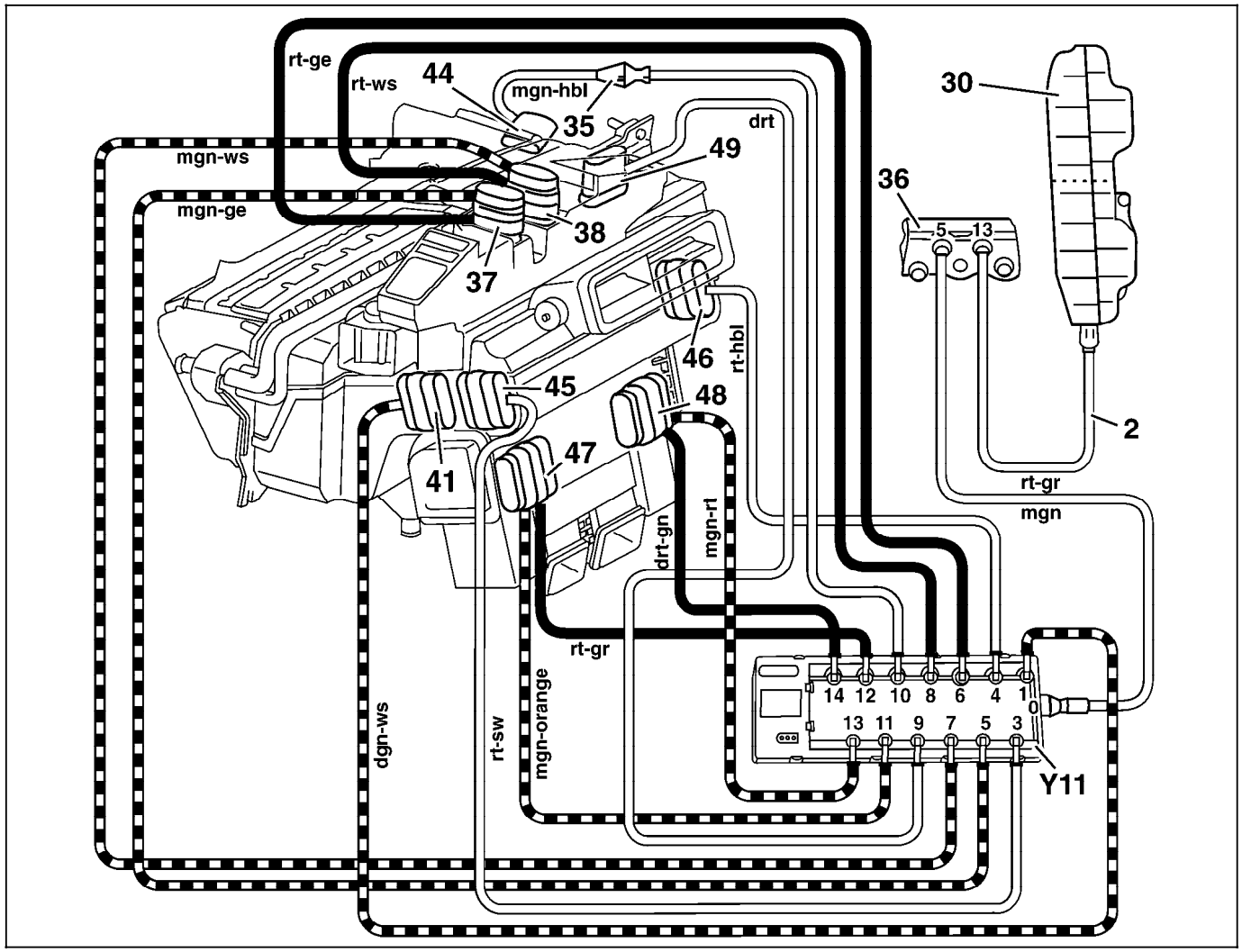
⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
2.0	**Vacuum actuators** Blend air flap, left/right center air outlet vacuum actuators (45, 46) and left/right defroster flap vacuum actuators (37, 38). Review 32 as well.		Evacuate system with 400 mbar vacuum. **Left display code :** Left display code 3 and 4: Vacuum actuators 45, 46, 37, 38 (vacuum line color red) with vacuum. i For vacuum actuators 45, 46: see Vacuum diagram 2, 33/5 For vacuum actuators 37, 38: see Vacuum diagram 1, 33/4	30 mbar pressure increase in 1 minute.	Replace leaking actuators and or leaking vacuum lines.

Pneumatic Test Program – Test

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
3.0	**Vacuum actuators** Main air flap front vacuum actuator (44), air recirculation flap vacuum actuator (49) and blend air left/right center air outlet vacuum actuators (45, 46). Review 32 as well.		Evacuate system with 400 mbar vacuum. **Left display code :** Left display code and : Vacuum actuators 44, 49, 45, 46 and vacuum lines (vacuum line color red) with vacuum. i For vacuum actuators 44, 49: see Vacuum diagram 3, 33/6 For vacuum actuators 45, 46: see Vacuum diagram 2, 33/5	30 mbar pressure increase in 1 minute.	Replace leaking actuators and or leaking vacuum lines.

Pneumatic Test Program – Test

Vacuum diagram 1



P83.40-0246-76

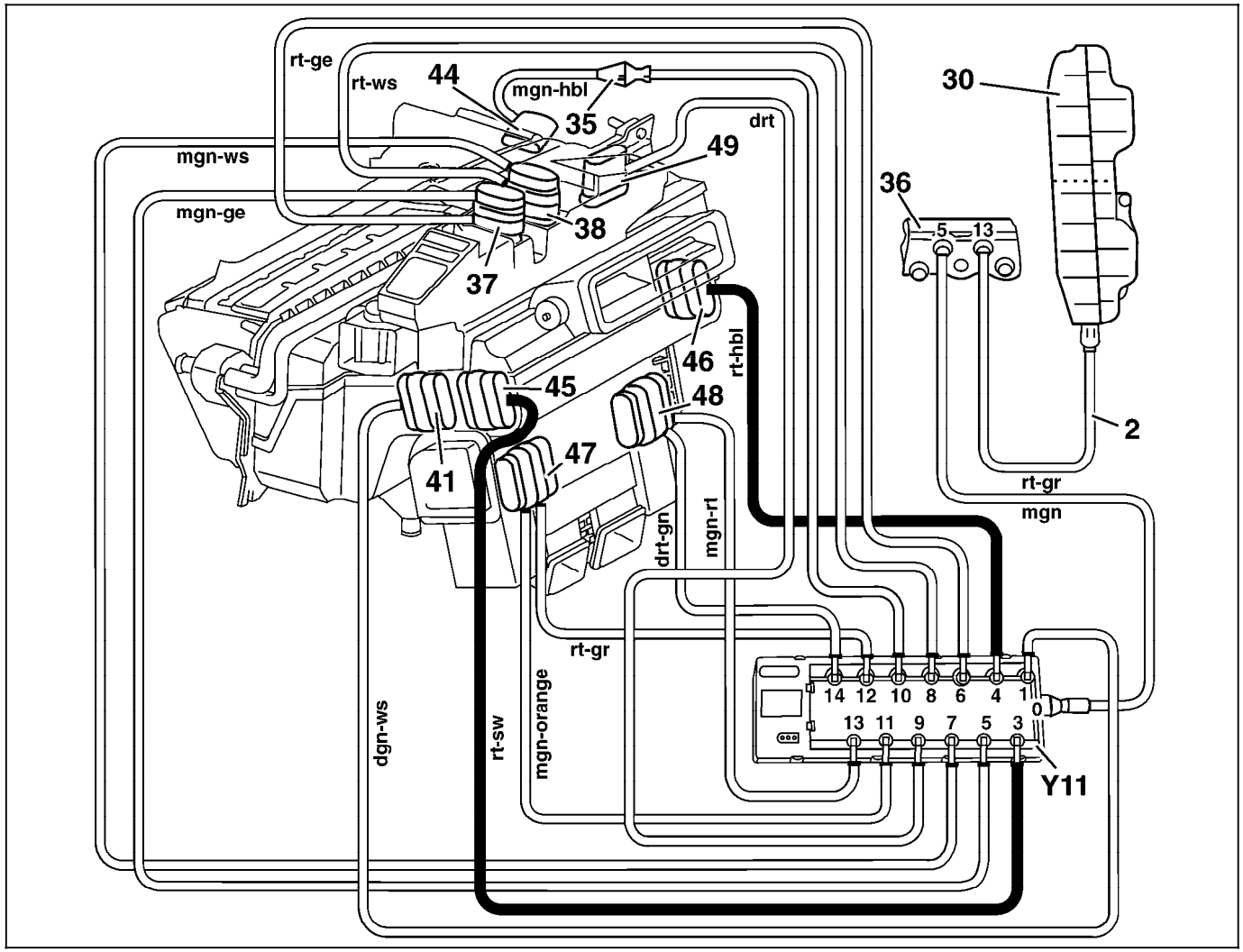
lbu	Light blue	mgn	Medium green
drd	Dark red	gy	Grey
ye	Yellow	rd	Red
gn	Green	wt	White
		dgn	Dark green

The following prefixes may appear with line colors:

d = dark
m = medium
l = light

Pneumatic Test Program – Test

Vacuum diagram 2



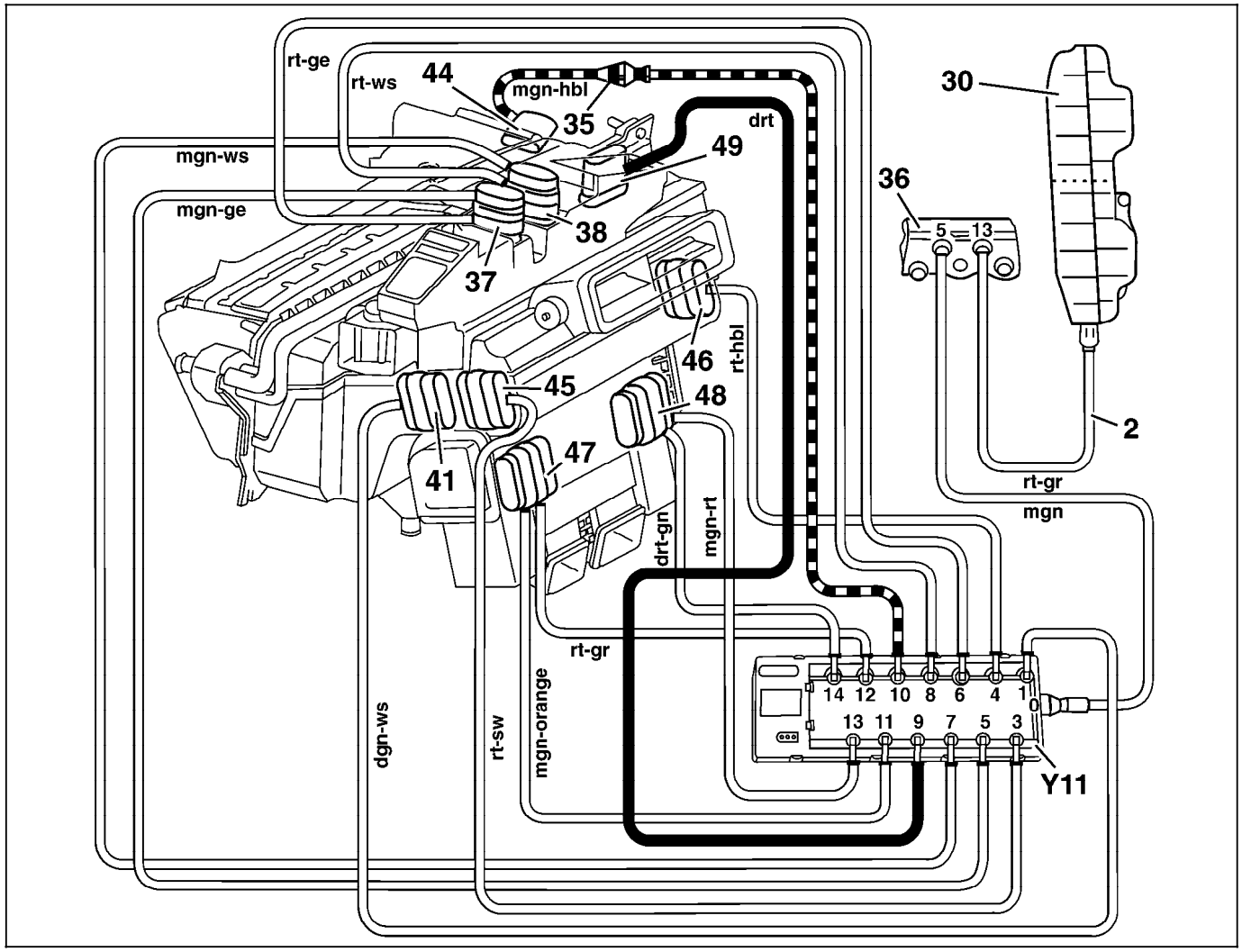
P83.40-0245-76

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

The following prefixes may appear with line colors:
d = dark
m = medium
l = light

Pneumatic Test Program – Test

Vacuum diagram 3



P83.40-0244-76

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

The following prefixes may appear with line colors:
d = dark
m = medium
l = light

Refrigeration System Test Program – Component Locations

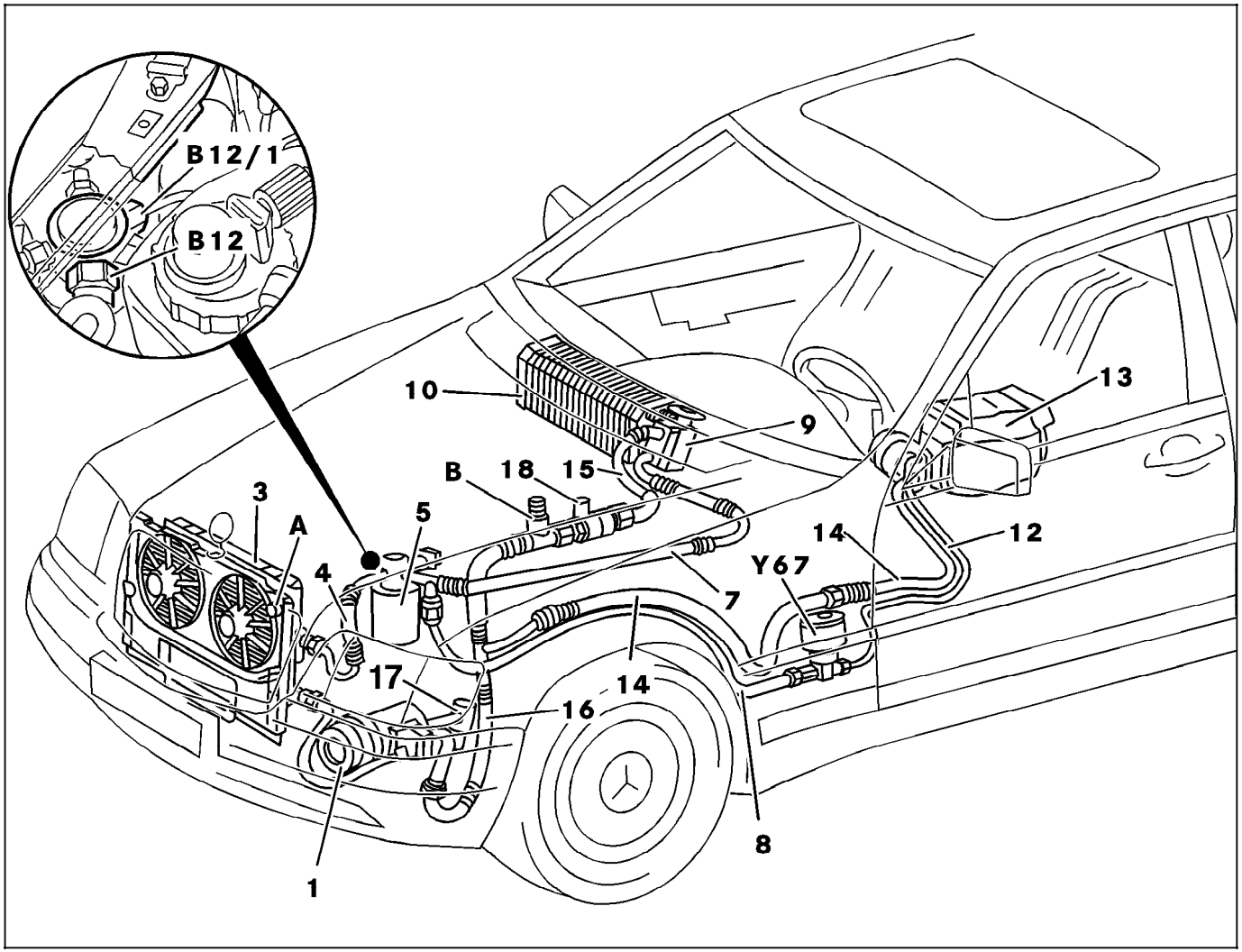


Figure 1

A	High pressure connection
B	Low pressure connection
1	A/C compressor
3	Condenser
4	High pressure liquid line to receiver/dryer
5	Receiver/dryer
7	High pressure line to evaporator
8	High pressure line to evaporator
9	Expansion valve
10	Evaporator
12	Pressure line
13	Rear A/C
14	Low pressure line
15	Low pressure line
16	Low pressure line
17	Pipe group
18	Fuel cooler
B12	Refrigerant pressure sensor
B12/1	Refrigerant temperature sensor
Y67	Rear refrigerant shut-off valve

P83.40-0294-06