


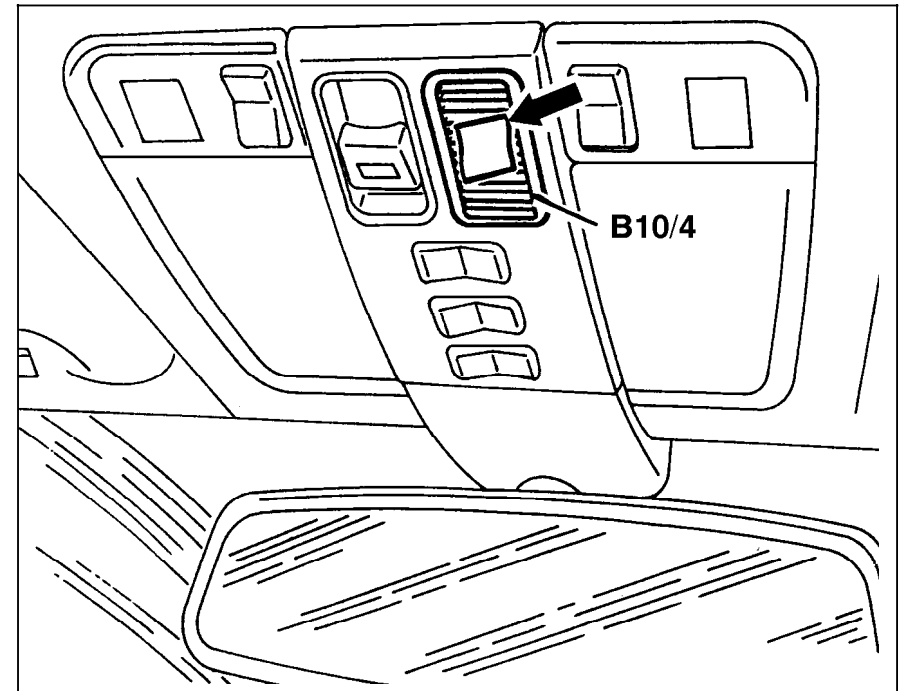
3.2 Model 140 up to M.Y. 1995

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Diagnosis – Function Test

Preparation for Test

1. Check condition of fuse 20 circuit 15 (F3-f20), fuse 21 circuit 15 (F3-f21) and fuse 18 circuit 30 (F3-f18).
Check condition of fuse 1 circuit 15 in rear fuse box (F4-1).
2. Check in – car temperature sensor/aspirator blower by placing a small piece of paper (approx. 1" 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. Ensure that the  button is not depressed.




P83-3330-35

Figure 1

B10/4 In – car temperature sensor (with aspirator blower in E15)

Diagnosis – Function Test

Note: 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	Temperature selector wheel at random setting. Press button  . 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, 13.0, 30.0
⇒ 2.0 Total ventilation in cooling mode	Temperature selector wheels in “blue” area. Press AUTO . Fan speed wheel set to AUTO .	Blower runs with increased speed. Air venting from center outlets. A/C compressor engaged. No heat output.	23 ⇒ 13.0, 30.0 33/2
⇒ 3.0 Normal ventilation in regulating mode	Temperature selector wheel set at present in-car temperature. Press AUTO . Fan speed wheel set to AUTO .	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 auxiliary coolant pump.	23 ⇒ 13.0, 25.0, 26.0, 27.0, 36.0 33/2, 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”	Temperature selector wheels in “red” area. Press warm air switch on center outlet. Fan speed wheel set to AUTO .	Heated air from center outlets. Blower speed increases.	23 ⇒ 13.0, 15.0, 16.0 33/3
⇒ 5.0 Center air outlet “cool”	Temperature selector wheels in “red” area. Press cool air switch on center outlet. Fan speed wheel set to AUTO . Press AUTO button.	Cool air from center outlet.	23 ⇒ 13.0, 15.0, 16.0 33/3
⇒ 6.0 Economy in heating mode	Temperature selector wheels in “red” area. Press S button. Fan speed wheel set to AUTO .	Air venting from lower and side outlets, leak air from upper outlets. Maximum heat output.	23 ⇒ 13.0, 33/2, 3

¹⁾ Observe Preparation for Test, see 22.

Note: 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.	23 ⇒ 32.0, 36.0, 44.0

¹⁾ Observe Preparation for Test, see 22.

Diagnosis – Function Test

Test step/Test scope	Test condition	Nominal value	Possible cause/Remedy ¹⁾
⇒ 8.0 Cooling operation	<p>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 top.</p> <p>Push air distribution slide to the bottom.</p>	<p>Rear A/C blower running.</p> <p>Cool air venting from outlets.</p> <p>Cool air venting from beneath seat outlets.</p>	23 ⇒ 32.0, 37.0, 38.0, 39.0
⇒ 9.0 Heating operation	<p>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 top.</p> <p>Push air distribution slide to the bottom.</p>	<p>Rear A/C blower running.</p> <p>Warm air venting from outlets.</p> <p>Warm air venting from beneath seat outlets.</p>	23 ⇒ 32.0, 37.0, 38.0, 39.0, 40.0, 41.0, 42.0
⇒ 10.0 Full heat operation	<p>Temperature selector wheels front A/C panel set to "red" detent. 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 top.</p>	<p>Rear A/C blower running.</p> <p>Warm air venting from beneath seat outlets and from console outlets.</p>	23 ⇒ 32.0, 37.0, 38.0, 39.0, 40.0, 41.0, 42.0, 44.0

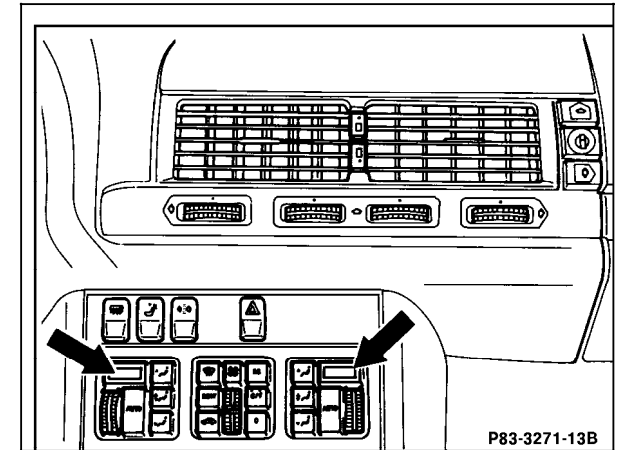
1) Observe Preparation for Test, see 22.

Diagnosis – Reading Sensor Values

Notes:

1. The display windows (arrows) will show in sequence the actual temperature sensor readings, refrigerant pressure, blower control voltage, software status and control module version. Thereby allowing the tolerance range of the temperature sensors and the refrigerant pressure to be checked.
2. The temperature control is maintained during the duration of the test.

Figure 1



P83-3271-13B
P83-3271-13B

Diagnosis – Reading Sensor Values

Preparation for Test

1. Set temperature selector wheels to white area.
2. Ignition: **ON**
3. Press left and right **AUTO** button.
4. Wait at least 20 seconds then press **REST** for more than 5 seconds.
5. The number "1" will appear in the left display window, in the right window the momentary in-car temperature will appear, or, **HI** if there is a short circuit, **LO** if there is an open circuit.
6. By pressing the left **AUTO** button the next value will be displayed in the right window (see table on following page).
7. Press **REST** button to end test program.

Diagnosis – Reading Sensor Values

Display code in left window	Possible cause	Remedy/Test Step ¹⁾
1	In-car temperature sensor with aspirator blower (B10/4)	23⇒ 4.0
2	Outside temperature sensor (B10/5)	23⇒ 5.0
3	Left heater core temperature sensor (B10/2) ²⁾	23⇒ 7.0
4	Right heater core temperature sensor (B10/3) ²⁾	23⇒ 8.0
5	Evaporator temperature sensor (B10/6)	23⇒ 6.0
6	ECT sensor (A/C) (B10/8) ²⁾	23⇒ 9.0
7	Refrigerant pressure in bar (06 = 6 bar)	23⇒ 10.0
8	Blower control voltage from 8 (MIN) – 60 (MAX)	23⇒ 13.0
9	Software status, A/C pushbutton control module (N22), manufacturer Bosch: 57, 58, etc., manufacturer Kammerer: 02, 03, etc.	–
10	Left rear heater core temperature sensor (B10/9)	23⇒ 34.0
11	Right rear heater core temperature sensor (B10/10)	23⇒ 35.0
12	Rear evaporator temperature sensor (B10/11)	23⇒ 33.0
13	Software status, rear A/C pushbutton control module (N22/3), manufacturer Bosch: 42 ³⁾	–
16	Control module applicable for active charcoal filter A = yes, 0 = no.	23⇒ 17.0, 18.0

¹⁾ Observe Preparation for Test, see 22.

²⁾ Display will read only two digits (example: temperature of 104 °F will read 04 °F).

³⁾ Starting 02/92.

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

Notes:

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.

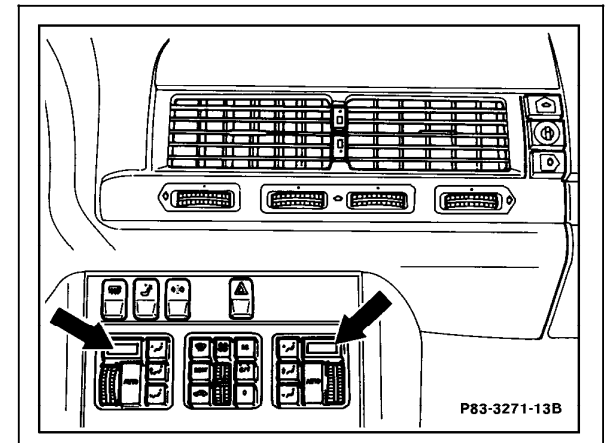


Figure 1

P83-3271-13B

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

Preparation for Test

1. Engine: **At Idle**
2. Press left and right **AUTO** buttons.
3. Set temperature selector to 72 °F.
4. Manually open the side and middle air vents.
5. Press **REST** and °C/°F and for > 5 secs.
6. The left display will show "L" and the right will show "R".
7. By pressing **AUTO** on the left side, the next highest test step is displayed. To switch from "L" to "H" press **AUTO** on the right side (see table).
8. 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.

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	All flaps closed, defroster outlet opened.	33/2, 33/3
			HI	All flaps opened.	
1	Left diverter flap ²⁾	Press right AUTO	LO	Left center outlet closed.	33/2, 33/3
			HI	Left center outlet opened, cold air.	
2	Right diverter flap ²⁾	Press right AUTO	LO	Right center outlet closed.	33/2
			HI	Right center outlet opened, cold air.	
3	Left blend air flap ²⁾	Set left temperature selector wheel to “red” detent. Press right AUTO	LO	Left center outlet closed.	33/3
			HI	Left center outlet, warm air.	
4	Right blend air flap ²⁾	Set right temperature selector wheel to “red” detent. Press right AUTO	LO	Right center outlet, closed.	33/3
			HI	Right center outlet, warm air.	
5	Side outlet diverter flaps ¹⁾ (up to VIN 1A 123445)	Set both temperature selector wheels to “blue” detent. Press right AUTO Set both temperature selector wheels to “red” detent.	LO	Cool air from side outlet.	33/3
			HI	Warm air from side outlet.	

1) Observe Preparation for Test, see 22.

2) 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).

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⁾
B	Left defroster flap long stroke ²⁾	Pushbutton right AUTO	LO	Left defroster outlet opened.	33/2
			HI	Left defroster outlet opened, leak air.	
7	Left defroster flap long and short stroke ²⁾	Pushbutton right AUTO	LO	Left defroster outlet opened.	33/2
			HI	Left defroster outlet closed.	
8	Right defroster flap, long stroke ³⁾	Pushbutton right AUTO	LO	Right defroster flap open, leak air.	33/2
			HI	Right defroster flap opened.	
9	Right defroster flap, long and short stroke ³⁾	Pushbutton right AUTO	LO	Right defroster flap opened.	33/2
			HI	Right defroster flap, opened.	
10	Main air flap short stroke ⁴⁾ (up to VIN 123445)	Pushbutton right AUTO	LO	Fresh air.	33/4
			HI	Recirculated air (increased air volume).	
	LO		100% fresh air		
	HI		100% recirculated air		

1) Observe Preparation for Test, see 22.

2) The right defroster outlets 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	Main air flap long and short stroke ⁴⁾ (up to VIN 123445)	Pushbutton right AUTO	LO HI	Fresh air. Recirculated air 100%.	33/4
	Main air flap (up to VIN 123446)	Pushbutton right AUTO	LO HI	100% recirculated air. 100% fresh air.	
12	Left footwell flap, long stroke ¹⁾	Pushbutton right AUTO	LO HI	Left footwell flap, closed. Left footwell flap opened, leak air.	32/2
13	Left footwell flap, long and short stroke ¹⁾	Pushbutton right AUTO	LO HI	Left footwell flap, leak air. Left footwell flap, opened.	33/2
14	Right footwell flap, long stroke ¹⁾	Pushbutton right AUTO	LO HI	Right footwell flap, closed. Right footwell flap opened, leak air	33/2
15	Rightfootwell flap, long and short stroke ¹⁾	Pushbutton right AUTO	LO	Right footwell flap, leak air.	33/2
			HI	Right footwell flap, opened.	

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).

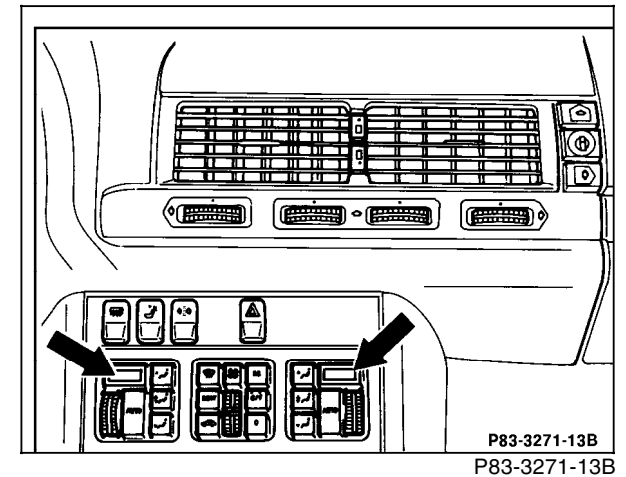
⁴⁾ The left and right blend air flaps will also be activated.

Diagnosis – Diagnostic Trouble Code (DTC) Memory

Notes for Diagnosis

- The A/C pushbutton control module (N22) has DTC memory and the capability to display the codes via the temperature display windows (arrows) on the A/C pushbutton control panel. The stored DTC's will remain in memory even with the vehicle battery disconnected.
- The DTC memory can also be read using the Hand-Held Tester (HHT).
- The DTC readout differentiates between continuous as well as intermittent faults.

Figure 1



Diagnosis – Diagnostic Trouble Code (DTC) Memory

Preparation for Test

1. Turn left temperature selector wheel to “red” detent.
2. Turn right temperature selector wheel to “blue” detent.
3. Turn ignition **ON**.
4. Press **AUTO**.
5. Within 20 seconds simultaneously press **REST** and **0** for > 2 seconds.
6. The display will show permanent DTC's stored in memory (see table on following page). Press right **AUTO** until all stored DTC's are displayed. Record each DTC as it is displayed.
7. Each malfunction (short circuit, open circuit, etc.) has a specific DTC. The letter “E” (Error) along with the hundredth digit of the DTC is displayed in the left window. The tenth and single digit of the DTC is displayed in the right window. By pressing the right **AUTO** button the next DTC stored in memory will be displayed.

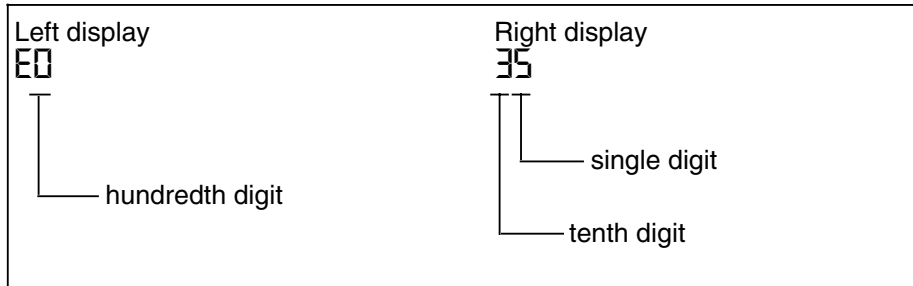
8. Turn ignition **OFF** and repair recorded DTC's according to the respective diagnostic chart.
9. Turn ignition **ON** and press left **AUTO** button. A “d” (delete) is displayed in the left window.

By pressing the right **AUTO** button the DTC will be deleted from memory. Continue to press the left and right **AUTO** buttons until all DTC's are deleted from memory (display will show “E0 00”).

10. Return temperature selector wheels to normal setting.

Note:

The red diode in the recirculation switch will blink during the test as of software status 6.2 (Bosch) or 06 (Kammerer).



Diagnosis – Diagnostic Trouble Code (DTC) Memory

Diagnostic Trouble Code (DTC)	Possible Cause	Test Step/Remedy ¹⁾
E0 01	No malfunction stored in memory	–
E0 02	A/C pushbutton control module (N22)	A/C pushbutton control module (N22).
E0 03	Rear A/C pushbutton control module (N22/3)	Rear A/C pushbutton control module (N22/3).
E0 06	Connection to switchover valve block (Y11)	Wiring.
E0 07	Data exchange (CAN B), short circuit	Wiring.
E0 08	Data exchange (CAN A), short circuit	Wiring.
E0 09	Data exchange (CAN A and B), short circuit	Wiring.
E0 10	Repeat DTC readout	–
E0 11	Data exchange (CAN B), open circuit	Wiring.
E0 12	Data exchange (CAN A), open circuit	Wiring.
E0 13	Connection to rear A/C pushbutton control module	Wiring.
E0 14	Data exchange (CAN B), open circuit (rear A/C control module)	Wiring.
E0 15	Data exchange (CAN A), open circuit (rear A/C control module)	Wiring.

¹⁾ Observe Preparation for Test, see 22.

Diagnosis – Diagnostic Trouble Code (DTC) Memory

Diagnostic Trouble Code (DTC)	Possible Cause	Test Step/Remedy ¹⁾
E0 16	In-car temperature sensor (B10/4), short circuit ²⁾	23 ⇒ 4.0
E0 17	In-car temperature sensor (B10/4), short circuit ³⁾	23 ⇒ 4.0
E0 18	In-car temperature sensor (B10/4), open or short circuit ²⁾	23 ⇒ 4.0
E0 19	In-car temperature sensor (B10/4), open or short circuit ³⁾	23 ⇒ 4.0
E0 24	Left heater core temperature sensor (B10/2), short circuit ²⁾	23 ⇒ 7.0
E0 25	Left heater core temperature sensor (B10/2), short circuit ³⁾	23 ⇒ 7.0
E0 26	Left heater core temperature sensor (B10/2), open or short circuit ²⁾	23 ⇒ 7.0
E0 27	Left heater core temperature sensor (B10/2), open or short circuit ³⁾	23 ⇒ 7.0
E0 28	Right heater core temperature sensor (B10/3), short circuit ²⁾	23 ⇒ 8.0
E0 29	Right heater core temperature sensor (B10/3), short circuit ³⁾	23 ⇒ 8.0
E0 30	Right heater core temperature sensor (B10/3), open or short circuit ²⁾	23 ⇒ 8.0
E0 31	Right heater core temperature sensor (B10/3), open or short circuit ³⁾	23 ⇒ 8.0
E0 32	Outside temperature sensor (B10/5), short circuit ²⁾	23 ⇒ 5.0
E0 33	Outside temperature sensor (B10/5), short circuit ³⁾	23 ⇒ 5.0

1) Observe Preparation for Test, see 22.

2) Continuous faults.

3) Intermittent faults.

Diagnosis – Diagnostic Trouble Code (DTC) Memory

Diagnostic Trouble Code (DTC)	Possible Cause	Test Step/Remedy ¹⁾
E0 34	Outside temperature sensor (B10/5), open or short circuit ²⁾	23 ⇒ 5.0
E0 35	Outside temperature sensor (B10/5), open or short circuit ³⁾	23 ⇒ 5.0
E0 36	Evaporator temperature sensor (B10/6), short circuit ²⁾	23 ⇒ 6.0
E0 37	Evaporator temperature sensor (B10/6), short circuit ³⁾	23 ⇒ 6.0
E0 38	Evaporator temperature sensor (B10/6), open or short circuit ²⁾	23 ⇒ 6.0
E0 39	Evaporator temperature sensor (B10/6), open or short circuit ³⁾	23 ⇒ 6.0
E0 40	ECT sensor (B10/8), short circuit ²⁾	23 ⇒ 9.0
E0 41	ECT sensor (B10/8), short circuit ³⁾	23 ⇒ 9.0
E0 42	ECT sensor (B10/8), open or short circuit ²⁾	23 ⇒ 9.0
E0 43	ECT sensor (B10/8), open or short circuit ³⁾	23 ⇒ 9.0
E0 44	Refrigerant pressure sensor (B12), short circuit ²⁾	23 ⇒ 10.0
E0 45	Refrigerant pressure sensor (B12), short circuit ³⁾	23 ⇒ 10.0
E0 46	Refrigerant pressure sensor (B12), open or short circuit ²⁾	23 ⇒ 10.0
E0 47	Refrigerant pressure sensor (B12), open or short circuit ³⁾	23 ⇒ 10.0

1) Observe Preparation for Test, see 22.

2) Continuous faults.

3) Intermittent faults.

Diagnosis – Diagnostic Trouble Code (DTC) Memory

Diagnostic Trouble Code (DTC)	Possible Cause	Test Step/Remedy ¹⁾
E0 48	Left temperature selector wheel, short circuit ²⁾	23 ⇒ 12.0
E0 49	Left temperature selector wheel, short circuit ³⁾	23 ⇒ 12.0
E0 50	Left temperature selector wheel, open or short circuit ²⁾	23 ⇒ 12.0
E0 51	Left temperature selector wheel, open or short circuit ³⁾	23 ⇒ 12.0
E0 52	Right temperature selector wheel, short circuit ²⁾	23 ⇒ 11.0
E0 53	Right temperature selector wheel, short circuit ³⁾	23 ⇒ 11.0
E0 54	Right temperature selector wheel, open or short circuit ²⁾	23 ⇒ 11.0
E0 55	Right temperature selector wheel, open or short circuit ³⁾	23 ⇒ 11.0
E0 72	Heater supply unit coolant circulation pump (A31m1), short circuit ²⁾	23 ⇒ 24.0
E0 73	Heater supply unit coolant circulation pump (A31m1), short circuit ³⁾	23 ⇒ 24.0
E0 74	Coolant circulation pump (A31m1), open or short circuit ²⁾	23 ⇒ 24.0
E0 75	Coolant circulation pump (A31m1), open or short circuit ³⁾	23 ⇒ 24.0
E0 76	Coolant circulation pump (A31m1), over load ²⁾	Check mechanical function of circulation pump
E0 77	Coolant circulation pump (A31m1), over load ³⁾	Check mechanical function of circulation pump

1) Observe Preparation for Test, see 22.

2) Continuous faults.

3) Intermittent faults.

Diagnosis – Diagnostic Trouble Code (DTC) Memory

Diagnostic Trouble Code (DTC)	Possible Cause	Test Step/Remedy ¹⁾
E0 80	Left duovalve (A31y1), short circuit ²⁾	23 ⇒ 26.0
E0 81	Left duovalve (A31y1), short circuit ³⁾	23 ⇒ 26.0
E0 82	Left duovalve (A31y1), open or short circuit ²⁾	23 ⇒ 26.0
E0 83	Left duovalve (A31y1), open or short circuit ³⁾	23 ⇒ 26.0
E0 84	Right duovalve (A31y2), short circuit ²⁾	23 ⇒ 25.0
E0 85	Right duovalve (A31y2), short circuit ³⁾	23 ⇒ 25.0
E0 86	Right duovalve (A31y2), open or short circuit ²⁾	23 ⇒ 25.0
E0 87	Right duovalve (A31y2), open or short circuit ³⁾	23 ⇒ 25.0
E0 88	A/C compressor ground activation ²⁾	23 ⇒ 10.0, 30.0
E0 89	A/C compressor ground activation ³⁾	23 ⇒ 10.0, 30.0
E0 90	A/C compressor ground activation, open or short circuit ²⁾	23 ⇒ 10.0, 30.0
E0 91	A/C compressor ground activation, open or short circuit ³⁾	23 ⇒ 10.0, 30.0
E0 96	Auxiliary fan, 1st stage activation, short circuit ²⁾	23 ⇒ 19.0
E0 97	Auxiliary fan, 1st stage activation, short circuit ³⁾	23 ⇒ 19.0
E0 98	Auxiliary fan, 1st stage activation, open or short circuit ²⁾	23 ⇒ 19.0
E0 99	Auxiliary fan, 1st stage activation, open or short circuit ³⁾	23 ⇒ 19.0

1) Observe Preparation for Test, see 22.

2) Continuous faults.

3) Intermittent faults.

Diagnosis – Diagnostic Trouble Code (DTC) Memory

Diagnostic Trouble Code (DTC)	Possible Cause	Test Step/Remedy ¹⁾
E1 00	Auxiliary fan, 2nd stage activation, short circuit ²⁾	23 ⇒ 20.0
E1 01	Auxiliary fan, 2nd stage activation, short circuit ³⁾	23 ⇒ 20.0
E1 02	Auxiliary fan, 2nd stage activation, open or short circuit ²⁾	23 ⇒ 20.0
E1 03	Auxiliary fan, 2nd stage activation, open or short circuit ³⁾	23 ⇒ 20.0
E1 04	Auxiliary fan, 3rd stage activation, short circuit ²⁾	23 ⇒ 21.0
E1 05	Auxiliary fan, 3rd stage activation, short circuit ³⁾	23 ⇒ 21.0
E1 06	Auxiliary fan, 3rd stage activation, open or short circuit ²⁾	23 ⇒ 21.0
E1 07	Auxiliary fan, 3rd stage activation, open or short circuit ³⁾	23 ⇒ 21.0
E1 08	Auxiliary coolant pump control relay module (K30), power supply, short circuit ²⁾ ⁴⁾	23 ⇒ 14.0
E1 09	Auxiliary coolant pump control relay module (K30), power supply, short circuit ³⁾ ⁴⁾	23 ⇒ 14.0
E1 10	Auxiliary coolant pump control relay module (K30), power supply, open or short circuit ²⁾ ⁴⁾	23 ⇒ 14.0
E1 11	Auxiliary coolant pump control relay module (K30), power supply, open or short circuit ³⁾ ⁴⁾	23 ⇒ 14.0
E1 12	Engine rpm increase diode matrix (V2), short circuit ²⁾	23 ⇒ 23.0
E1 13	Engine rpm increase diode matrix (V2), short circuit ³⁾	23 ⇒ 23.0
E1 14	Engine rpm increase diode matrix (V2), open or short circuit ²⁾	23 ⇒ 23.0
E1 15	Engine rpm increase diode matrix (V2), open or short circuit ³⁾	23 ⇒ 23.0

1) Observe Preparation for Test, see 22.

2) Continuous faults.

3) Intermittent faults.

4) Possible sequential failures 75, 83, 87, 99, 1 03.

Diagnosis – Diagnostic Trouble Code (DTC) Memory

Diagnostic Trouble Code (DTC)	Possible Cause	Test Step/Remedy ¹⁾
E1 16	Activated charcoal filter actuator (A32m2) (OPEN), short circuit ²⁾	23 ⇒ 17.0, 18.0
E1 17	Activated charcoal filter actuator (A32m2) (OPEN), short circuit ³⁾	23 ⇒ 17.0, 18.0
E1 18	Activated charcoal filter actuator (A32m2) (OPEN), open or short circuit ²⁾	23 ⇒ 17.0, 18.0
E1 19	Activated charcoal filter actuator (A32m2) (OPEN), open or short circuit ³⁾	23 ⇒ 17.0, 18.0
E1 20	Activated charcoal filter actuator (A32m2) (CLOSED), short circuit ²⁾	23 ⇒ 17.0, 18.0
E1 21	Activated charcoal filter actuator (A32m2) (CLOSED), short circuit ³⁾	23 ⇒ 17.0, 18.0
E1 22	Activated charcoal filter actuator (A32m2) (CLOSED), open or short circuit ²⁾	23 ⇒ 17.0, 18.0
E1 23	Activated charcoal filter actuator (A32m2) (CLOSED), open or short circuit ³⁾	23 ⇒ 17.0, 18.0

1) Observe Preparation for Test, see 22.

2) Continuous faults.

3) Intermittent faults.

Diagnosis – Diagnostic Trouble Code (DTC) Memory (Rear A/C)

Note:

The following DTC's appear only if vehicle is equipped with rear A/C system

Diagnostic Trouble Code (DTC)	Possible Cause	Test Step/Remedy ¹⁾
E1 28	Left rear heater core temperature sensor (B10/9), short circuit ²⁾	23 ⇒ 34.0
E1 29	Left rear heater core temperature sensor (B10/9), short circuit ³⁾	23 ⇒ 34.0
E1 30	Left rear heater core temperature sensor (B10/9), open or short circuit ²⁾	23 ⇒ 34.0
E1 31	Left rear heater core temperature sensor (B10/9), open or short circuit ³⁾	23 ⇒ 34.0
E1 32	Right rear heater core temperature sensor (B10/10), short circuit ²⁾	23 ⇒ 35.0
E1 33	Right rear heater core temperature sensor (B10/10), short circuit ³⁾	23 ⇒ 35.0
E1 34	Right rear heater core temperature sensor (B10/10), open or short circuit ²⁾	23 ⇒ 35.0
E1 35	Right rear heater core temperature sensor (B10/10), open or short circuit ³⁾	23 ⇒ 35.0
E1 36	Left temperature selector wheel, short circuit ²⁾	23 ⇒ 38.0
E1 37	Left temperature selector wheel, short circuit ³⁾	23 ⇒ 38.0
E1 38	Left temperature selector wheel, open or short circuit ²⁾	23 ⇒ 38.0
E1 39	Left temperature selector wheel, open or short circuit ³⁾	23 ⇒ 38.0

1) Observe Preparation for Test, see 22.

2) Continuous faults.

3) Intermittent faults.

Diagnosis – Diagnostic Trouble Code (DTC) Memory (Rear A/C)

Diagnostic Trouble Code (DTC)	Possible Cause	Test Step/Remedy ¹⁾
E1 40	Right temperature selector wheel, short circuit ²⁾	23 ⇒ 37.0
E1 41	Right temperature selector wheel, short circuit ³⁾	23 ⇒ 37.0
E1 42	Right temperature selector wheel, open or short circuit ²⁾	23 ⇒ 37.0
E1 43	Right temperature selector wheel, open or short circuit ³⁾	23 ⇒ 37.0
E1 44	Rear evaporator temperature sensor (B10/11), short circuit ²⁾	23 ⇒ 33.0
E1 45	Rear evaporator temperature sensor (B10/11), short circuit ³⁾	23 ⇒ 33.0
E1 46	Rear evaporator temperature sensor (B10/11), open or short circuit ²⁾	23 ⇒ 33.0
E1 47	Rear evaporator temperature sensor (B10/11), open or short circuit ³⁾	23 ⇒ 33.0
E1 48	Coolant circulation pump (A31/1m1), short circuit ²⁾	23 ⇒ 40.0
E1 49	Coolant circulation pump (A31/1m1), short circuit ³⁾	23 ⇒ 40.0
E1 50	Coolant circulation pump (A31/1m1), open or short circuit ²⁾	23 ⇒ 40.0
E1 51	Coolant circulation pump (A31/1m1), open or short circuit ³⁾	23 ⇒ 40.0
E1 52	Coolant circulation pump (A31/1m1), overload ²⁾	23 ⇒ 40.0
E1 53	Coolant circulation pump (A31/1m1), overload ³⁾	23 ⇒ 40.0

1) Observe Preparation for Test, see 22.

2) Continuous faults.

3) Intermittent faults.

Diagnosis – Diagnostic Trouble Code (DTC) Memory (Rear A/C)

Diagnostic Trouble Code (DTC)	Possible Cause	Test Step/Remedy ¹⁾
E1 56	Left duovalve (A31/1y1), short circuit ²⁾	23 ⇒ 42.0
E1 57	Left duovalve (A31/1y1), short circuit ³⁾	23 ⇒ 42.0
E1 58	Left duovalve (A31/1y1), open or short circuit ²⁾	23 ⇒ 42.0
E1 59	Left duovalve (A31/1y1), open or short circuit ³⁾	23 ⇒ 42.0
E1 60	Right duovalve (A31/1y2), short circuit ²⁾	23 ⇒ 41.0
E1 61	Right duovalve (A31/1y2), short circuit ³⁾	23 ⇒ 41.0
E1 62	Right duovalve (A31/1y2), open or short circuit ²⁾	23 ⇒ 41.0
E1 63	Right duovalve (A31/1y2), open or short circuit ³⁾	23 ⇒ 41.0
E1 64	Rear refrigerant shut-off valve (Y67), short circuit ²⁾	23 ⇒ 39.0
E1 65	Rear refrigerant shut-off valve (Y67), short circuit ³⁾	23 ⇒ 39.0
E1 66	Rear refrigerant shut-off valve (Y67), open or short circuit ²⁾	23 ⇒ 39.0
E1 67	Rear refrigerant shut-off valve (Y67), open or short circuit ³⁾	23 ⇒ 39.0
E1 68	Rear tunnel flap vacuum valve (Y67/1), short circuit ²⁾	23 ⇒ 44.0
E1 69	Rear tunnel flap vacuum valve (Y67/1), short circuit ³⁾	23 ⇒ 44.0
E1 70	Rear tunnel flap vacuum valve (Y67/1), open or short circuit ²⁾	23 ⇒ 44.0
E1 71	Rear tunnel flap vacuum valve (Y67/1), open or short circuit ³⁾	23 ⇒ 44.0

1) Observe Preparation for Test, see 22.

2) Continuous faults.

3) Intermittent faults.

Electrical Test Program – Component Locations

Electrical Components in Passenger Compartment

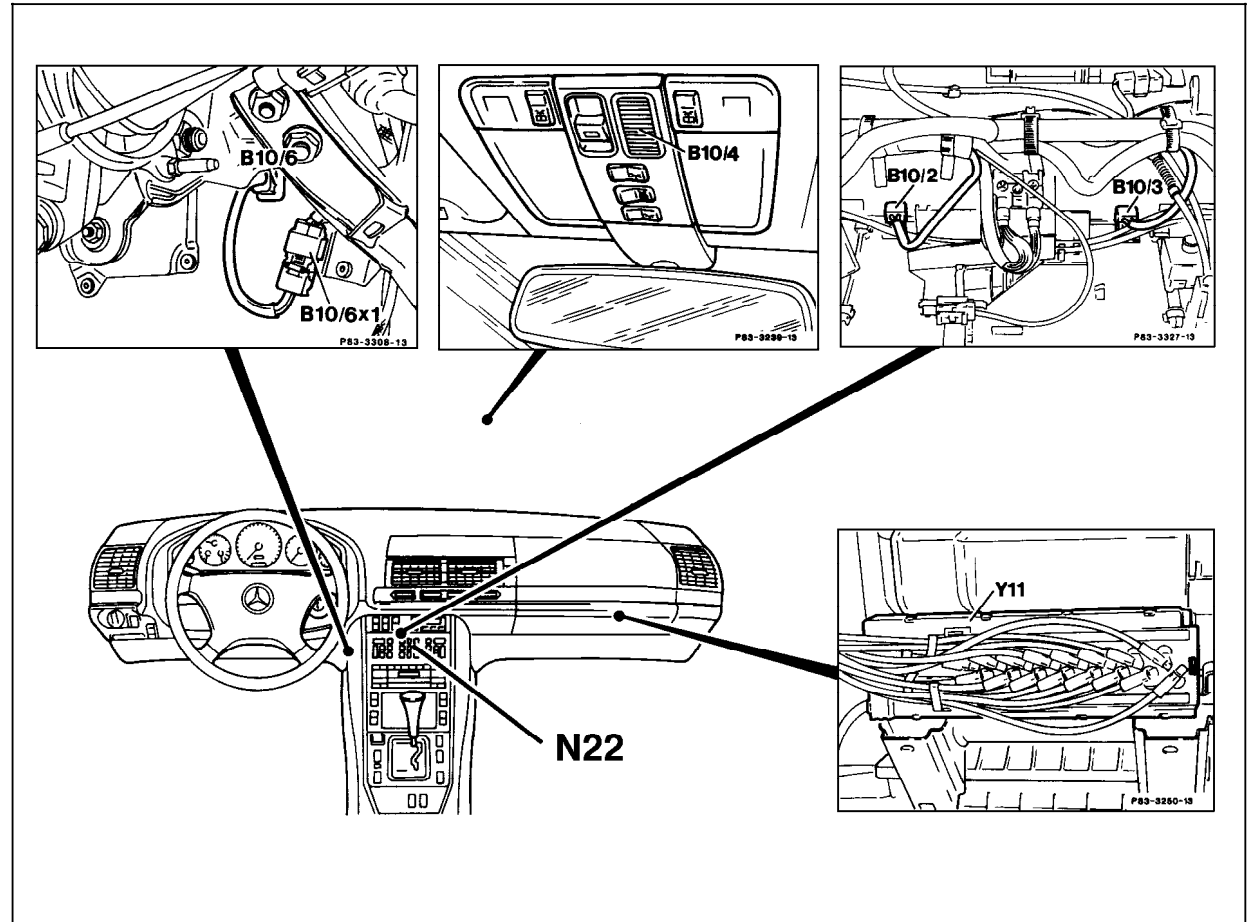


Figure 1

- B10/2 Left heater core temperature sensor
- B10/3 Right heater core temperature sensor
- B10/4 In-car temperature sensor (with aspirator blower in E15)
- B10/6 Evaporator temperature sensor
- B10/6x1 Evaporator temperature sensor connector
- N22 A/C pushbutton control module
- Y11 Switchover valve block (15 connections, multiplex)

P83-5006-57

Electrical Test Program – Component Locations

Electrical Components in Engine Compartment

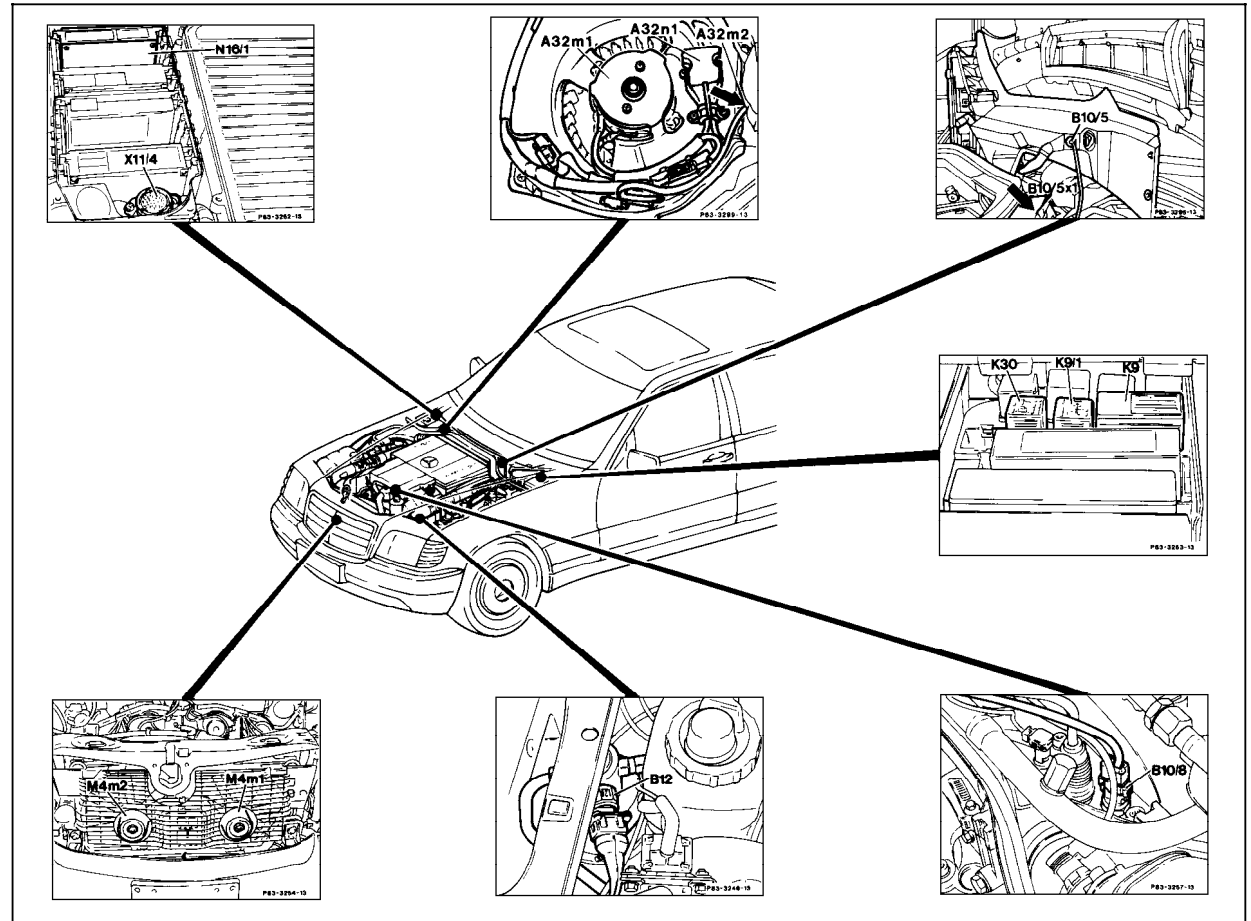


Figure 2

- A32m1 Blower motor
- A32m2 Activated charcoal filter actuator
- A32n1 Blower regulator
- B10/5 Outside temperature sensor
- B10/5x1 Outside temperature sensor connector
- B10/8 ECT sensor (A/C)
- B12 Refrigerant pressure sensor
- K9 Auxiliary fan relay module (stage 2)
- K9/1 Auxiliary fan relay module (stage 1)
- K30 Auxiliary coolant pump control relay module
- M4m1 Left auxiliary fan
- M4m2 Right auxiliary fan
- N16/1 Base module
- X11/4 Data link connector (DTC readout)

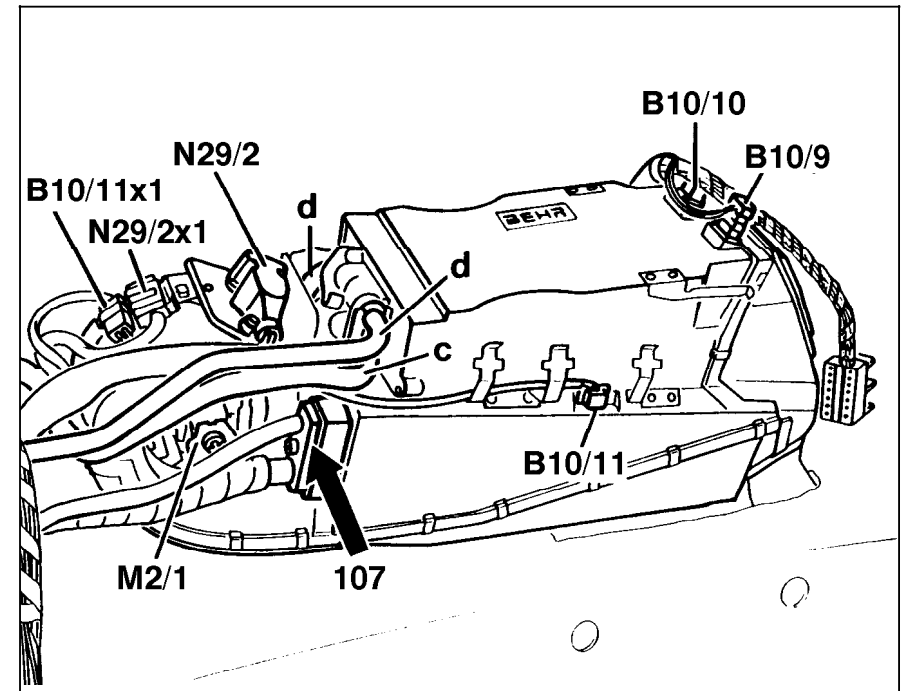
P83-0441-57

Electrical Test Program – Component Locations

Component Locations in Passenger Compartment

Figure 3

B10/9	Left rear heater core temperature sensor
B10/10	Right rear heater core temperature sensor
B10/11	Rear evaporator temperature sensor
B10/11x1	Rear evaporator temperature sensor connector
M2/1	Rear blower motor, automatic A/C
N29/2	Rear A/C electronic blower regulator
N29/2x1	Rear A/C electronic blower regulator connector (4-pole)
107	Refrigerant injector
c	Hot water feed
d	Hot water return



P83-5493-35

Electrical Test Program – Component Locations

Component Locations in Passenger Compartment

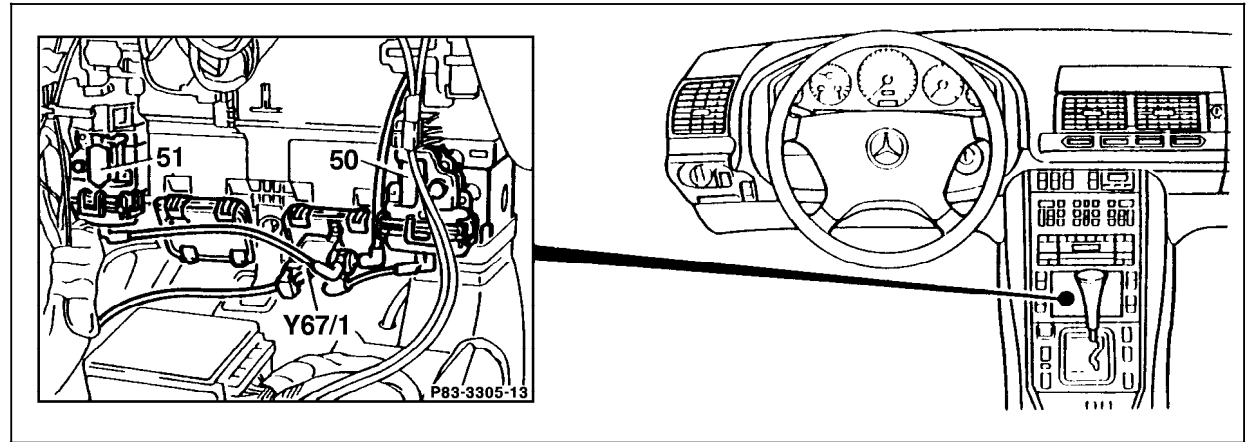


Figure 4
Y67/1 Rear tunnel flap vacuum valve

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Electrical Test Program – Component Locations

Vacuum Diagram

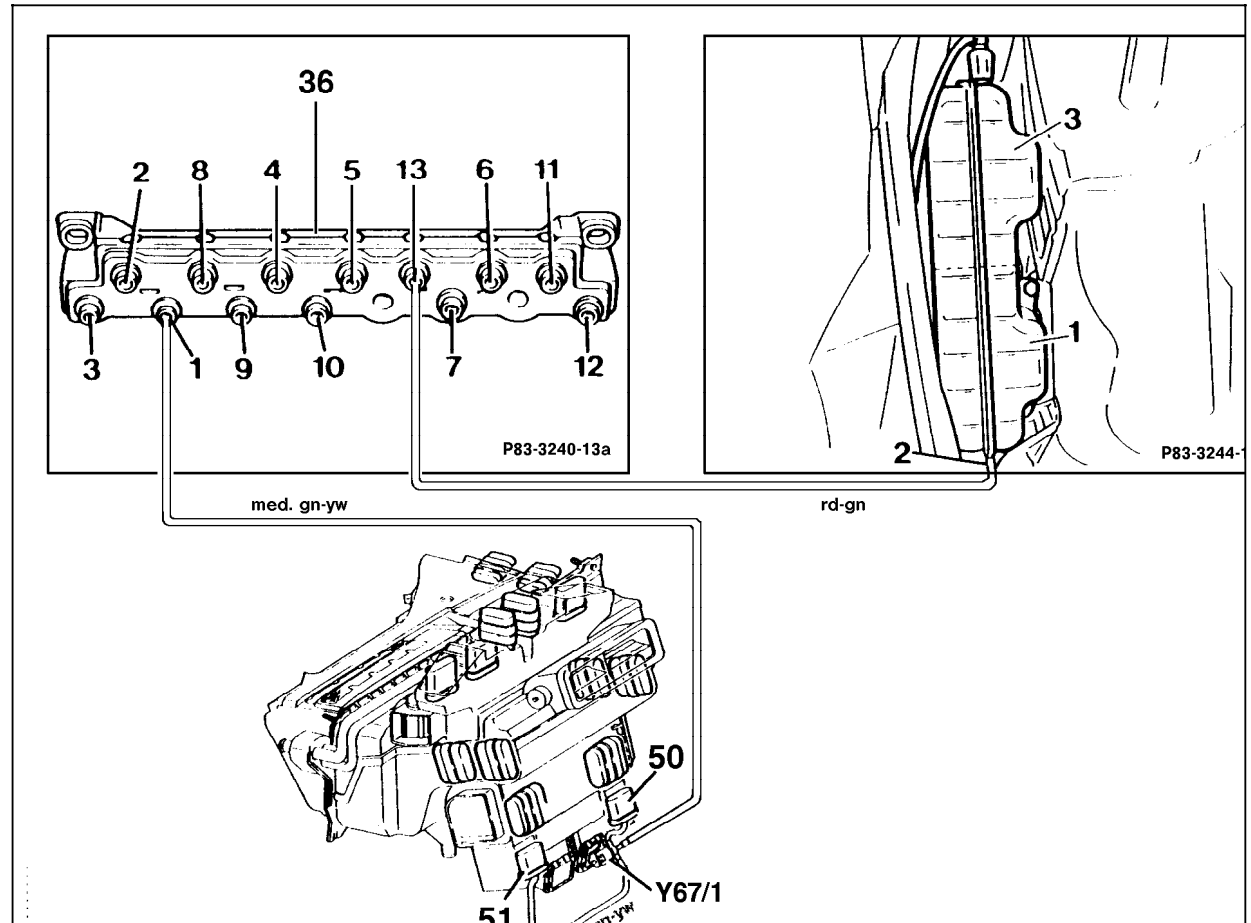


Figure 5

- Y67/1 Rear tunnel flap vacuum valve
- 1 Vacuum accumulator
- 36 Vacuum distribution block
- 50 Vacuum element – right rear legroom
- 51 Vacuum element – left rear legroom

Electrical Test Program – Component Locations

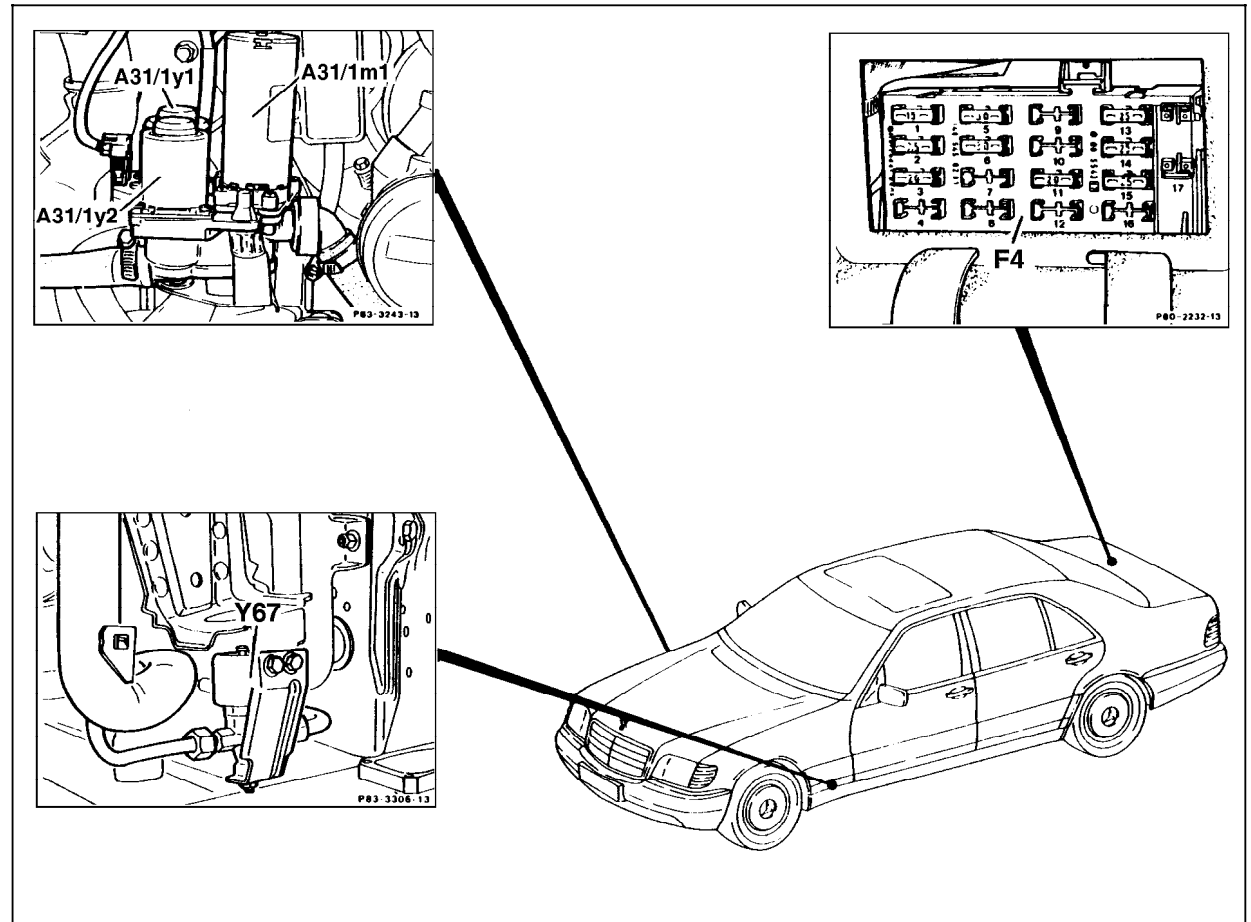


Figure 6

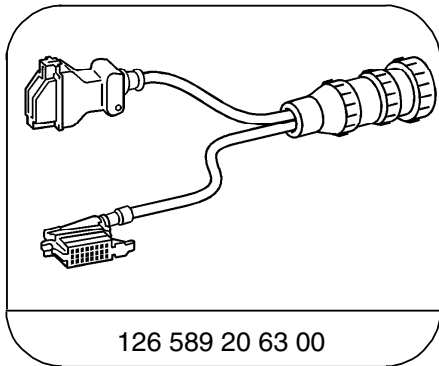
- A31/1m1 Coolant circulation pump
- A31/1y1 Left duovalue
- A31/1y2 Right duovalue
- F4 Rear fuse box
- Y67 Rear refrigerant shut-off valve

P83-5018-57

Electrical Test Program – Preparation for Test

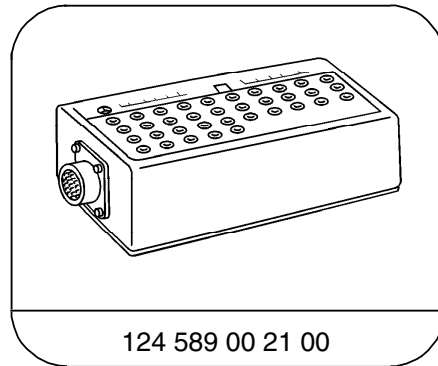
- Remove A/C pushbutton control module (N22) and/or rear A/C pushbutton control module (N22/3) (SMS, Job no.'s 83 – 635 and 582 respectively).

Special Tools



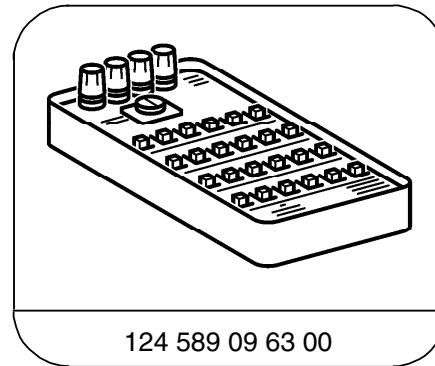
126 589 20 63 00

27-pin test cable



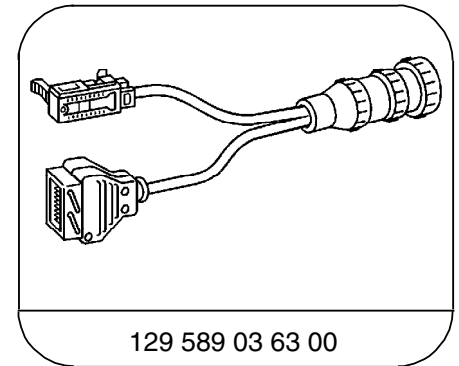
124 589 00 21 00

35-pin socket box



124 589 09 63 00

Ohm decade



129 589 03 63 00

20-pin test cable

Conventional tools, test equipment

Description	Brand, model, etc.
Multimeter ¹⁾	Fluke models 23, 83, 85, 87

¹⁾ Available through the MBUSA Standard Equipment Program.

Electrical Test Program – Preparation for Test

Connection Diagram – Socket Box

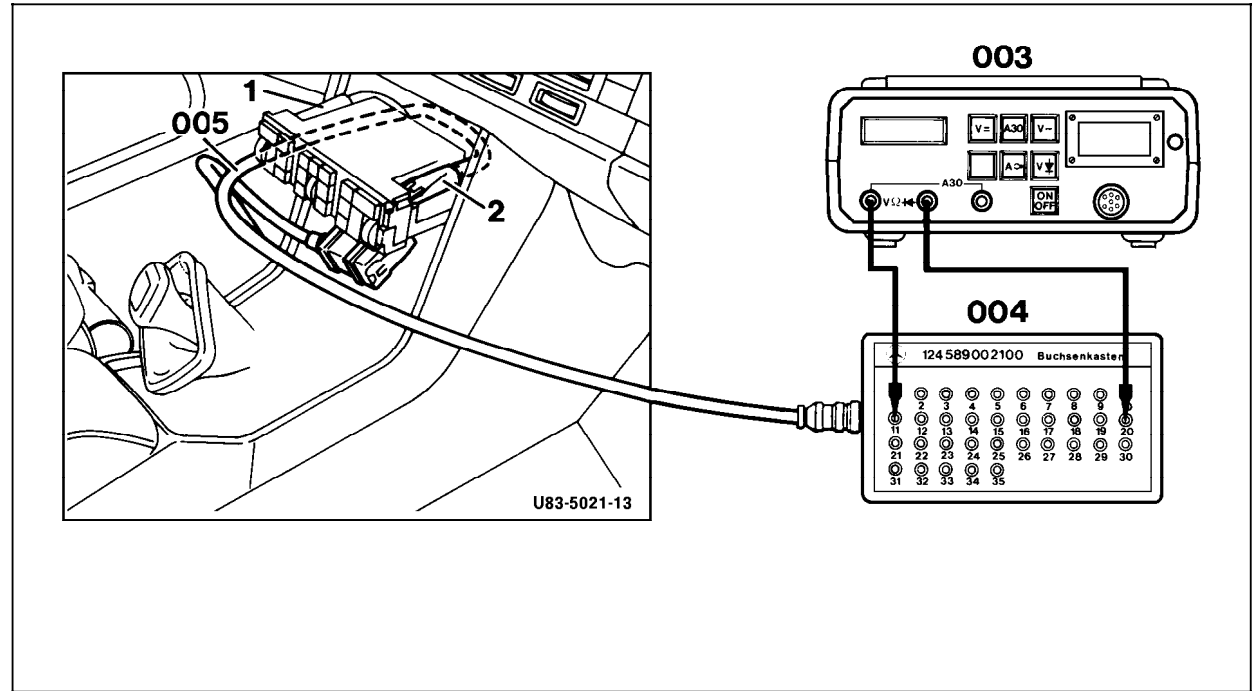


Figure 1

- 1 Left connector, A/C pushbutton control module
- 2 Right connector, A/C pushbutton control module
- 003 Multimeter
- 004 Socket box
- 005 Test cable

U83-5019-55

Note: Illustration depicts connection of test cable to right connector (2)

Note: After connecting the test equipment, erase DTC's in pushbutton control module (see 14)

Electrical Test Program – Preparation for Test

Connection Diagram – Socket Box
(rear A/C)

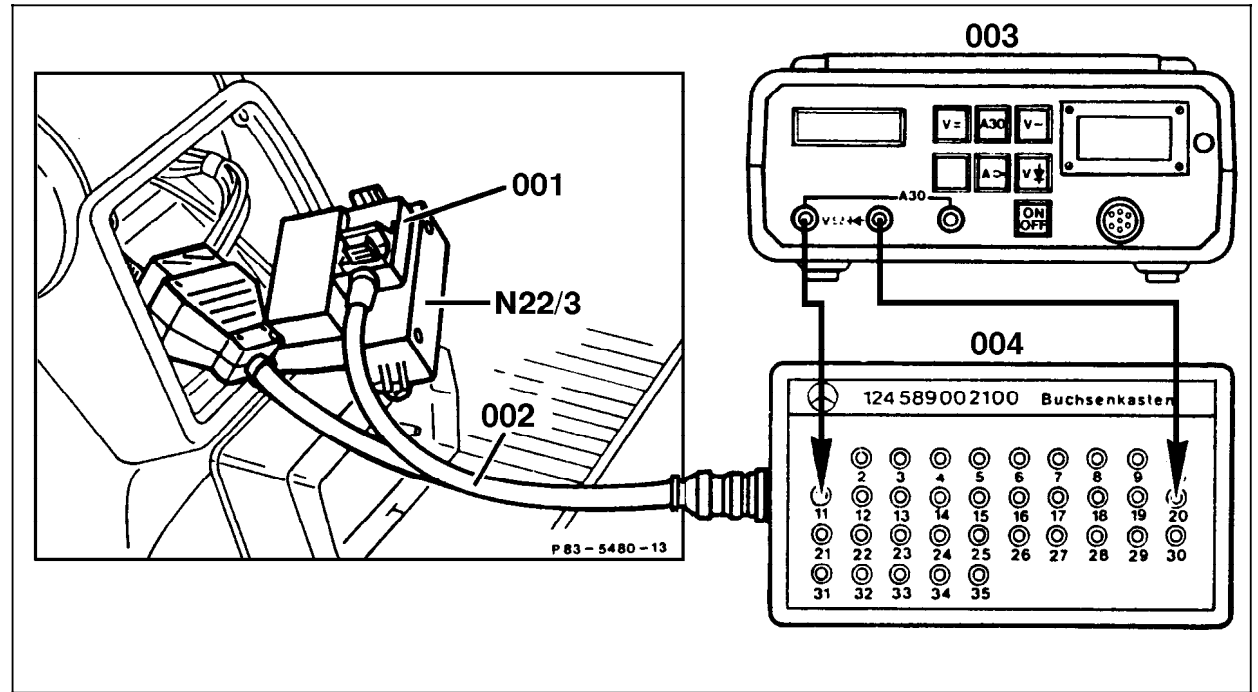



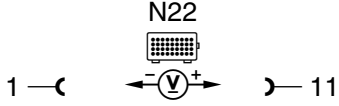

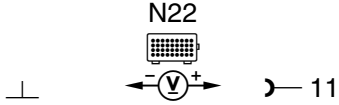
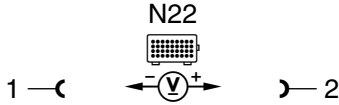

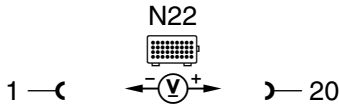

Figure 2

- N22/3 Rear A/C pushbutton control module
- 001 Connector
- 002 Test cable
- 003 Multimeter
- 004 Socket box



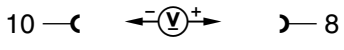


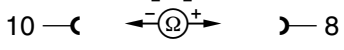



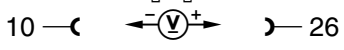


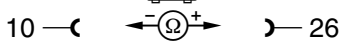


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Note: After connecting the test equipment, erase DTC's in pushbutton control module (see 14)


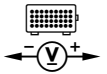

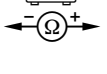


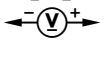

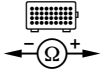


Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0		Voltage supply, circuit 30 for A/C pushbutton control module (N22)		 on right connector (2).	11 – 14 V	Wiring, ⇒ 1.1, Circuit 31.
1.1		Circuit 30			11 – 14 V	Wiring.
2.0		Voltage supply, circuit 15		 on right connector (2). Ignition: ON	11 – 14 V	Wiring.
3.0		Voltage supply, circuit 15x		 on right connector (2). Ignition: ON	11 – 14 V	Wiring.


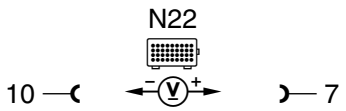

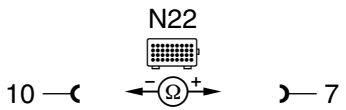


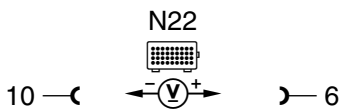




Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
4.0	016 017 018 019	Switch circuit, in-car temperature sensor with aspirator blower (B10/4)	 	 on right connector (2). Ignition: ON	°C V 10 3.2 – 3.5 20 2.6 – 2.9 30 2.0 – 2.4 45 1.3 – 1.7	Wiring, ⇒ 4.1, A/C pushbutton control module (N22).
4.1		In-car temperature sensor (B10/4) with aspirator blower	 	 on right connector (2). Ignition: OFF 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.
5.0	032 033 034 035	Switch circuit, outside temperature sensor (B10/5)	 	 on right connector (2). Ignition: ON	°C V 10 3.2 – 3.5 20 2.6 – 2.9 30 2.0 – 2.4 45 1.3 – 1.7	Wiring, ⇒ 5.1, N22.
5.1		Outside temperature sensor (B10/5)	 	 on right connector (2). Ignition: OFF 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, B10/5.


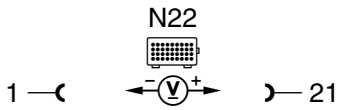

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
6.0	036 037 038 039	Switch circuit, evaporator temperature sensor (B10/6)	<p>N22</p> 	<p> on right connector (2). Ignition: ON</p>	<p>°C V</p> <p>0 2.2 – 2.6</p> <p>10 1.6 – 2.0</p> <p>20 1.2 – 1.5</p> <p>30 0.8 – 1.1</p> <p>45 0.5 – 0.7</p>	Wiring, ⇒ 6.1, A/C pushbutton control module (N22).
6.1		Evaporator temperature sensor (B10/6)	<p>N22</p> 	<p> on right connector (2). Ignition: OFF Disconnect N22 from .</p>	<p>°C kΩ</p> <p>0 7.3 – 10.0</p> <p>10 4.2 – 6.0</p> <p>20 2.8 – 3.9</p> <p>30 1.7 – 2.6</p> <p>45 1.0 – 1.5</p>	Wiring, B10/6.
7.0	024 025 026 027	Switch circuit, left heater core temperature sensor (B10/2)	<p>N22</p> 	<p> on right connector (2). Ignition: ON</p>	<p>°C V</p> <p>10 3.1 – 3.5</p> <p>20 2.6 – 2.9</p> <p>30 2.0 – 2.4</p> <p>45 1.3 – 1.7</p>	Wiring, ⇒ 7.1, N22.
7.1		Left heater core temperature sensor (B10/2)	<p>N22</p> 	<p> on right connector (2). Ignition: OFF Disconnect N22 from .</p>	<p>°C kΩ</p> <p>10 19.0 – 21.2</p> <p>20 11.9 – 13.2</p> <p>30 7.7 – 8.4</p> <p>45 4.2 – 4.6</p>	Wiring, B10/2.

Electrical Test Program – Test


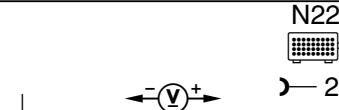

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
8.0	028 029 030 031	Switch circuit, right heater core temperature sensor (B10/3)		 on right connector (2). Ignition: ON	°C V 10 3.1 – 3.5 20 2.6 – 2.9 30 2.0 – 2.4 45 1.3 – 1.7	Wiring, ⇒ 8.1, A/C pushbutton control module (N22).
8.1		Right heater core temperature sensor (B10/3)		 on right connector (2). Ignition: OFF 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, B10/3.
9.0	040 041 042 043	Switch circuit, ECT sensor (B10/8)		 on right connector (2). Ignition: ON	°C V 20 4.3 – 4.7 60 2.9 – 3.6 85 2.0 – 2.5 100 1.6 – 1.9 120 1.0 – 1.4	Wiring, ⇒ 9.1, N22.
9.1		ECT sensor (B10/8)		 on right connector (2). Ignition: OFF Disconnect N22 from  .	°C kΩ 20 5.0 – 8.0 60 1.0 – 1.5 85 0.46 – 0.65 100 0.3 – 0.4 120 0.19 – 0.22	Wiring, B10/8.

Electrical Test Program – Test


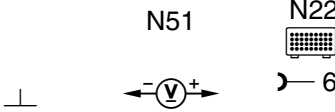

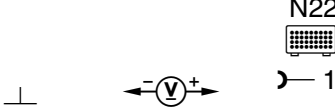
⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
13.0		Blower potentiometer (temperature selector wheel)		 on right connector (2). Ignition: ON Potentiometer setting: min max	< 1 V continuous > 4 V	A/C pushbutton control module (N22).

Test Condition


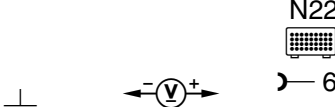
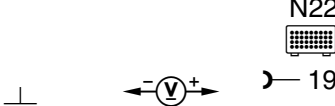
Disconnect test cable from right connector (2) and right harness. Reconnect right harness to pushbutton control module. Connect test cable to left connector (1) of pushbutton control module (N22) and left harness.

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
14.0	108 109 110 111	Voltage supply Auxiliary coolant pump control relay module (REST) (K30)		 on left connector (1). Ignition: OFF Ignition: ON	11 – 14 V < 1 V	Wiring, K30, N22. Wiring, Ignition/starter switch (S2/1), N22.







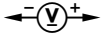


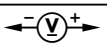



Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
15.0		Warm/cool air switch (S24/1)		 on left connector (1). Ignition: ON Press AUTO Set blower wheel to AUTO. Press and hold warm air button (red): ON	4.75 – 5.25 V 2 – 3 V Red LED indicator in (S24/1) comes on.	Wiring, S24/1, A/C pushbutton control module (N22). ⇒ 15.1.
15.1		LED for warm air		Ignition: ON Warm air button: OFF Warm air button: ON	11 – 14 V no LED < 5 V LED comes on	Wiring, S24/1, N22.









Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
16.0		Warm/cool air switch (S24/1)		Ignition: ON Press AUTO Set blower wheel to AUTO. Press and hold cool air button (blue): ON	4.75 – 5.25 V < 1 V Blue LED indicator in (S24/1) comes on.	Wiring, S24/1, A/C pushbutton control module (N22). ⇒ 16.1.
16.1				Ignition: ON Cool air button: OFF Cool air button: ON	11 – 14 V no LED < 5 V LED comes on	Wiring, S24/1, N22.


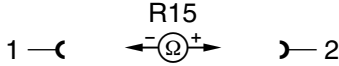
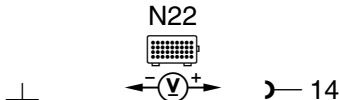

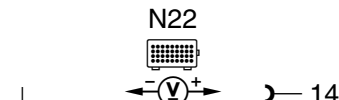

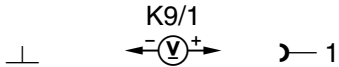
Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
17.0	116 117 118 119 120 121 122 123	Active charcoal filter switch (S24/2) (if so equipped)	  N22  16	 on left connector (1) Ignition: ON	4.75 – 5.25 V	⇒ 17.1
17.1		Active charcoal filter switch (S24/2)	   N22  10	Ignition: ON Press and hold charcoal filter button: ON Press and hold charcoal filter button: OFF	2 – 3 V LED indicator in S24/2 comes on < 1 V	Wiring, S24/2, A/C pushbutton control module (N22). ⇒ 17.2 Wiring, S24/2, N22.
17.2		LED for active charcoal filter	  N22  10 	Ignition: ON Charcoal filter button: ON Charcoal filter button: OFF	11 – 14 V LED comes on < 4 V no LED	Wiring, S24/2, N22.


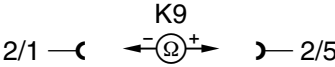
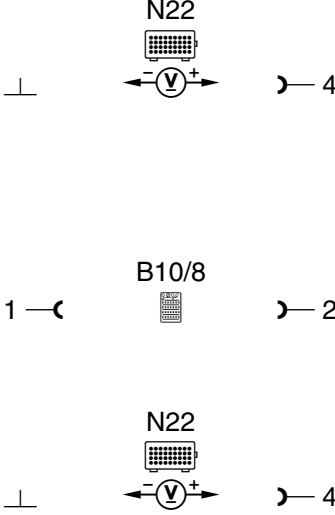

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
19.0	096 097 098 099	Auxiliary fan (M4), stage 1 (up to M.Y. 1993)	<p>⊥  5</p> <p>1 —  2</p> <p>⊥  5</p>	<p> on left connector (1). Ignition: ON Auxiliary fan, stage 1: OFF Ignition: OFF Disconnect ECT sensor (B10/8).</p> <p>Simulate a resistance of 310 Ω</p> <p>Ignition: ON</p>	<p>11 – 14 V</p> <p>Auxiliary fan (M4) runs in stage 1</p> <p>< 1 V</p>	<p>Wiring, ⇒ 9.0, ⇒ 10.0, A/C pushbutton control module (N22).</p> <p>⇒ 19.1</p>
19.1		Auxiliary fan (M4), stage 1	<p>1 —  5</p> <p>⊥  2/5</p> <p>2/5 —  2/1</p>	<p>Ignition: OFF Simulate a resistance of 310 Ω. Disconnect auxiliary fan relay module (K9).</p> <p>Ignition: ON</p> <p>Ignition: ON</p>	<p>6.5 – 7.5 V</p> <p>2.5 – 3.5 V</p>	<p>Wiring, M4</p> <p>Wiring, Auxiliary fan preresistor (R15).</p>


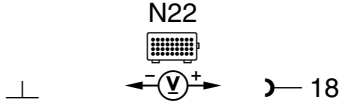
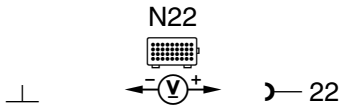


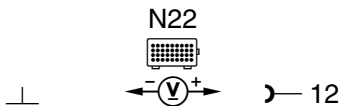

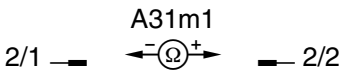
Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
[19.1]				Ignition: OFF	< 1 Ω	Auxiliary fan preresistor, stage 1 (R15/1), Auxiliary fan relay module, stage 1 (K9).
20.0	100 101 102 103	Auxiliary fan (M4), stage 2	  	<p> on left connector (1). Ignition: ON Auxiliary fan, stage 2: OFF</p> <p>Ignition: OFF Disconnect ECT sensor (B10/8).</p> <p>Simulate a resistance of 250 Ω.</p> <p>Ignition: ON</p>	<p>11 – 14 V</p> <p>Auxiliary fan (M4) runs in stage 2</p> <p>< 1 V</p>	<p>⇒ 20.1</p> <p>⇒ 20.1</p>
20.1		Auxiliary fan (M4), stage 2		<p>Ignition: OFF Disconnect auxiliary fan relay module (K9/1). Ignition: ON</p>	11 – 14 V	Wiring, Auxiliary fan relay module, stage 2 (K9), ⇒ 20.2


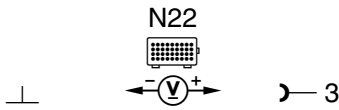

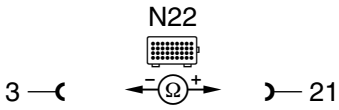

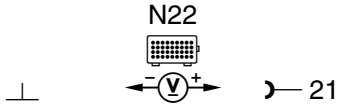

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
20.2.		Auxiliary fan (M4), stage 2		Disconnect auxiliary fan relay module (K9)	< 1 Ω	Wiring, Auxiliary fan preresistor, stage 2 (R15).
21.0	104 105 106 107	Auxiliary fan (M4), stage 3		<p> on left connector (1). Ignition: ON Auxiliary fan, stage 3: OFF</p> <p>Ignition: OFF Disconnect ECT sensor (B10/8).</p> <p>Simulate a resistance of 200 Ω.</p> <p>Ignition: ON Auxiliary fan, stage 3: ON</p>	<p>11 – 14 V</p> <p>Auxiliary fan (M4) runs in stage 3</p> <p>< 1 V</p>	<p>Auxiliary fan relay module, stage 2 (K9).</p> <p>Wiring, K9, A/C pushbutton control module (N22).</p>


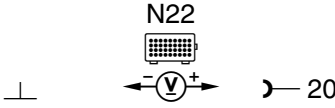

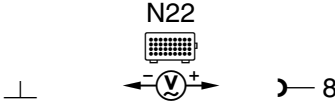
Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
22.0		Diagnostic signal output		Ignition: ON	11 – 14 V	Wiring, A/C pushbutton control module (N22).
23.0	112 113 114 115	Engine rpm increase diode matrix (V2)		 on left connector (1). Ignition: ON Press 	< 1 V 10 – 12 V	Wiring, V2, DM, Engines, Vol. 3 – 6.2 23, N22.
24.0	072 073 074 075	Coolant circulation pump (A31m1)		 on left connector (1). Ignition: ON Both temperature selector wheels at: Red detent Blue detent	< 1 V 11 – 14 V	⇒ 24.1, Wiring, N22.
24.1		Coolant circulation pump (A31m1)		Ignition: OFF Disconnect connector 2 from A31m1.	2 – 4 Ω	A31m1.












Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
25.0	084 085 086 087	Right duovalve (A31y2)		 on left connector (1). Ignition: ON Both temperature selector wheels at: Red detent Blue detent	11 – 14 V < 1 V	Wiring, ⇒ 25.1, A/C pushbutton control module (N22).
25.1		Left/right duovalve (A31y1, A31y2)		Ignition: OFF Disconnect N22 from 	20 – 35 Ω	A31y1, A31y2.
26.0	080 081 082 083	Left duovalve (A31y1)		 on left connector (1). Ignition: ON Press AUTO Both temperature selector wheels at: Red detent Blue detent	11 – 14 V < 1 V	Wiring, ⇒ 25.1, N22.


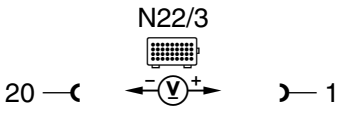
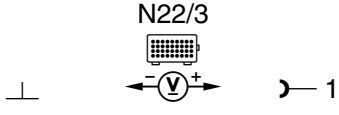
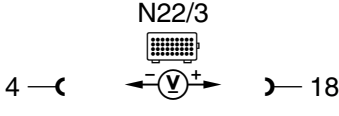


Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
27.0		Blower regulator (A32n1)		 on left connector (1). Ignition: ON Fan selector wheel set to: MIN MAX	< 1 V > 5 V, blower motor running	A/C system blower unit (A32).
28.0		Left front axle vehicle speed signal		Raise front of vehicle off ground (parking brake engaged). Selector lever position: "N" Ignition: ON Turn left front wheel by hand (> 1 revolution/second).	> 3 V~	Wiring, DM, Chassis and Drivetrain, Vol. 2 – 4.2 11 or, DM, Chassis and Drivetrain, Vol. 2 – 5.2 11 or, DM, Chassis and Drivetrain, Vol. 2 – 6.2 11, A/C pushbutton control module (N22).
29.0		Non-USA vehicles only. Continue to next test step.				


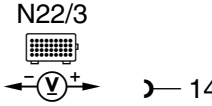
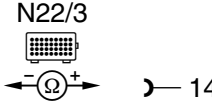

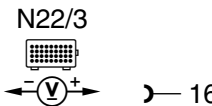
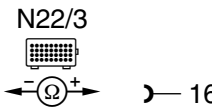

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
30.0	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">088</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">089</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">090</div> <div style="border: 1px solid black; padding: 2px;">091</div> </div>	<p>Switch circuit, ground activation for A/C compressor (A9)</p>	<p>⊥</p> <p style="text-align: center;">N22   17</p>	<p> on left connector (1). Ignition: ON A/C compressor:  A/C compressor: </p>	<p>9 – 12 V < 1 V</p>	<p>Wiring, Base module (N16/1), DM, Chassis and Drivetrain, Vol. 1 – 1.0 11/1, N22.</p>
31.0		<p>Switch circuit, A/C compressor electromagnetic clutch (A9k1)</p>	<p>⊥</p> <p style="text-align: center;">N22   23</p>	<p> on left connector (1). Engine: at Idle (parking brake engaged and selector lever in “P”). Press AUTO A/C compressor:  A/C compressor: </p>	<p>< 1 V 11 – 14 V</p>	<p>Wiring, N16/1, DM, Chassis and Drivetrain, Vol. 1 – 1.0 11/1, A/C compressor rpm sensor (A9I1), DM, Chassis and Drivetrain, Vol. 1 – 1.0 23, N22.</p>


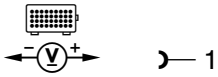


Electrical Test Program – Test (Rear A/C)

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy												
32.0		Voltage supply, circuit 15 for rear A/C pushbutton control module (N22/3)		Ignition: ON	11 – 14 V	Wiring.												
32.1		Circuit 15		Ignition: ON	11 – 14 V	Wiring.												
33.0	144 145 146 147	Rear evaporator temperature sensor (B10/11)		Ignition: ON	<table border="1"> <thead> <tr> <th>°C</th> <th>V</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>2.2 – 2.6</td> </tr> <tr> <td>10</td> <td>1.6 – 2.0</td> </tr> <tr> <td>20</td> <td>1.2 – 1.5</td> </tr> <tr> <td>30</td> <td>0.8 – 1.1</td> </tr> <tr> <td>45</td> <td>0.5 – 0.7</td> </tr> </tbody> </table>	°C	V	0	2.2 – 2.6	10	1.6 – 2.0	20	1.2 – 1.5	30	0.8 – 1.1	45	0.5 – 0.7	⇒ 33.1.
°C	V																	
0	2.2 – 2.6																	
10	1.6 – 2.0																	
20	1.2 – 1.5																	
30	0.8 – 1.1																	
45	0.5 – 0.7																	
33.1		Rear evaporator temperature sensor (B10/11)		Ignition: OFF Disconnect N22/3 from 	<table border="1"> <thead> <tr> <th>°C</th> <th>kΩ</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>7.3 – 10.0</td> </tr> <tr> <td>10</td> <td>4.2 – 6.0</td> </tr> <tr> <td>20</td> <td>2.8 – 3.9</td> </tr> <tr> <td>30</td> <td>1.7 – 2.6</td> </tr> <tr> <td>45</td> <td>1.0 – 1.5</td> </tr> </tbody> </table>	°C	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, B10/11, Rear A/C pushbutton control module (N22/3).
°C	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																	



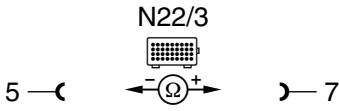

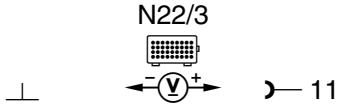
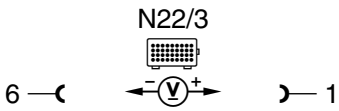
Electrical Test Program – Test (Rear A/C)

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy										
34.0	128 129 130 131	Left rear heater core temperature sensor (B10/9)	<p>N22/3</p> 	Ignition: ON	<table border="1"> <tr> <th>°C</th> <th>V</th> </tr> <tr> <td>10</td> <td>3.1 – 3.5</td> </tr> <tr> <td>20</td> <td>2.6 – 2.9</td> </tr> <tr> <td>30</td> <td>2.0 – 2.4</td> </tr> <tr> <td>45</td> <td>1.3 – 1.7</td> </tr> </table>	°C	V	10	3.1 – 3.5	20	2.6 – 2.9	30	2.0 – 2.4	45	1.3 – 1.7	⇒ 34.1.
°C	V															
10	3.1 – 3.5															
20	2.6 – 2.9															
30	2.0 – 2.4															
45	1.3 – 1.7															
34.1		Left rear heater core temperature sensor (B10/9)	<p>N22/3</p> 	Ignition: OFF Disconnect N22/3 from  .	<table border="1"> <tr> <th>°C</th> <th>kΩ</th> </tr> <tr> <td>10</td> <td>19.0 – 21.2</td> </tr> <tr> <td>20</td> <td>11.9 – 13.2</td> </tr> <tr> <td>30</td> <td>7.7 – 8.4</td> </tr> <tr> <td>45</td> <td>4.2 – 4.6</td> </tr> </table>	°C	kΩ	10	19.0 – 21.2	20	11.9 – 13.2	30	7.7 – 8.4	45	4.2 – 4.6	Wiring, B10/9, Rear A/C pushbutton control module (N22/3).
°C	kΩ															
10	19.0 – 21.2															
20	11.9 – 13.2															
30	7.7 – 8.4															
45	4.2 – 4.6															
35.0	132 133 134 135	Right rear heater core temperature sensor (B10/10)	<p>N22/3</p> 	Ignition: ON	<table border="1"> <tr> <th>°C</th> <th>V</th> </tr> <tr> <td>10</td> <td>3.1 – 3.5</td> </tr> <tr> <td>20</td> <td>2.6 – 2.9</td> </tr> <tr> <td>30</td> <td>2.0 – 2.4</td> </tr> <tr> <td>45</td> <td>1.3 – 1.7</td> </tr> </table>	°C	V	10	3.1 – 3.5	20	2.6 – 2.9	30	2.0 – 2.4	45	1.3 – 1.7	⇒ 35.1.
°C	V															
10	3.1 – 3.5															
20	2.6 – 2.9															
30	2.0 – 2.4															
45	1.3 – 1.7															
35.1		Right rear heater core temperature sensor (B10/10)	<p>N22/3</p> 	Ignition: OFF Disconnect N22/3 from  .	<table border="1"> <tr> <th>°C</th> <th>kΩ</th> </tr> <tr> <td>10</td> <td>19.0 – 21.2</td> </tr> <tr> <td>20</td> <td>11.9 – 13.2</td> </tr> <tr> <td>30</td> <td>7.7 – 8.4</td> </tr> <tr> <td>45</td> <td>4.2 – 4.6</td> </tr> </table>	°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.
°C	kΩ															
10	19.0 – 21.2															
20	11.9 – 13.2															
30	7.7 – 8.4															
45	4.2 – 4.6															

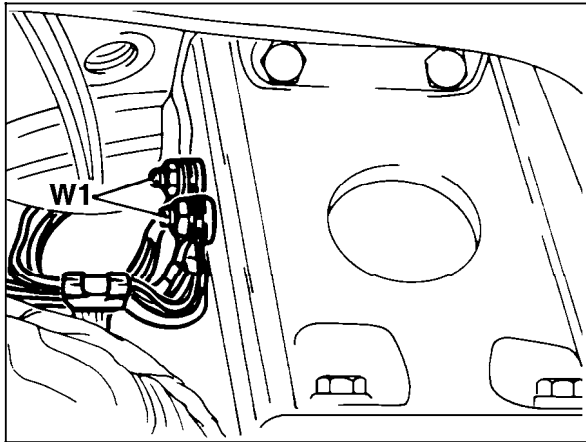
Electrical Test Program – Test (Rear A/C)

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
40.0	148 149 150 151 152 153	Coolant circulation pump (A31/1m1)	<p>N22/3</p> 	Ignition: ON Both temperature selector wheels at: Red detent Blue detent	11 – 14 V < 1 V	Wiring, ⇒ 40.1.
40.1		Coolant circulation pump (A31/1m1)	<p>A31/1m1</p> 	Ignition: OFF Connector 2 disconnected from A31/1m1.	2 – 4 Ω	A31/1m1, Rear A/C pushbutton control module (N22/3).
41.0	160 161 162 163	Right duovalve (A31/1y2)	<p>N22/3</p> 	Ignition: ON Both temperature selector wheels at: Red detent Blue detent	< 1 V 11 – 14 V	Wiring, ⇒ 42.1, N22/3.

Electrical Test Program – Test (Rear A/C)

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
42.0	156 157 158 159	Left duovalve (A31/1y1)	<p>N22/3</p> 	Ignition: ON Both temperature selector wheels at: Red detent Blue detent	< 1 V 11 – 14 V	Wiring, ⇒ 42.1.
42.1		Left/right duovalve (A31/1y1, A31/1y2)	<p>N22/3</p> 	Ignition: OFF Disconnect N22/3 from  .	20 – 35 Ω	A31/1y1, A31/1y2, Rear A/C pushbutton control module (N22/3).
43.0		Rear A/C electronic blower regulator (N29/2)	<p>N22/3</p> 	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).
44.0	168 169 170 171	Rear tunnel flap vacuum valve (Y67/1)	<p>N22/3</p> 	Rear A/C: OFF Rear A/C: ON	< 1 V > 9 V	Wiring, Y67/1.

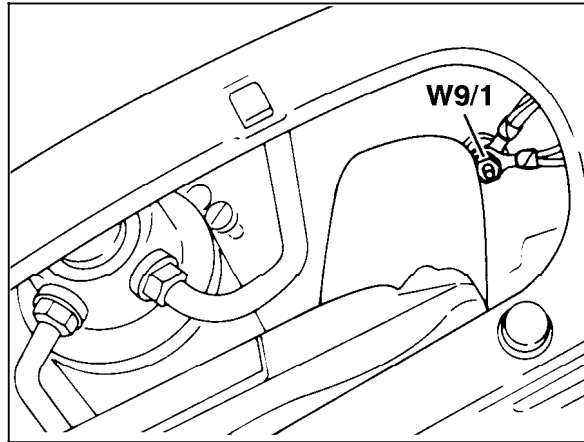
Electrical Test Program – Test



P83-3307-13

Figure 1

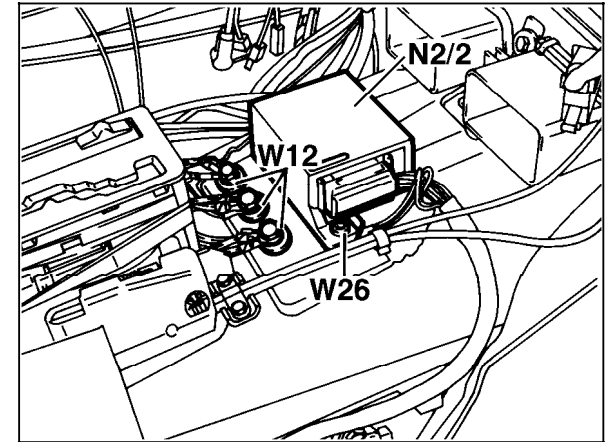
W1 Main ground (behind instrument cluster)



P83-3320-13

Figure 2

W9/1 Ground (at left headlamp unit - ignition coil)

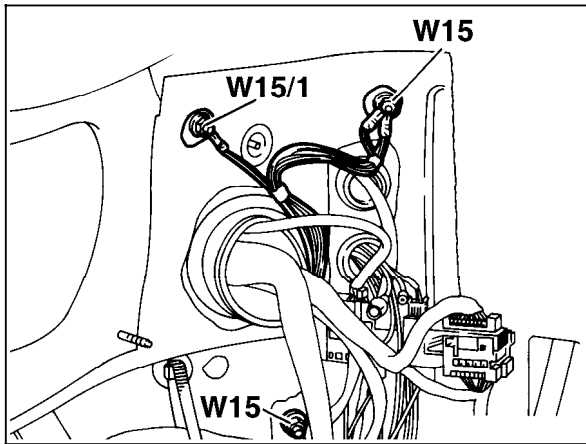


P91-2606-13

Figure 3

W12 Ground (center console)

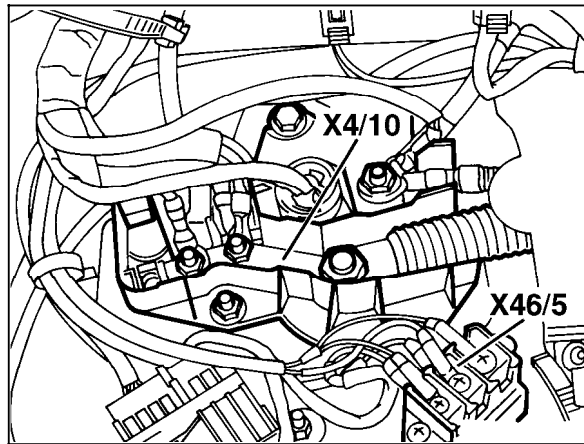
Electrical Test Program – Test



P54-2843-13

Figure 4

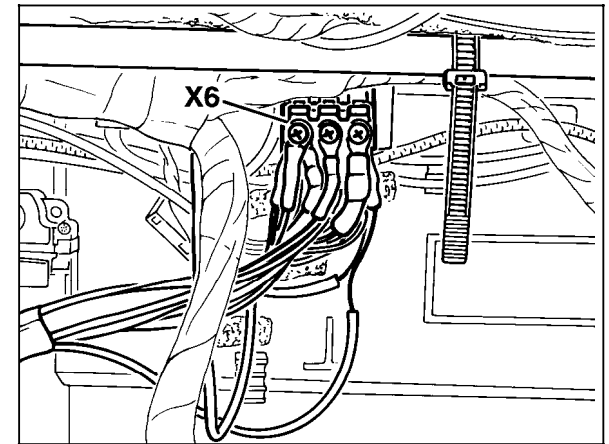
W15 Ground (electronics output ground - right footwell)



P83-3273-13

Figure 5

X4/10 Terminal block (circuit 30/Ü)
X46/5 Terminal block (right foot well)

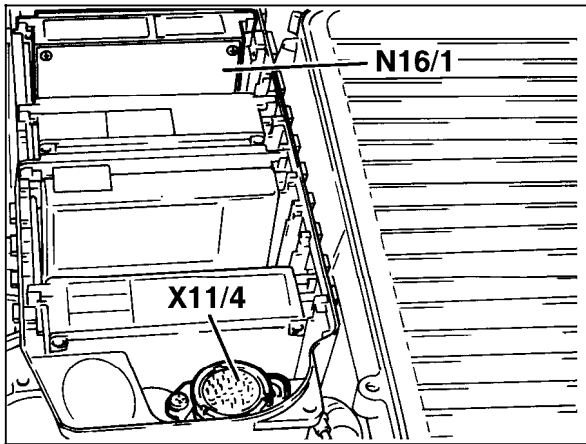


P82-3066-13

Figure 6

X6 Terminal block (circuit 58d) (3- or 4-pole)

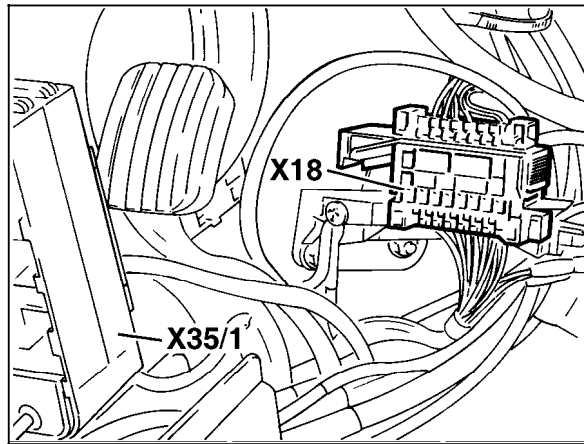
Electrical Test Program – Test



P83-3252-13

Figure 7

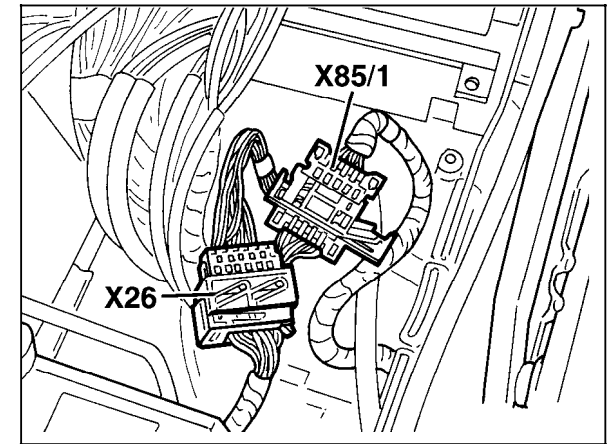
N16/1 Base module (BM)
 X11/4 Data link connector (DTC readout)



P54-2850-13

Figure 8

X18 Interior/taillamp harness connector

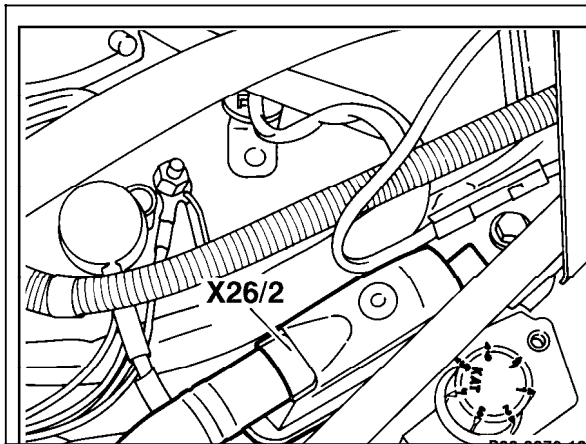


P83-5009-13

Figure 9

X26 Interior/engine connector
 X85/1 A/C harness/engine harness connector

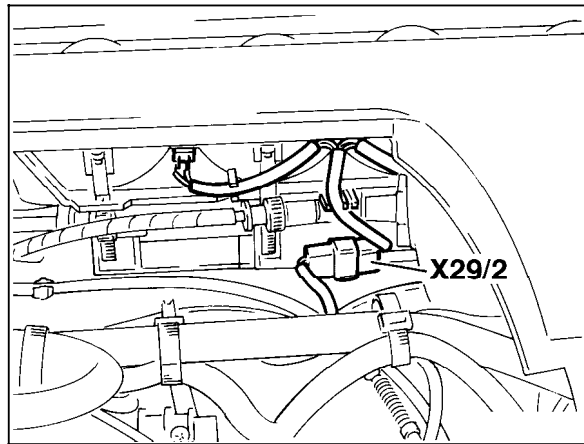
Electrical Test Program – Test



P83-3279-13

Figure 10

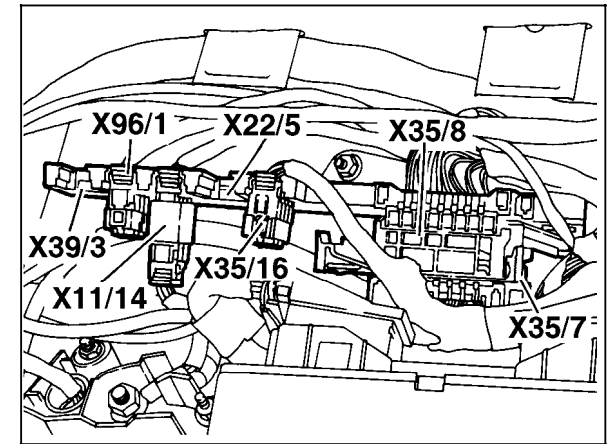
X26/2 Engine separation point connector



P83-3317-13

Figure 11

X29/2 Center air outlet illumination intermediate connector (2-pole)

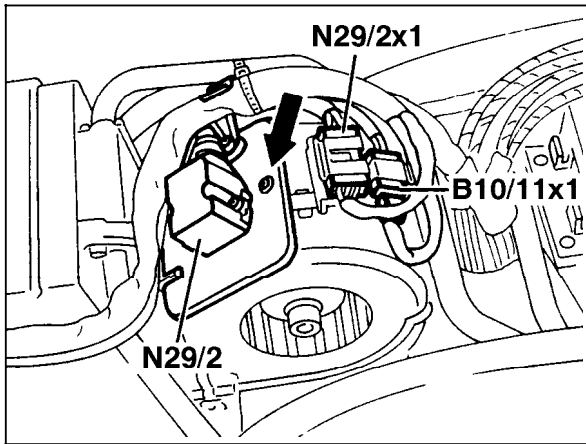


P54-2844-13

Figure 12

X35/7 Cockpit/module box separation point (18-pole)

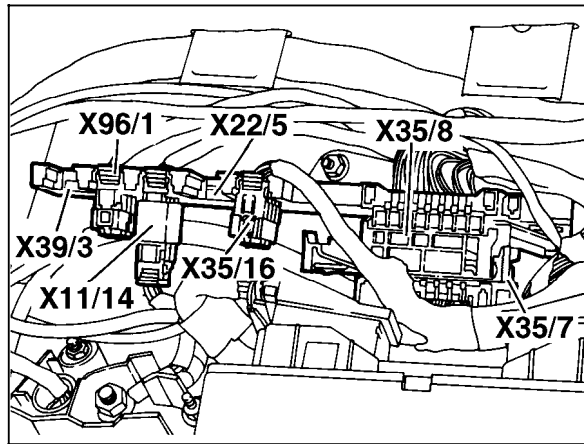
Electrical Test Program – Test



P83-5456-13

Figure 13

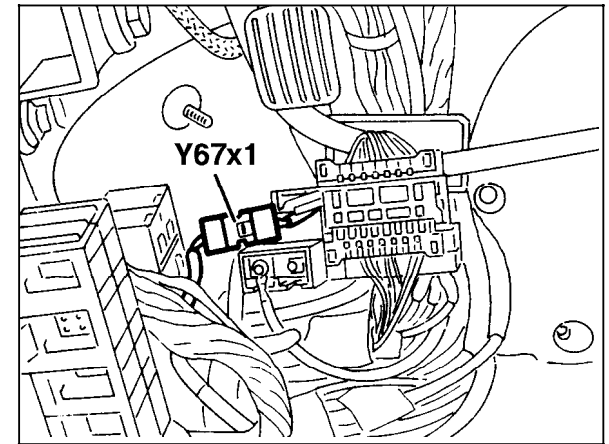
- B10/11x1 Rear evaporator temperature sensor connector
- N29/2 Rear A/C electronic blower regulator
- N29/2x1 Rear A/C electronic blower regulator connector (4-pole)



P54-2844-13

Figure 14

- X96/1 Rear A/C connector (4-pole)



P83-5457-13

Figure 15

- Y67x1 Rear refrigerant shut-off valve connector

Pneumatic Test Program – Component Locations

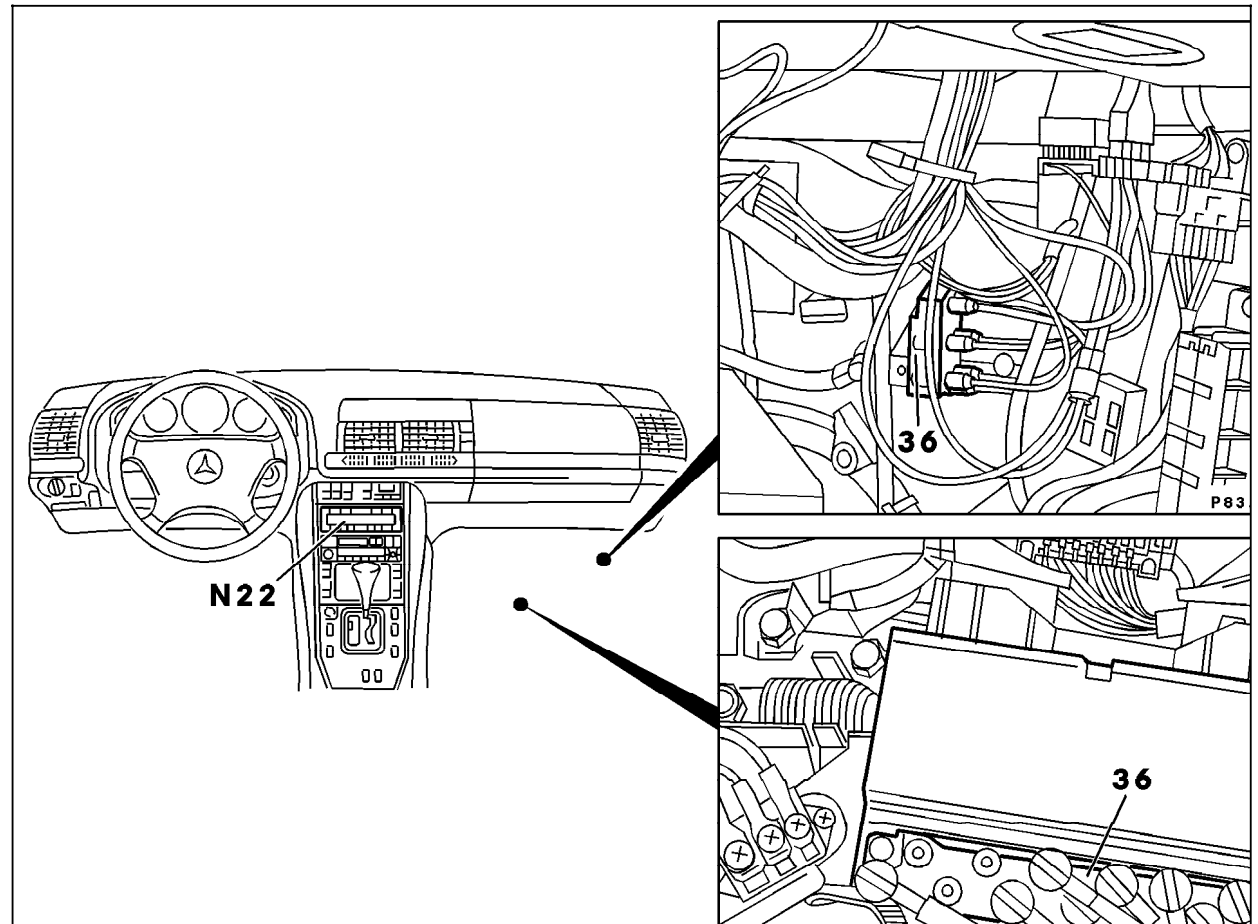


Figure 1
36 Distributor valve block

P83.40-0309-06

Pneumatic Test Program – Component Locations

Vehicles up to Chassis End No. 1A 123445

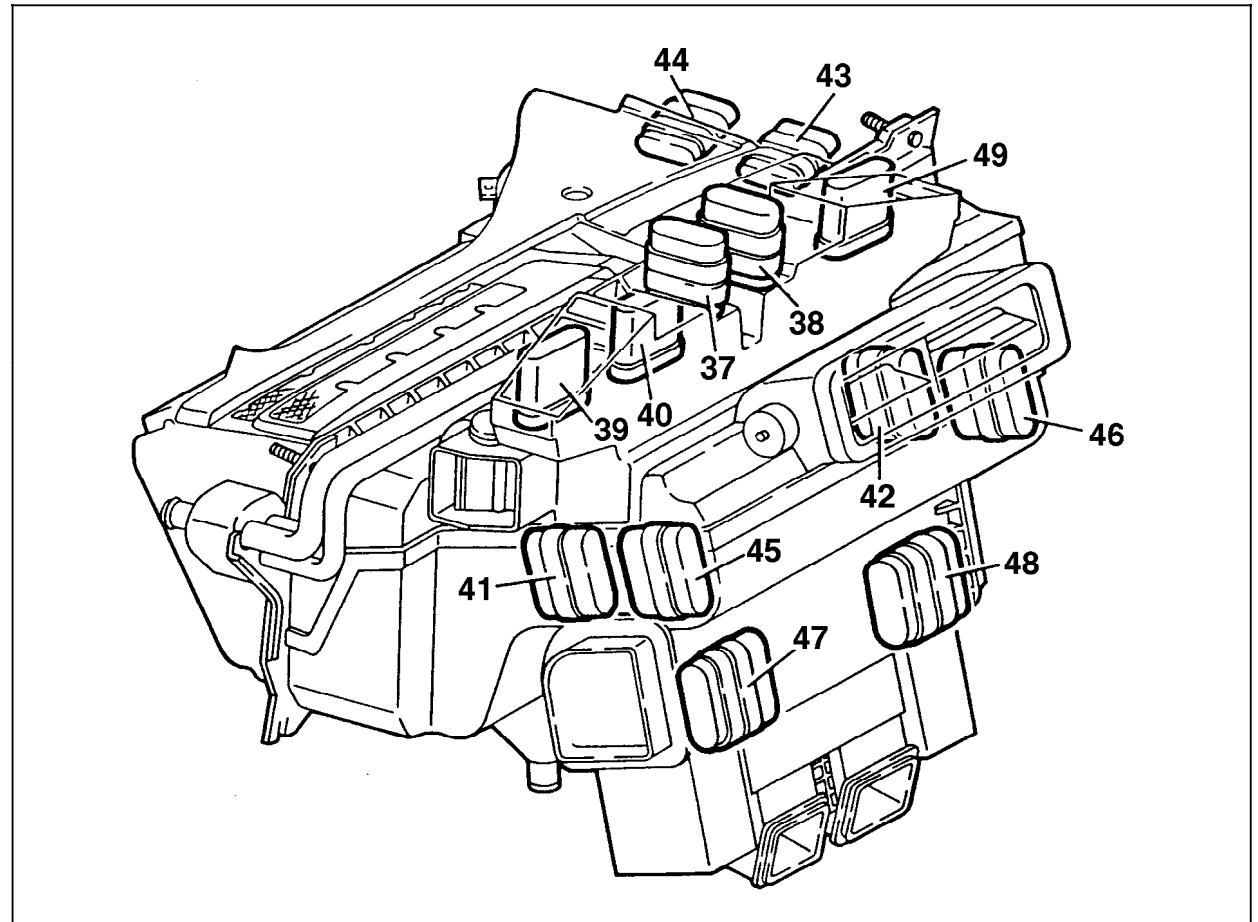


Figure 2

- 37 Left defroster flap vacuum actuator
- 38 Right defroster flap vacuum actuator
- 39 Diverter flap, left side air outlet vacuum actuator
- 40 Diverter flap, right side air outlet vacuum actuator
- 41 Diverter flap, left center air outlet vacuum actuator
- 42 Diverter flap, right center air outlet vacuum actuator
- 43 Main air flap, rear 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

P83-5476-57

Pneumatic Test Program – Component Locations

Vehicles starting Chassis End No. 1A
123446 up to 182367

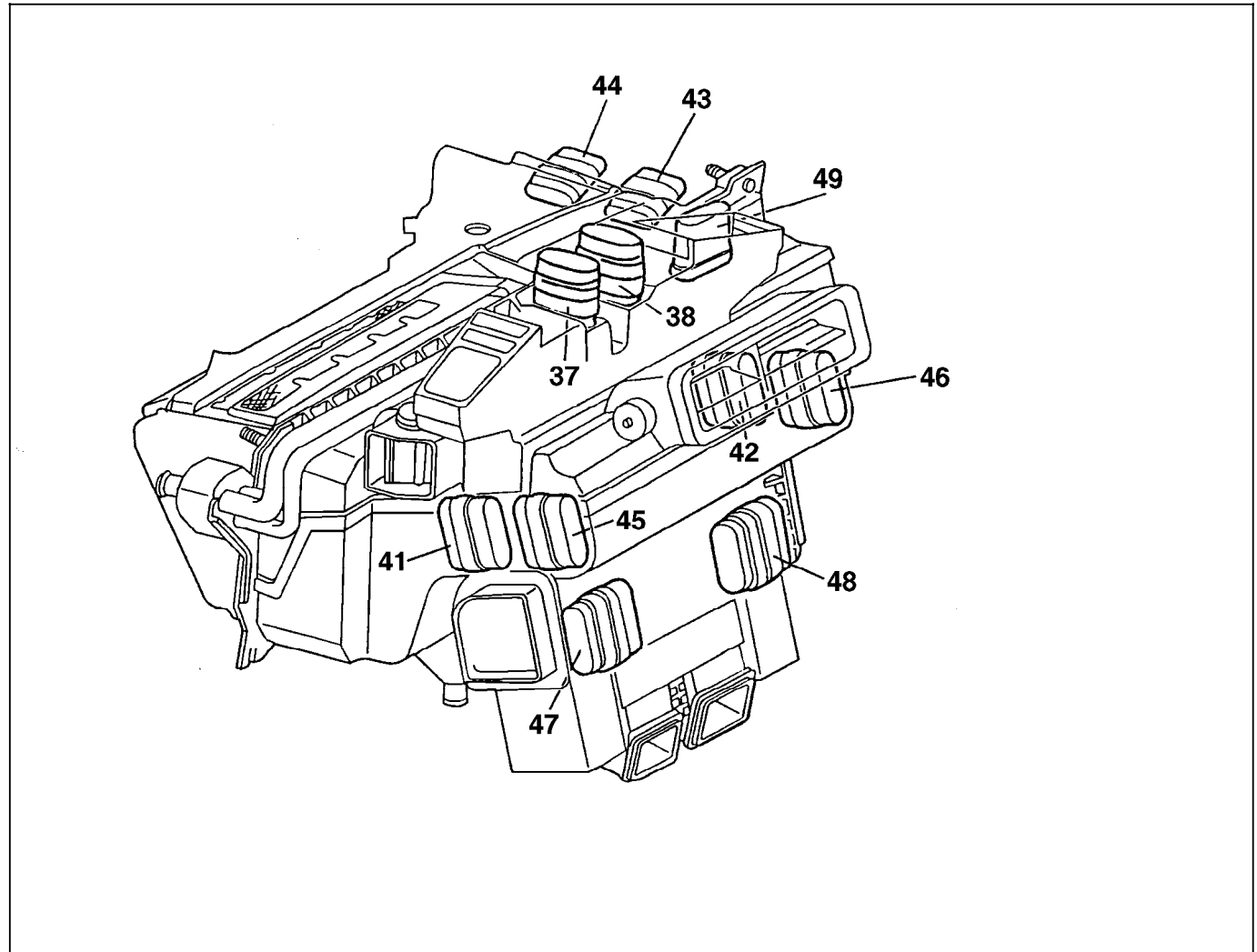


Figure 3

- 37 Left defroster flap vacuum actuator
- 38 Right defroster flap vacuum actuator
- 41 Diverter flap, left center air outlet vacuum actuator
- 42 Diverter flap, right center air outlet vacuum actuator
- 43 Main air flap, rear 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

P83.40-0215-06

Pneumatic Test Program – Component Locations

Vehicles up to Chassis End No.
1A 182368

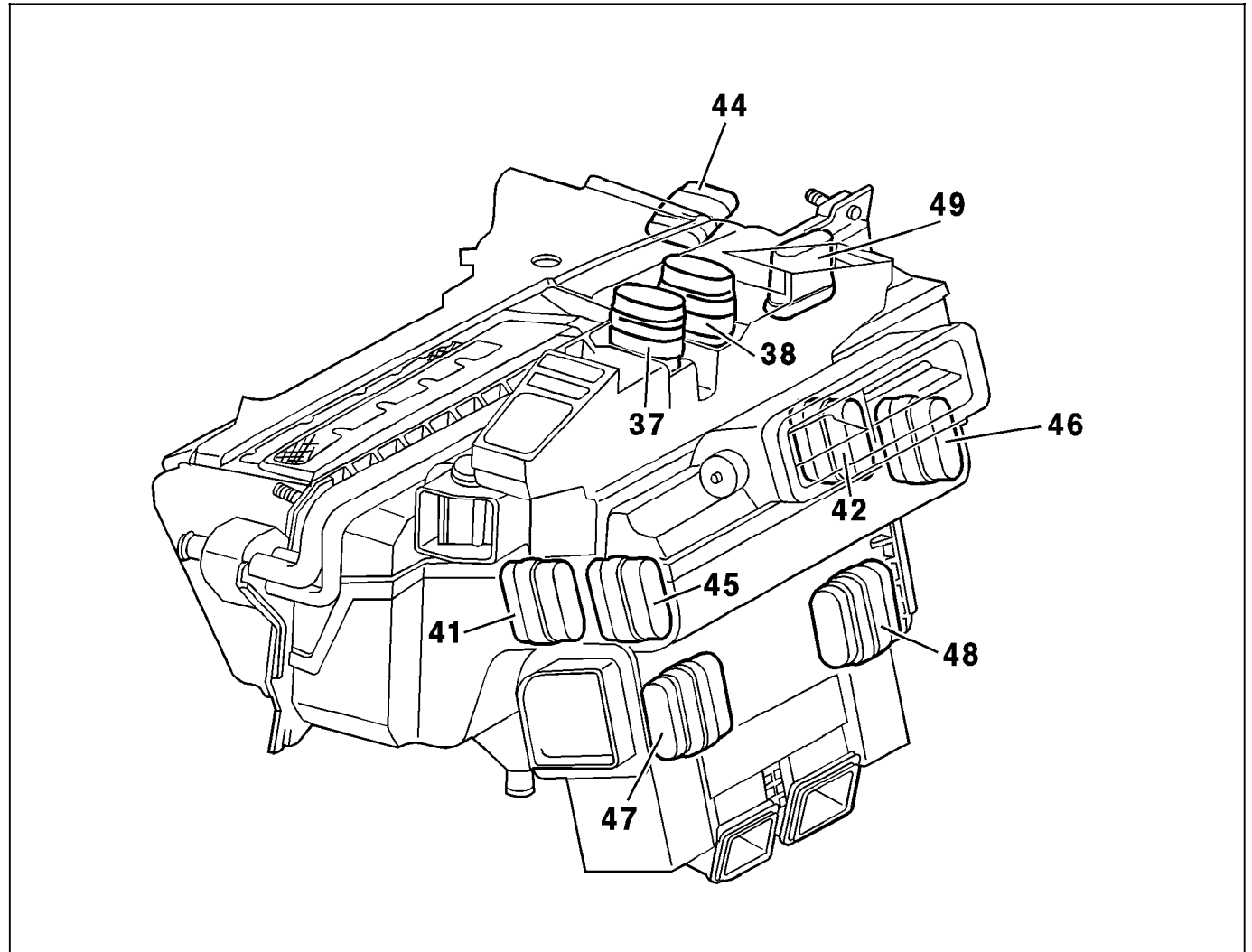


Figure 4

- 37 Left defroster flap vacuum actuator
- 38 Right defroster flap vacuum actuator
- 41 Diverter flap, left center air outlet vacuum actuator
- 42 Diverter flap, right 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

P83.40-0239-06

Pneumatic Test Program – Preparation for Test

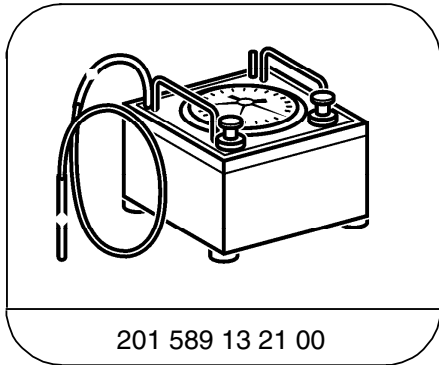
Preliminary work:

Test automatic A/C vacuum system for leaks SMS Job no. 83 – 620

- Disconnect and plug connection 5 (Y11 – switchover valve block) from the vacuum distribution block (36).
- Connect vacuum/pressure tester to the disconnected pneumatic line.
- Refer to the respective vacuum diagram in 33 depending upon the indicated code in the left display window (from 13).
- Permissible leakage of the actuators with pneumatic lines at 400 mbar vacuum per minute is 30 mbar.

Electrical Test Program – Preparation for Test

Special Tools



Tester

Conventional tools, test equipment

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

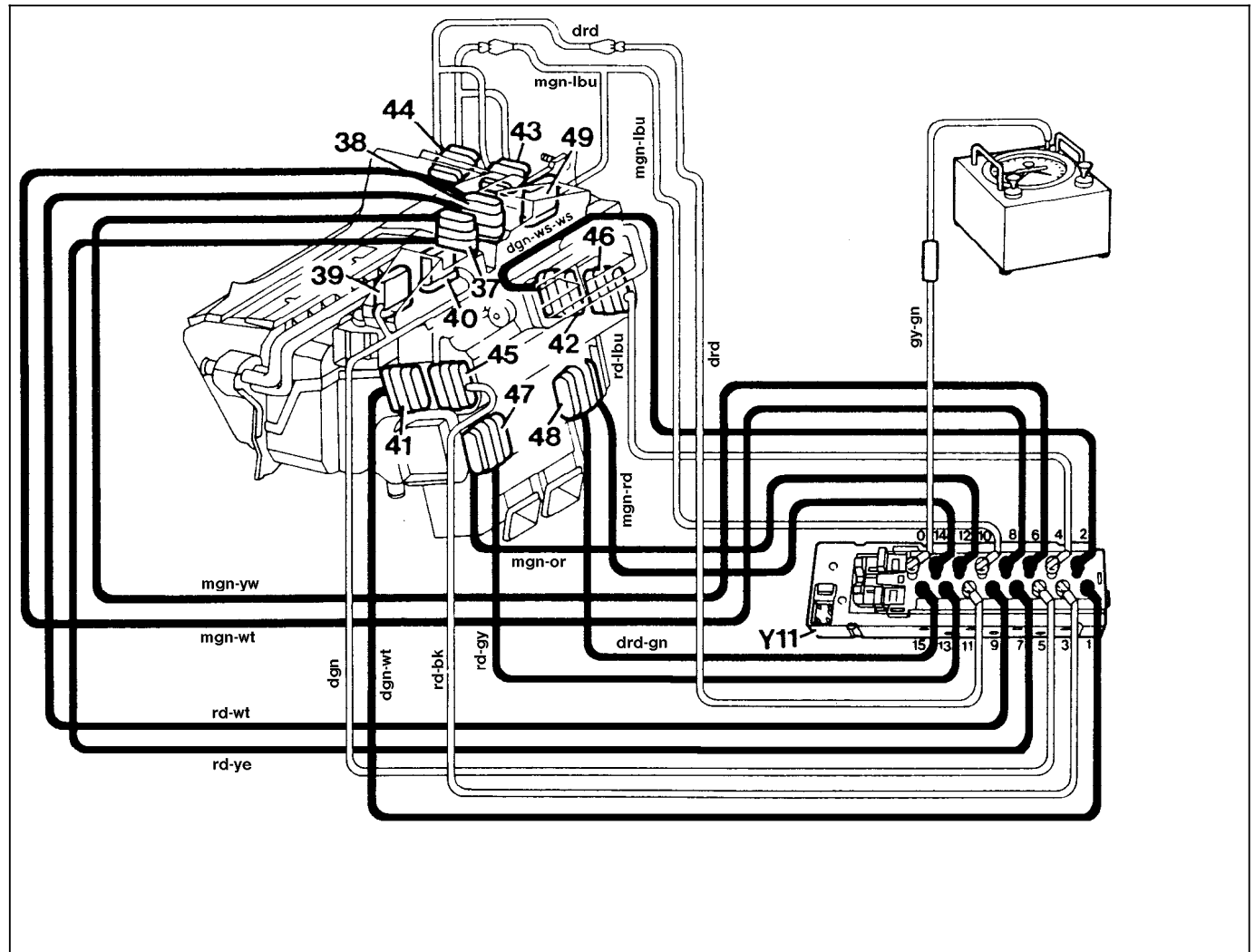
Pneumatic Test Program – Test

Test A

1. Left display code \square : vacuum actuators 37, 38, 47 and 48 (vacuum line colors medium green and red) with vacuum applied.
2. Left display code \uparrow and \square : vacuum actuators 41 and (vacuum line color dark green) with vacuum applied.
3. If the vacuum on the gauge drops, disconnect the lines with mounting base from the switchover valve block (Y11) and individually test the vacuum actuator(s) and line(s).
4. Replace any defective vacuum actuator(s) and/or pneumatic line(s).

The following prefixes may appear with line colors:

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



Vacuum diagram 1

P83-5464-57X

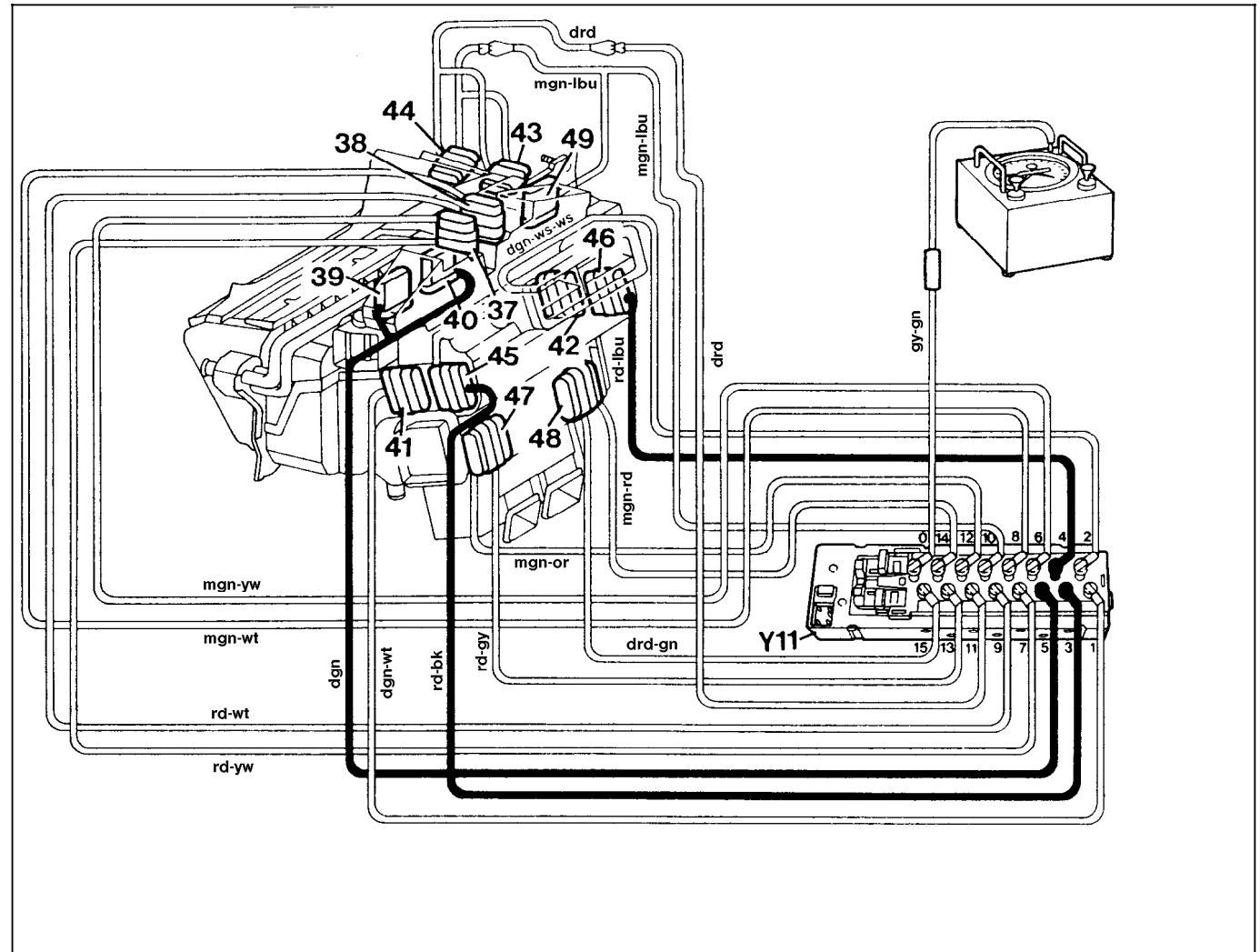
Pneumatic Test Program – Test

Test B

1. Left display code 3 and 4: Vacuum actuators 45 and 46 (vacuum line color red) with vacuum. In addition, actuators 37 and 38 (see vacuum diagram 1).
 2. Left display code 5: Vacuum actuators 39¹⁾ and 40¹⁾ (vacuum line color dark green) with vacuum applied. In addition, actuators 37 and 38 (see vacuum diagram 1) with vacuum applied.
 3. If the vacuum on the gauge drops, disconnect the lines with mounting base from the switchover valve block (Y11) (refer to SMS 83-566) and individually test the vacuum actuator(s) and line(s).
 4. Replace any defective vacuum actuator(s) and/or pneumatic line(s).
- 1) Up to VIN 1A 123445

The following prefixes may appear with line colors:

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

P83-5465-57X

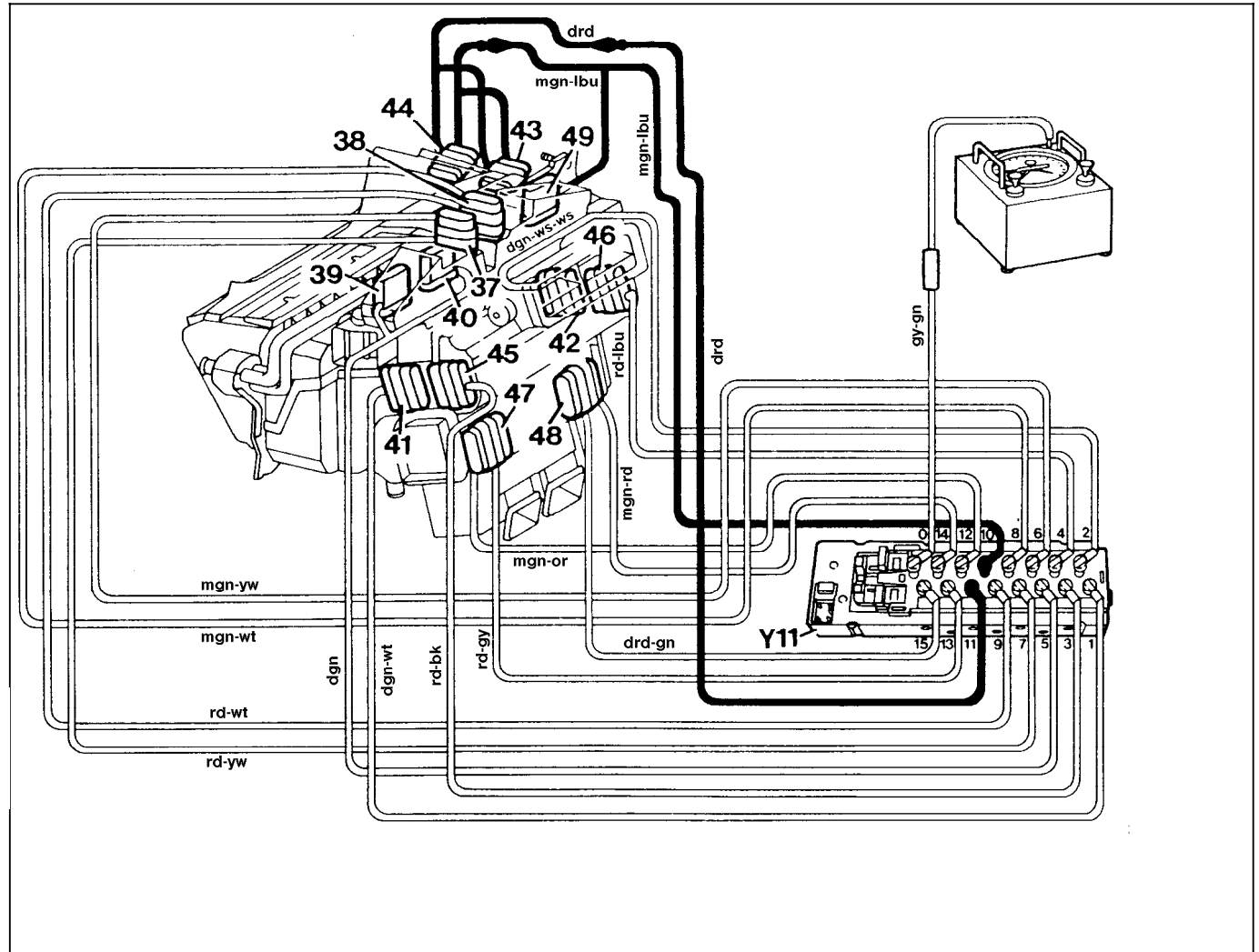
Pneumatic Test Program – Test

Test C

1. Left display code I□ and II: Vacuum actuators 43, 44 and 49 (vacuum line colors dark red and medium green) with vacuum. In addition, actuators 45 and 46 with vacuum applied (see vacuum diagram 2).
2. If the vacuum on the gauge drops, disconnect the lines with mounting base from the switchover valve block (Y11) and individually test the vacuum actuator(s) and line(s).
3. Replace any defective vacuum actuator(s) and/or pneumatic line(s).

The following prefixes may appear with line colors:

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



Vacuum diagram 3

P83-5463-57X