



2.3 Model 202 (202.024) as of M.Y. 1999

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Diagnosis – Function Test

Preparation for Test

1. Review 14, 15, 21, 22, 31, 32, 41, 42,
2. Check condition of fuses.
3. 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.
4. 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).
5. Outside air temperature > 15° C (58° F).
6.  button on A/C pushbutton control module (N19) is **not illuminated**.
7. Manually open center and side air outlets.
8. Ensure that the  button is not depressed.
9. Set blower fan to stage 3.

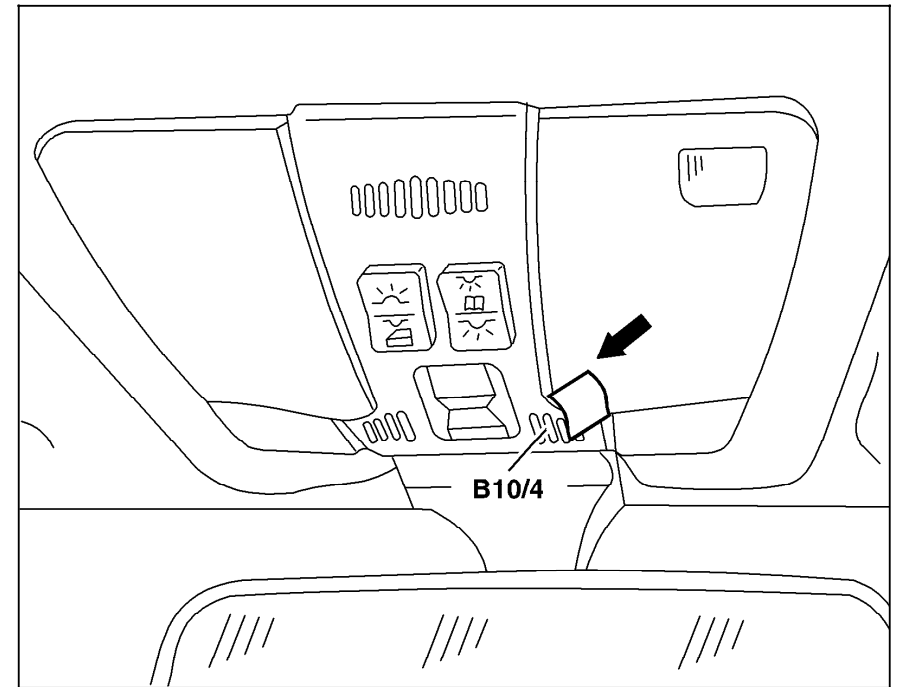


Figure 1

P83.30-3100-11

Diagnosis – Function Test

Test step/Test sequence	Test condition	Nominal value	Possible cause/Remedy ¹⁾
⇒ 1.0 Defrost	Temperature selector wheel in "white range". EC button indicator lamp is not illuminated. Air distribution dial set at 12 o'clock position (vertical).	Air venting from center vents. Air venting from defroster outlets. A/C compressor engaged.	23, 32 ⇒ 1.0 – 3.0
⇒ 2.0 Normal ventilation in regulating mode	Temperature selector wheel in "white range". EC button indicator lamp is not illuminated. Air distribution dial set at 4 o'clock position.	Air venting from lower and upper outlets. A/C compressor engaged. Tempered air from center air outlet. Duovalve cycles at the same time and coolant circulation pump (M13) runs.	23 ⇒ 11.0, 12.0, 14.0, 15.0, 16.0, 17.0, 18.0
⇒ 3.0 Economy setting not in heating mode	Temperature selector wheel in "blue range" detent. EC button indicator lamp is illuminated. Air distribution dial set at 9 o'clock position.	Air venting from center air outlets (ambient temperature) A/C compressor not engaged.	23 ⇒ 11.0, 14.0, 15.0

¹⁾ Observe Preparation for Test, see 22.

Diagnosis – Function Test


Test step/Test sequence	Test condition	Nominal value	Possible cause/Remedy ¹⁾
⇒ 4.0 Economy setting in heating mode	Temperature selector wheel in "red range" detent. EC button indicator lamp is illuminated. Air distribution dial set at 4 o'clock position.	Heated air venting from lower, upper and center air outlets. A/C compressor not engaged.	23 ⇒ 11.0, 14.0, 15.0
⇒ 5.0 "REST" (residual engine heat utilization mode)	Ignition: OFF Press REST button. Temperature selector wheel in "red range". Air distribution dial set at 4 o'clock position.	Heated air venting from lower, upper and center air outlets.	23 ⇒ 12.0, 14.0, 15.0
⇒ 6.0 "A/C" Test	See A/C Test section.		51, 52
⇒ 7.0 Quality Control and Heater Output Test	See Quality Control and Heater Output Test section.	Special tools	51, 52 22

1) Observe Preparation for Test, see 22.

Diagnosis – Reading Actual Values – via Hand-Held tester (HHT)


Preparation for Test

1. Review 14, 15, 21, 22, 31, 32, 41, 42,
2. Review following page: 11/1

 Possible cause	Test step/Remedy ¹⁾
01 In-car temperature sensor with aspirator blower (B10/4)	23 ⇒ 4.0
02 Outside temperature sensor (B14)	23 ⇒ 18.0
03 Heater core temperature sensor left (B10/1)	23 ⇒ 6.0
04 Heater core temperature sensor right (B10/2)	23 ⇒ 7.0
05 Evaporator temperature sensor (B10/6)	23 ⇒ 5.0
06 ECT sensor (DFI, IFI) (B11/4)	23 ⇒ 18.0
07 Refrigerant pressure sensor (B12)	23 ⇒ 8.0
12 Software version (example: 37)	–
12 Software version (example: 08)	–

¹⁾ Observe Preparation for Test, see 22.

Version Coding

Indication in  1)	Version
	□ With serial interface K1 and K2
	Auxiliary fan not installed as of 06/96
	⌘ Coolant circulation pump (M13) not installed.

1) Version coding menu.

Diagnosis – Diagnostic Trouble Code (DTC) Memory

Notes regarding Diagnostic trouble Code Memory

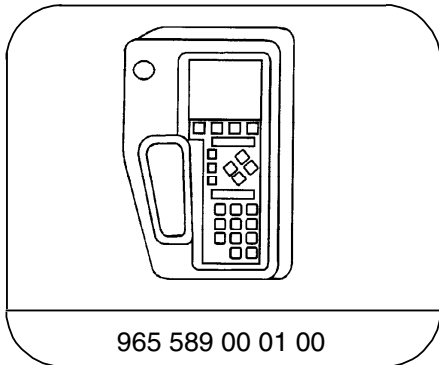
- To each fault (short circuit, open circuit etc) a certain numerical code has been assigned, i.e. Diagnostic Trouble Code (DTC). Additionally, current and intermittently appearing DTC's are differentiated from each other.
- When retrieving DTC's from the A/C pushbutton control module (N19), short circuits and open circuits can not be differentiated from each other in every case.
- If no DTC's are stored in DTC memory, but a complaint exists, it is possible that there may be a problem of incompatible tolerances between components. Since DTC memory can not read these tolerance variations, it is recommended that the entire system be completely checked, using the socket box and multimeter.

Prerequisite for reading out DTC Memory

Electrical wiring diagrams:

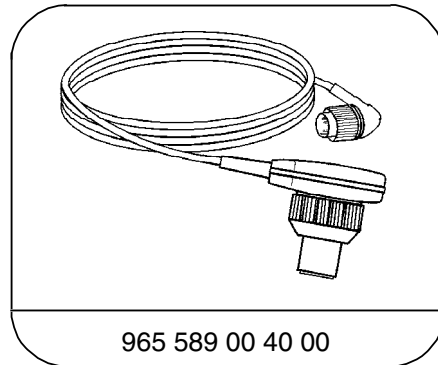
Electrical Troubleshooting Manual, Model 202/208, Vol. 2, Group 83

Special Tools



965 589 00 01 00


Hand-Held-Tester



965 589 00 40 00

Test cable

Diagnosis – Diagnostic Trouble Code (DTC) Memory

Diagnostic trouble code (DTC) 	Possible cause	Test step/Remedy ¹⁾
B1226	In-car temperature sensor (B10/4)	23⇒ 4.0
B1227	Outside temperature indicator temperature sensor (B14)	23⇒ 18.0
B1228	Heater core temperature left (B10/1)	23⇒ 6.0
B1229	Heater core temperature right (B10/2)	23⇒ 7.0
B1230	Evaporator temperature sensor (B10/6)	23⇒ 5.0
B1231	ECT sensor (B11/4)	23⇒ 18.0
B1232	Refrigerant pressure sensor (B12)	23⇒ 8.0
B1416	Coolant circulation pump (M13)	23⇒ 12.0
B1417	Left-side water valve (Y21y1)	23⇒ 14.0
B1418	Right-side water valve (Y21y2)	23⇒ 15.0
B1419	Electromagnetic clutch (A9k1)	23⇒ 11.0
B1420	Idle speed regulator	23⇒ 13.0
B1421	Auxiliary fan activation	23⇒ 9.0
B1422	Serial Interface K1	23⇒ 18.0
B1454	Fresh/recirculated air flap switch over valve (Y13)	23⇒ 17.0
B1459	Serial Interface K2 (as of 09/96)	23⇒ 19.0

1) Observe Preparation for Test, see 22.

Electrical Test Program – Component Locations

Components Location in Passenger
Compartment
Shown on Model 210

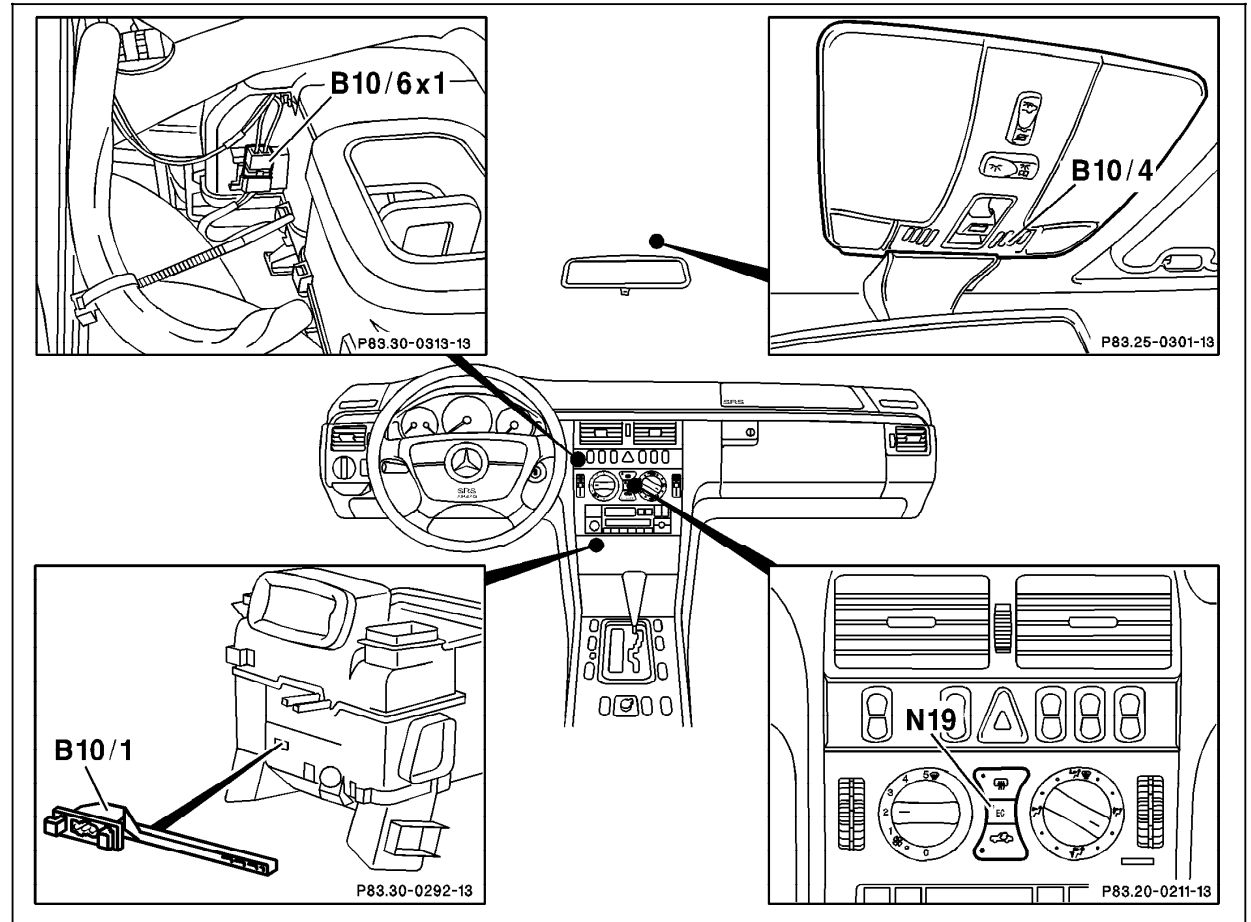


Figure 1

- B10/1 Heater core temperature sensor
- B10/4 In-car temperature sensor
- B10/6x1 Evaporator temperature sensor connector
- N19 A/C pushbutton control module

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Electrical Test Program – Component Locations

Components Location in Engine Compartment

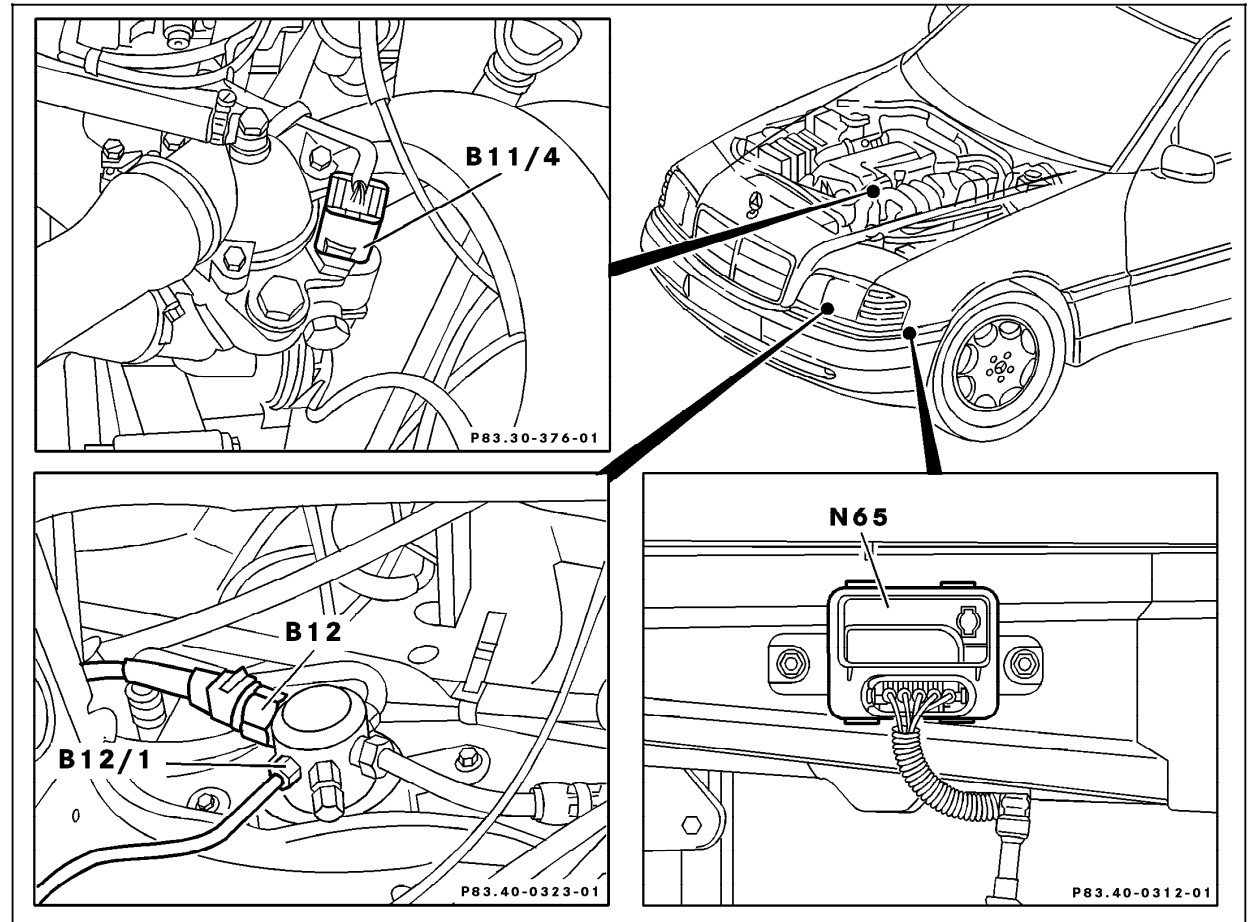


Figure 2

- B11/4 ECT sensor
- B12 Refrigerant pressure sensor
- B12/1 Refrigerant temperature sensor (with automatic A/C only)
- N65 Pulse module (traction systems, HCS, ATA, AAC)

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Electrical Test Program – Connection of Components

Connection of Components Model 202.024 with engine 111.975

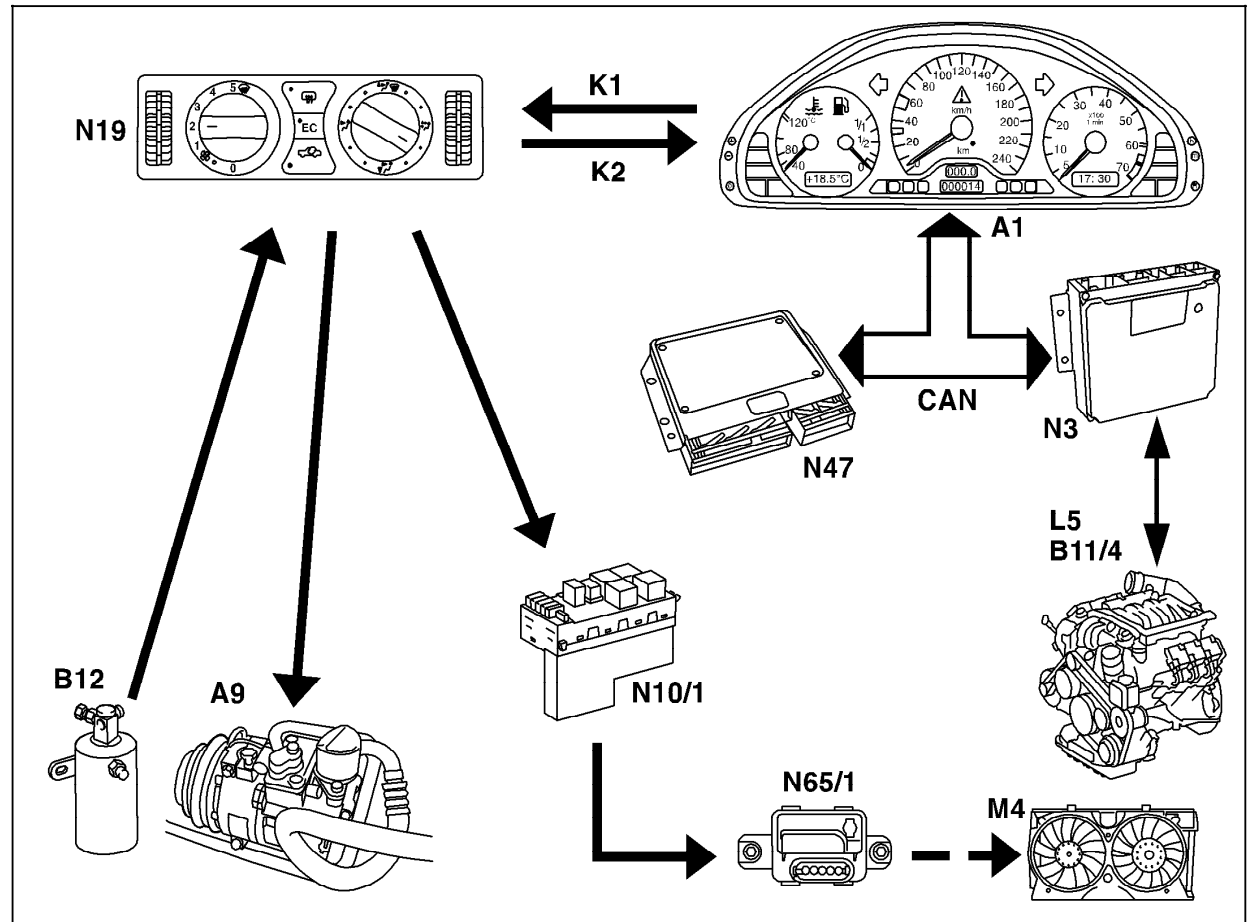


Figure 1

- A1 Instrument cluster
- A9 A/C compressor
- B11/4 ECT sensor (DIFI, IFI)
- B12 Refrigerant pressure sensor
- L5 CKP sensor
- K1 Serial Interface
- K2 Serial Interface
- M4 Auxiliary fan
- N3 Injection system control module
- N10/1 Signal pick-up and activation module (SAM) left front
- N19 A/C pushbutton control module (Tempmatic A/C)
- N47 Traction system control module
- N65/1 Air control module

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Electrical Test Program – Component Locations

Connection of Components for
Auxiliary Fan (M4) regulation

Model 202.024 with engine 111.975

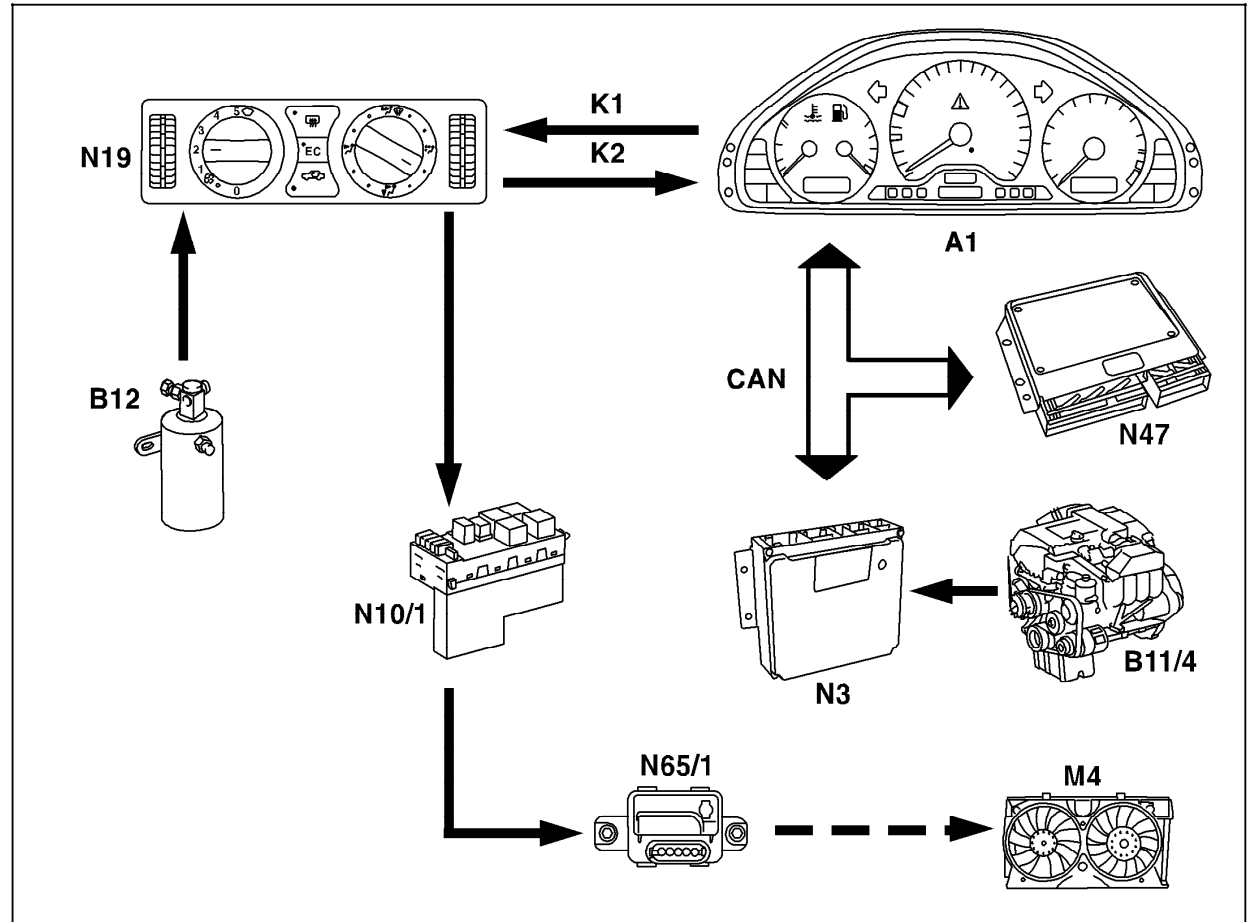


Figure 2

- A1 Instrument cluster
- B11/4 ECT sensor (DIFI, IFI)
- B12 Refrigerant pressure sensor
- M4 Auxiliary fan
- N3 Injection system control module
- N10/1 Signal pick-up and activation module (SAM) left front
- N19 A/C pushbutton control module (Tempmatic A/C)
- N47 Traction system control module
- N65/1 Air control module

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Electrical Test Program – Component Locations

Connection of Components for Temperature Regulation

Model 202.024

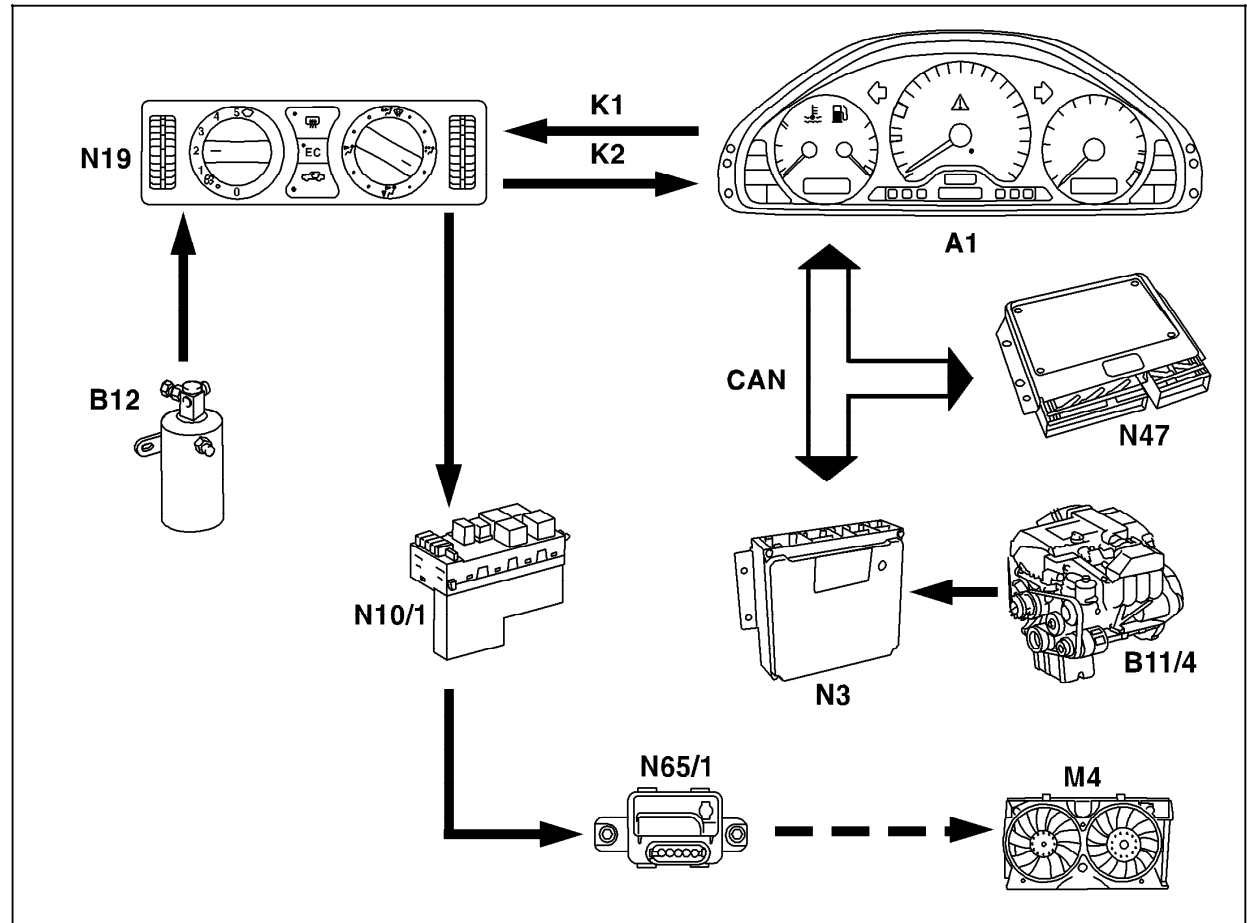


Figure 3

- A1 Instrument cluster
- A32m1 Blower motor
- B10/1 Heater core temperature sensor
- B10/4 In-car temperature sensor
- B10/6 Evaporator temperature sensor
- B14 Outside temperature indicator temperature sensor
- B32 Sun sensor
- M13 Coolant circulation pump
- N19 A/C pushbutton control module
- Y21 Duovalve

P83.30-3128-06

Electrical Test Program – Preparation for Test

Preparation for Test:

1. Remove A/C pushbutton control module (N19), see AR83.25-P-1120F
2. Review "Connection Diagram - Socket box", 22/2

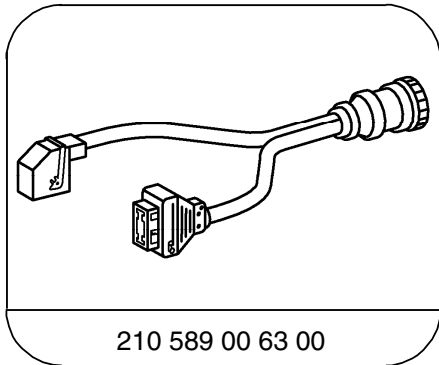


Upon completion of test, erase DTC memory from A/C pushbutton control module (N19) (see section 0).

Electrical wiring diagrams:

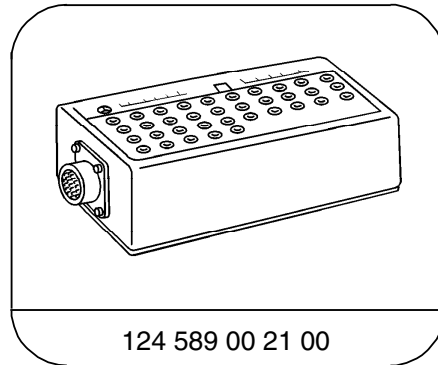
Electrical Troubleshooting Manual, Model 202/208, Vol. 2, Group 83.

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.
Digital multimeter	Fluke models 23, 77 III, 83, 85, 87

Electrical Test Program - Preparation for Test

Connection Diagram - Socket box

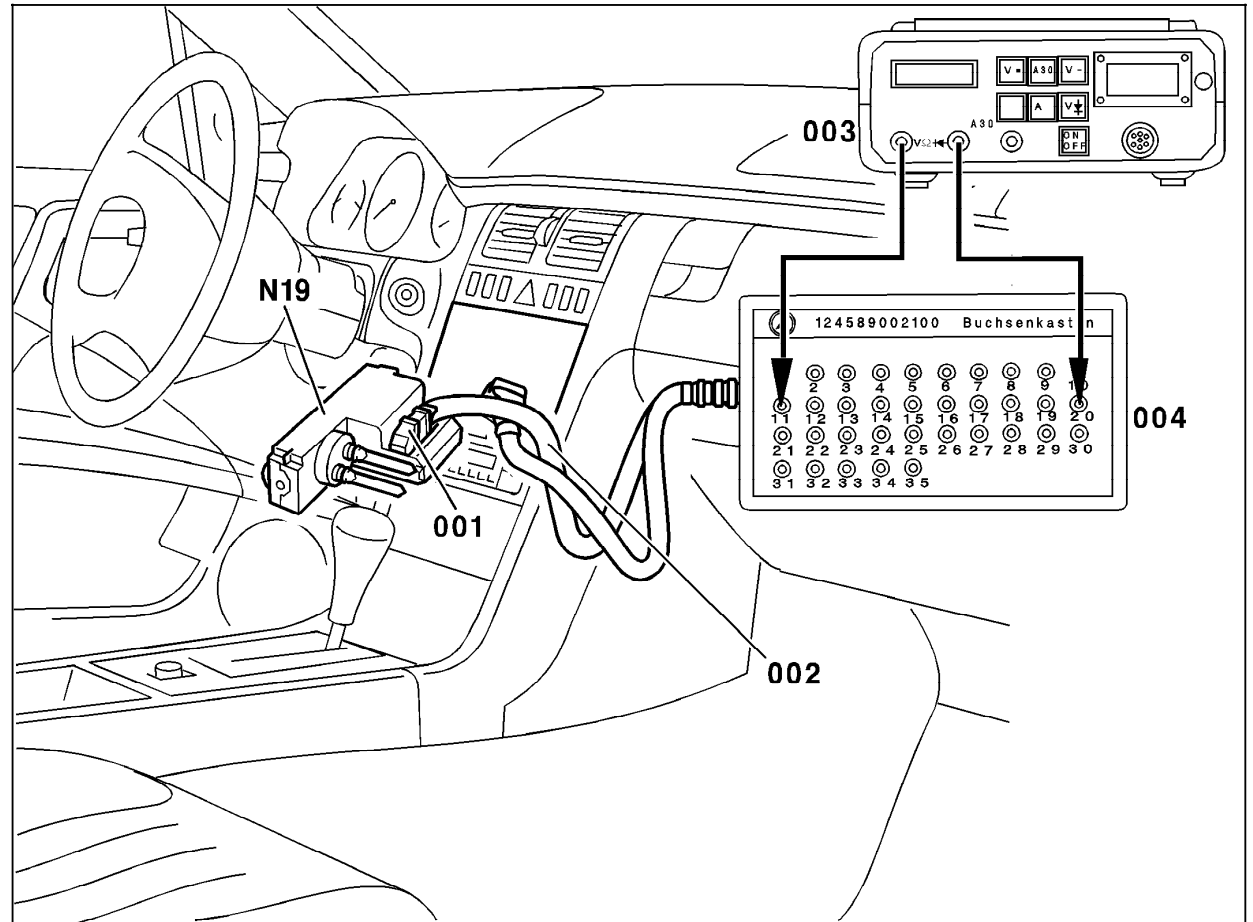


Figure 1

- 001 Right connector, A/C pushbutton control module
- 002 Test cable
- 003 Multimeter
- 004 Socket Box
- N19 A/C pushbutton control module

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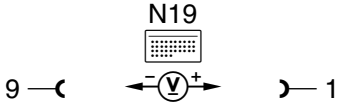


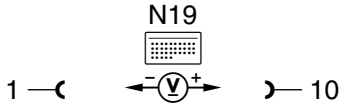


Electrical Test Program – Test

	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0	Voltage supply Circuit 30			11-14 V	Wiring, Circuit 31, ⇒ 1.1
1.1	Circuit 30			11-14 V	Wiring.
2.0	Voltage supply Circuit 15		Ignition: ON	11-14 V	Wiring.
3.0	Voltage supply Circuit 15x		Ignition: ON	11-14 V	Wiring.
4.0	In-car temperature sensor (with aspirator blower) (B10/4) Resistance		Ignition: OFF Disconnect N19 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
8.1		Voltage		Ignition: ON	4.75-5.25 V	Wiring, B12, N19
9.0	B1421	Auxiliary fan (M4) Activation		Engine: At idle Disconnect connector from refrigerant pressure sensor (B12).	>0.5 V	Wiring, Pulse module (N65), Or AIR control module (N65/1)
10.0		Diagnostic output		Ignition: ON	11-14 V	Wiring, N19
11.0	B1419	A/C compressor (A9) Activation		Engine: At idle A/C compressor: is A/C compressor: is not illuminated.	<1 V 11 – 14 V	Wiring, A9, N19
12.0	B1416	Coolant circulation pump (M13) Resistance		Ignition: OFF Disconnect connector from M13	2-4 Ω	Wiring, M13
13.0	B1420	Idle speed increase Voltage		Engine: At idle is not illuminated.	<1 V >2 V	Wiring, N19

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
14.0	B1417	Left-side water valve (Y21y1) Voltage supply		Ignition: ON Temperature selector wheels: Red range detent Blue range detent	After 15 seconds: <1 V 11 – 14 V	Wiring, ⇒ 1.1, N19
14.1		Left duovalve (Y21y1) Resistance		Ignition: OFF Disconnect N19 from  .	20-35 Ω	Y21
15.0	B1418	Right-side water valve (Y21y2) Voltage		Ignition: ON Both temperature selector wheels: Red range detent Blue range detent	<1 V 11 – 14 V	Wiring, ⇒ 1.1, N19
15.1		Right duovalve (Y21y2) Resistance		Ignition: OFF Disconnect N19 from  .	20-35 Ω	Y21

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
16.0		Blower regulator (A32n1) Voltage		Ignition: ON Blower switch in fan stage: <ol style="list-style-type: none"> 1 1.1 – 1.8 V 2 2.0 – 2.6 V 3 2.8 – 3.2 V 4 3.6 – 4.2 V 5 5.0 – 6.0 V 		Wiring, N19
17.0	B1454	Fresh/recirculated air flap switchover valve (Y13) Resistance		Disconnect from N19	45-65 Ω	Wiring.
18.0	B1422	Serial Interface K1		Engine: At Idle	> 2 V ~	Wiring.
19.0	B1459	Serial Interface K2		Engine: At Idle	> 2 V ~	Wiring.

Electrical Test Program – Test

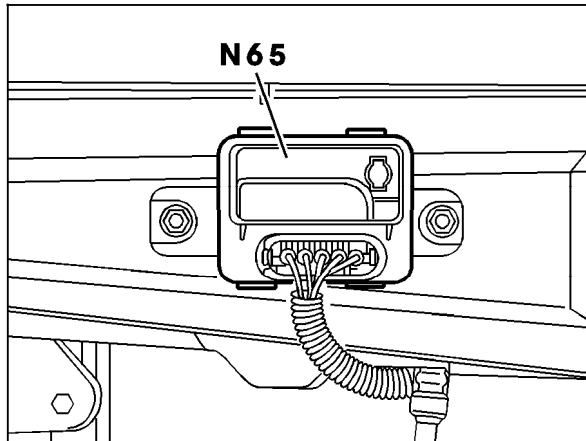


Figure 1 P83.40-0312-01

N65/1 AIR control module

Pneumatic Test Program – Component Locations

Location of Components

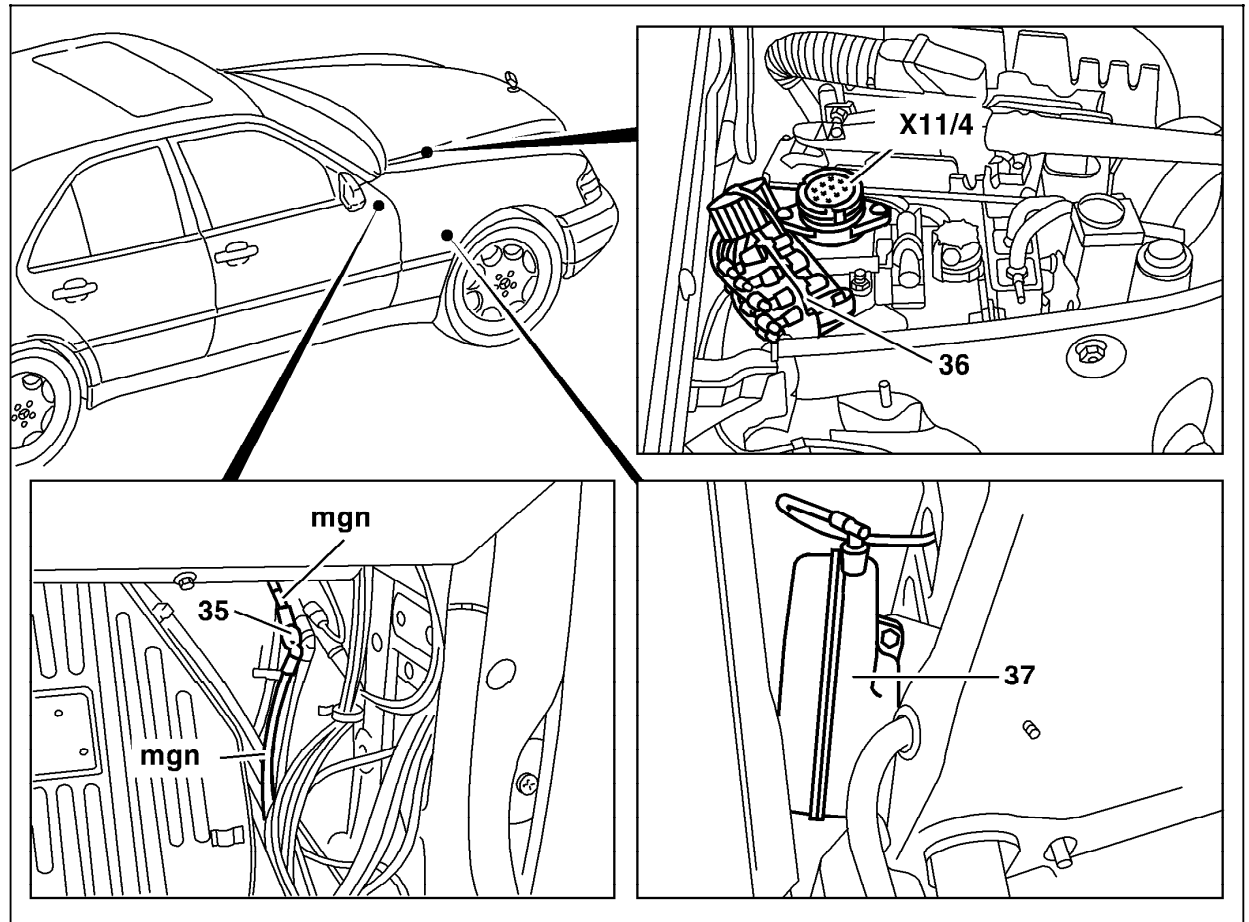


Figure 1

36 Vacuum distributor block

P83.30-3101-06

Pneumatic Test Program – Component Locations

Location of Components

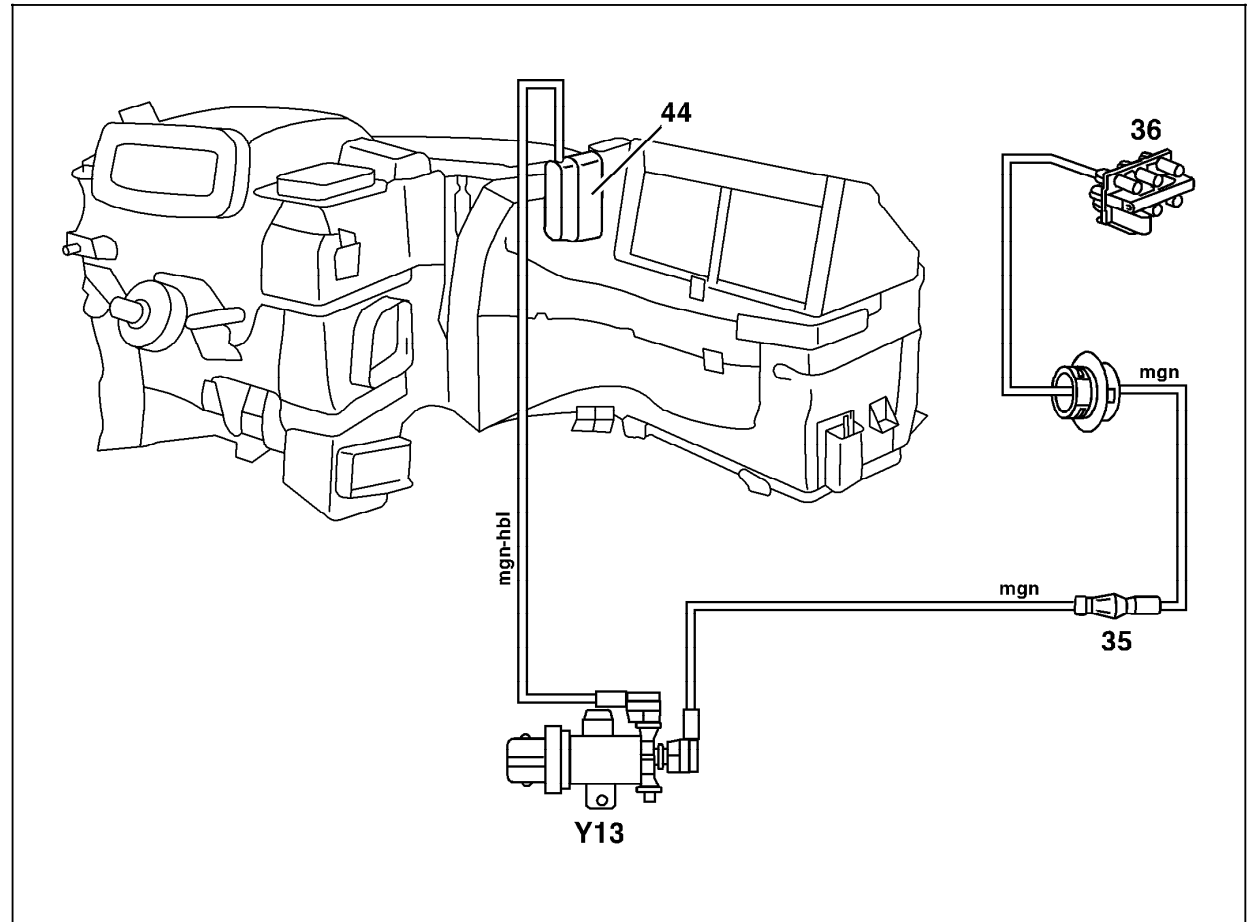


Figure 2

- 35 Separation fitting (cockpit)
- 36 Vacuum distributor block
- Y13 Fresh/recirculated air flap switchover valve
- mgn Medium green

P83.10-2006-06

Pneumatic Test Program - Preparation for Test

A. Pneumatic Test: Vacuum distribution block, Vacuum Reservoir, Fresh/recirculated Air flap Switchover Valve (Y13)

1. Disconnect all vacuum lines at vacuum distributor block (36), Figure 1.
2. Check gray vacuum line to intake manifold for leaks.

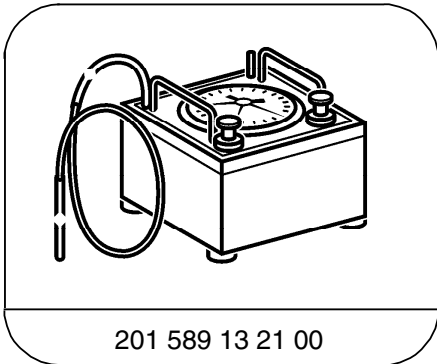


Permissible leakage of the elements with vacuum lines at 400 mbar vacuum per minute is 30 mbar.

Parts Required for Test:

- 1 Connector 129 800 95 15

Special Tools



Tester

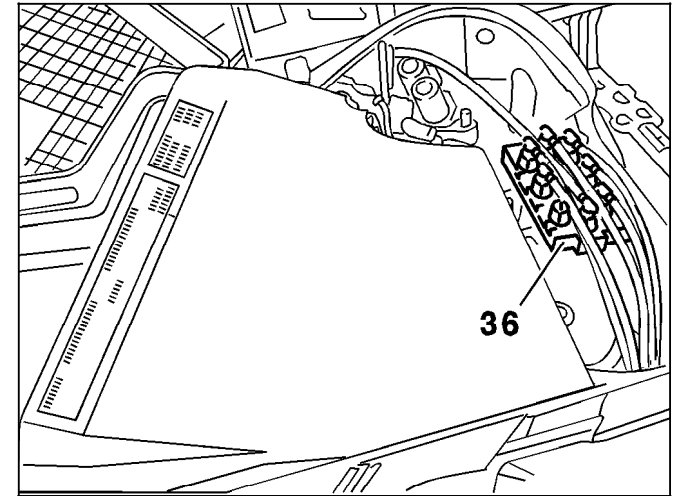


Figure 1

P83.25-0300-01

36 Vacuum distribution block

Pneumatic Test Program – Test

A. Vacuum distributor block, Vacuum Reservoir, Fresh/recirculated air flap switchover valve (Y13)

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0	Entire vacuum distributor block, See 32/1	Connection "P" on vacuum tester.	Evacuate system with 300 mbar vacuum.	30 mbar pressure increase in 1 minute.	Vacuum distributor block, ⇒ 1.1
1.1	Vacuum distributor block, Check valve "a"	Connection "1" on vacuum tester.	Evacuate system with 300 mbar vacuum.	30 mbar pressure increase in 1 minute.	Vacuum distributor block, ⇒ 1.2
1.2	Vacuum distributor block, Check valve "b"	Connection "4" on vacuum tester.	Evacuate system with 300 mbar vacuum.	30 mbar pressure increase in 1 minute	Vacuum distributor block.



Pneumatic Test Program – Test

A. Vacuum distributor block, Vacuum Reservoir, Fresh/recirculated air flap switchover valve (Y13)

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
2.0	Vacuum reservoir with vacuum line, See 32/1	Red/gray line (connection 3) on vacuum tester.	Evacuate system with 300 mbar vacuum.	30 mbar pressure increase in 1 minute	Vacuum lines, Vacuum reservoir.
3.0	Fresh/recirculated air flap switchover valve (Y13), See 32/4, (Figure 2)	Ignition: OFF Medium green line (connection 2) on vacuum tester.	Evacuate system with 300 mbar vacuum.	30 mbar pressure increase in 1 minute	Vacuum lines, Y13
4.0	Fresh/recirculated air flap vacuum actuator, See 32/4, (Figure 2, 44)		Evacuate system with 300 mbar vacuum.	30 mbar pressure increase in 1 minute	Vacuum lines, Actuator.

Pneumatic Test Program - Preparation for Test

Vacuum system

1. Ignition: **ON**
2.  stage 1
3.  button is illuminated.
4. Medium green line (connection 5) to tester.

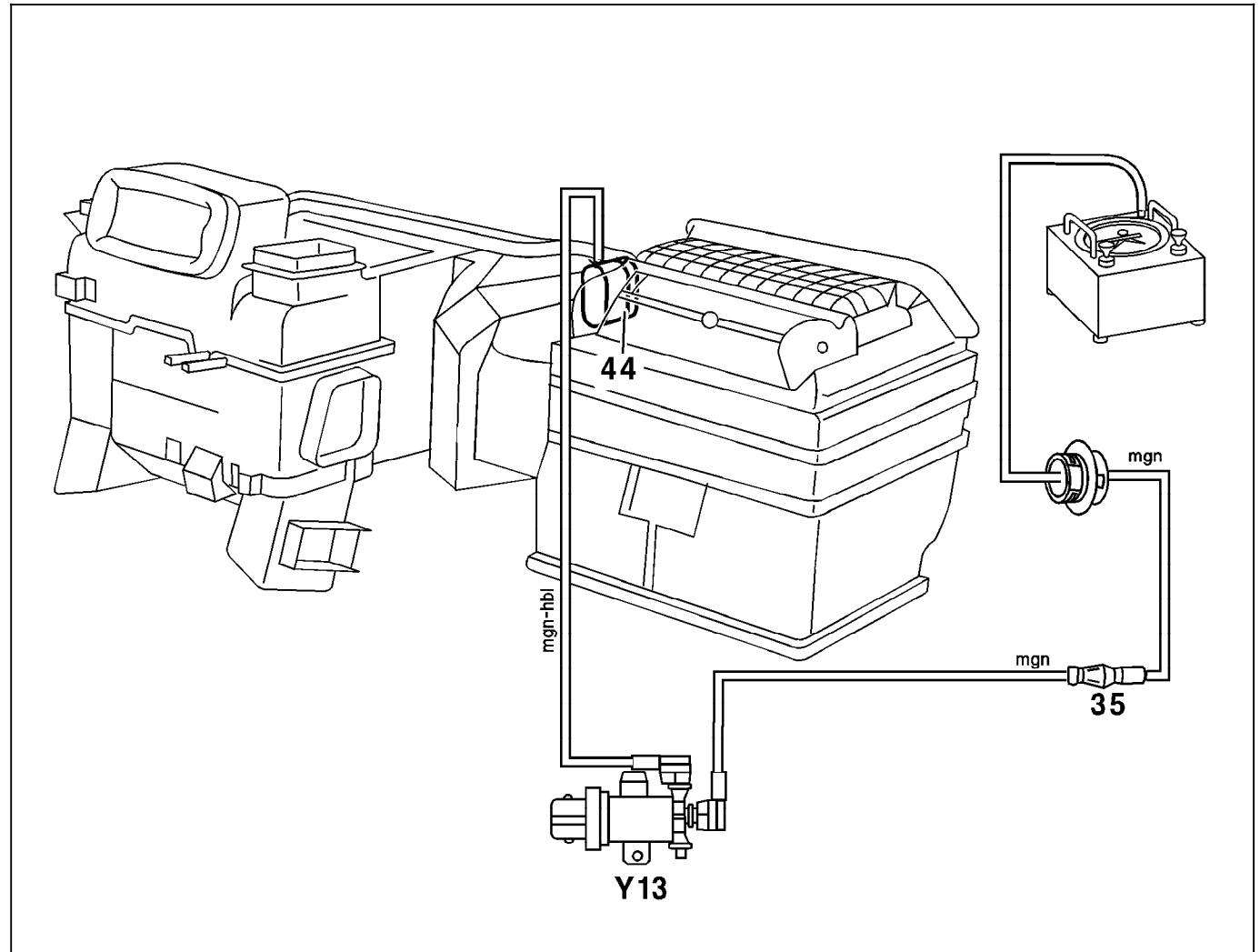


Figure 2

- | | |
|-----|--|
| 35 | Separation point (cockpit) |
| 44 | Fresh/recirculated air flap vacuum actuator |
| Y13 | Fresh/recirculated air flap switchover valve |
| mgn | Medium green |

P83.25-0303-06

Refrigeration System Test Program – Component Locations

Location of Components

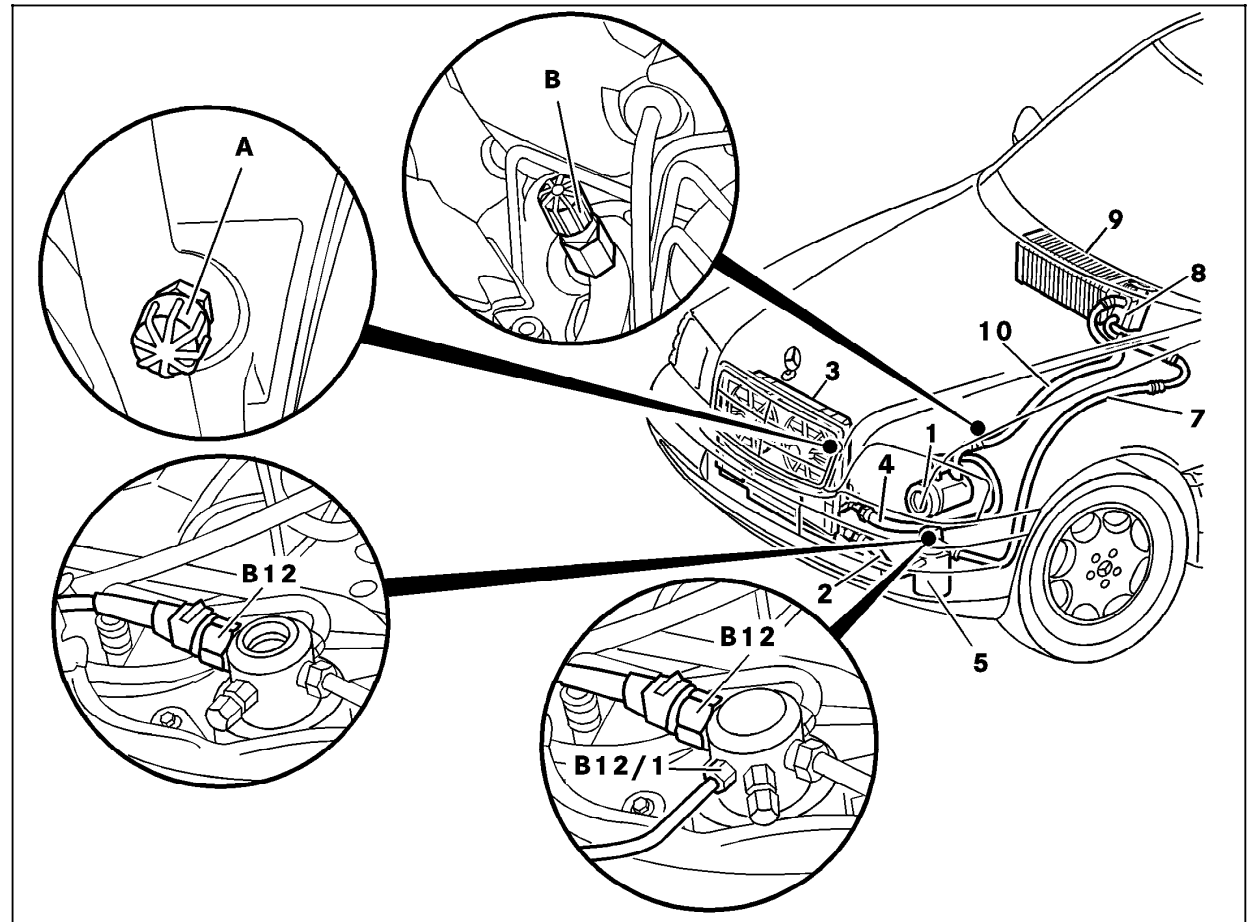


Figure 1

- A High pressure side connection
- B Low pressure side connection
- B12 Refrigerant pressure sensor
- B12/1 Refrigerant temperature sensor (automatic A/C only)
- 1 A/C compressor
- 2 High pressure hose
- 3 Condenser
- 4 High pressure hose
- 5 Receiver/drier
- 7 High pressure hose to evaporator
- 8 Expansion valve
- 9 Evaporator
- 10 Suction hose

P83.30-0390-06

Quality Control and Heater Output Test Program – Preparation for Test

1. Perform "Function Test" 11/1 and allow vehicle to stand outside overnight.
2. Install temperature probes, see Figure 1 for Quality Control and Figure 2 for Heater Output.
3. Outside air temperature < + 15° C.
4. Refrigerant temperature < + 40° C.
5. Side windows and pop-up and sliding/pop-up roof closed.
6. Attach temperature probe to right sun visor (arrow, Figure 1) and connect to multimeter, thereafter turn on multimeter.
7. Drive vehicle approx. 10 minutes before starting the measurements.
With outside air temperatures < 0° C, a longer test drive is required.

Electrical wiring diagrams :
Electrical Troubleshooting Manual, Model 202/208, Vol. 2, Group 83



Do not perform the A/C tests with the vehicle in the service shop, perform tests on vehicle which has been parked outside overnight.
Interior temperature < + 20° C.

Test equipment; See MBUSA Standard Service Equipment Program

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

¹⁾ Available through the MBUSA Standard Equipment Program.

Quality Control and Heater Output Test Program – Preparation for Test

Quality Control Test
Attach Temperature Probe

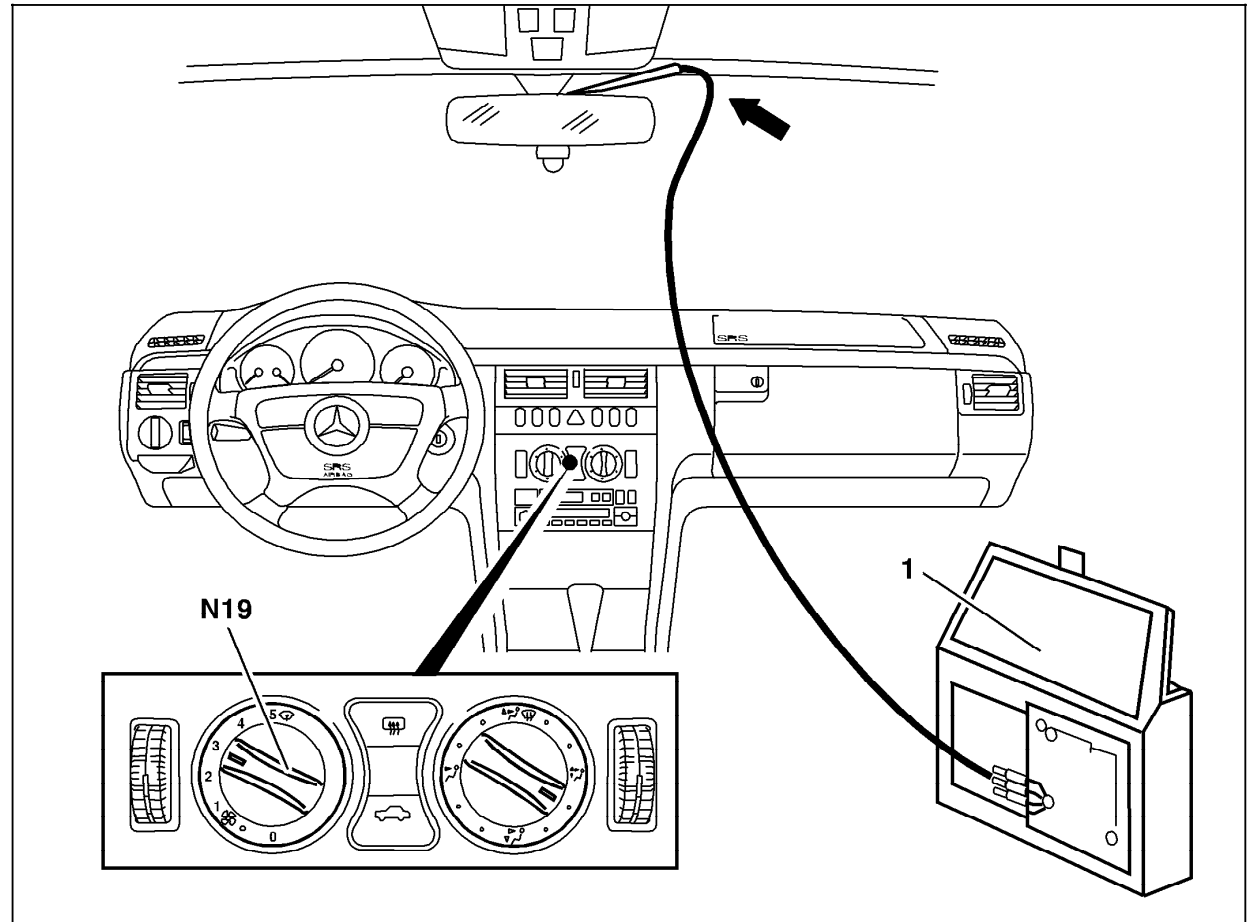


Figure 1

- 1 Temperature measuring equipment
- N19 A/C pushbutton control module
- Arrow Location (at sun visor) of temperature probe

P83.30-3103-06

Quality Control and Heater Output Test Program – Preparation for Test

Heater Output Test
Attach Temperature Probe

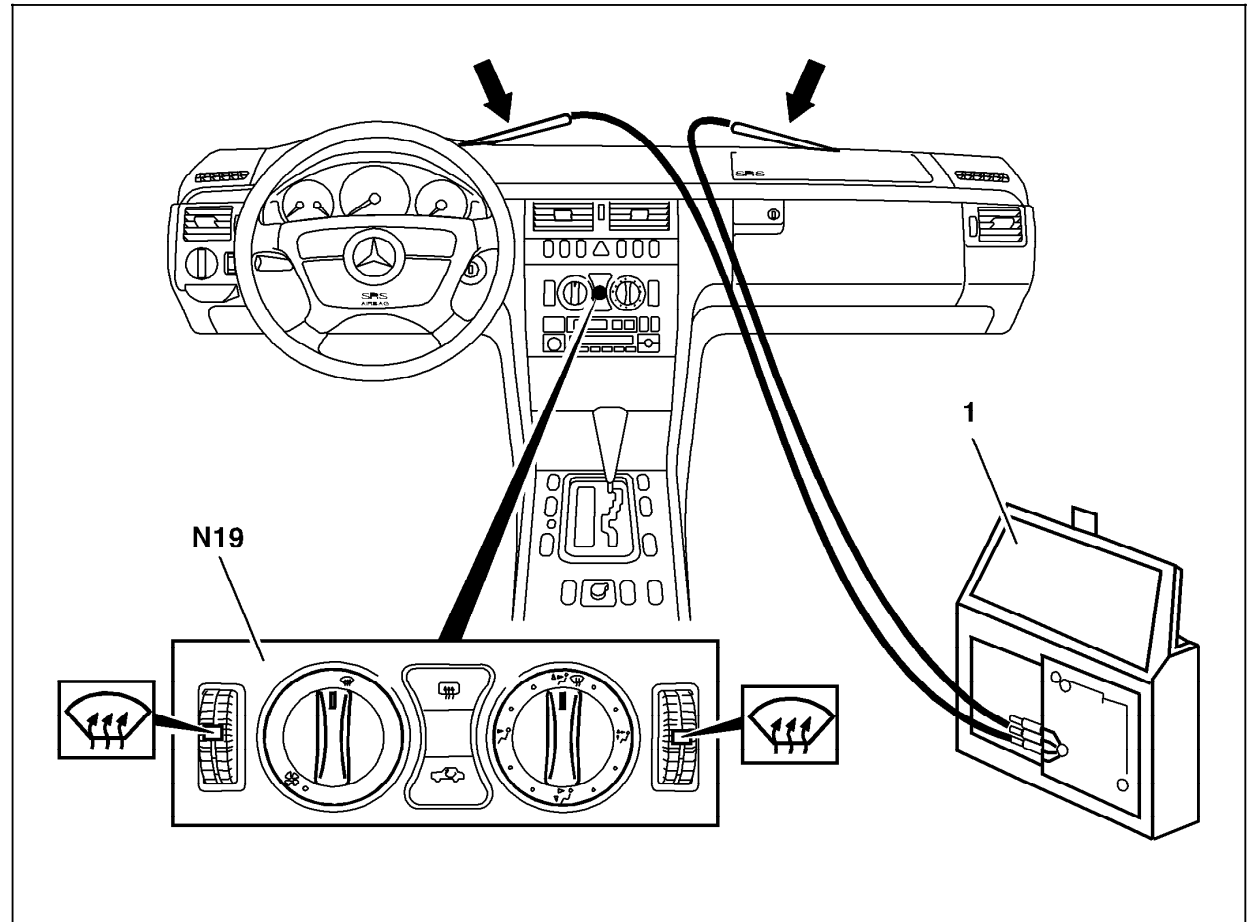


Figure 2


- 1 Temperature measuring equipment
- N18 Heater pushbutton control module
- Arrow Location (left/right defrost vent) of temperature probe

P83.30-3102-06

Quality Control and Heater Output Test Program – Test

A. Test – Quality Control

Test:

1. Review 51/1
2. Temperature selector wheel in "white field" (22° C).
3. Blower fan speed stage 3,
4. Set air distribution swith to 4 o'clock position.
5.  button is **not illuminated**.
6. Test duration > 15 minutes.
7. Engine rpm = 1,500 rpm.
8. Readout temperature measured by measuring probes.
9. Temperature measuring probe reads: 22 + 2° C



If the above noted measurements are not attained, continue test with B. "Heater Output Test", see 51/2

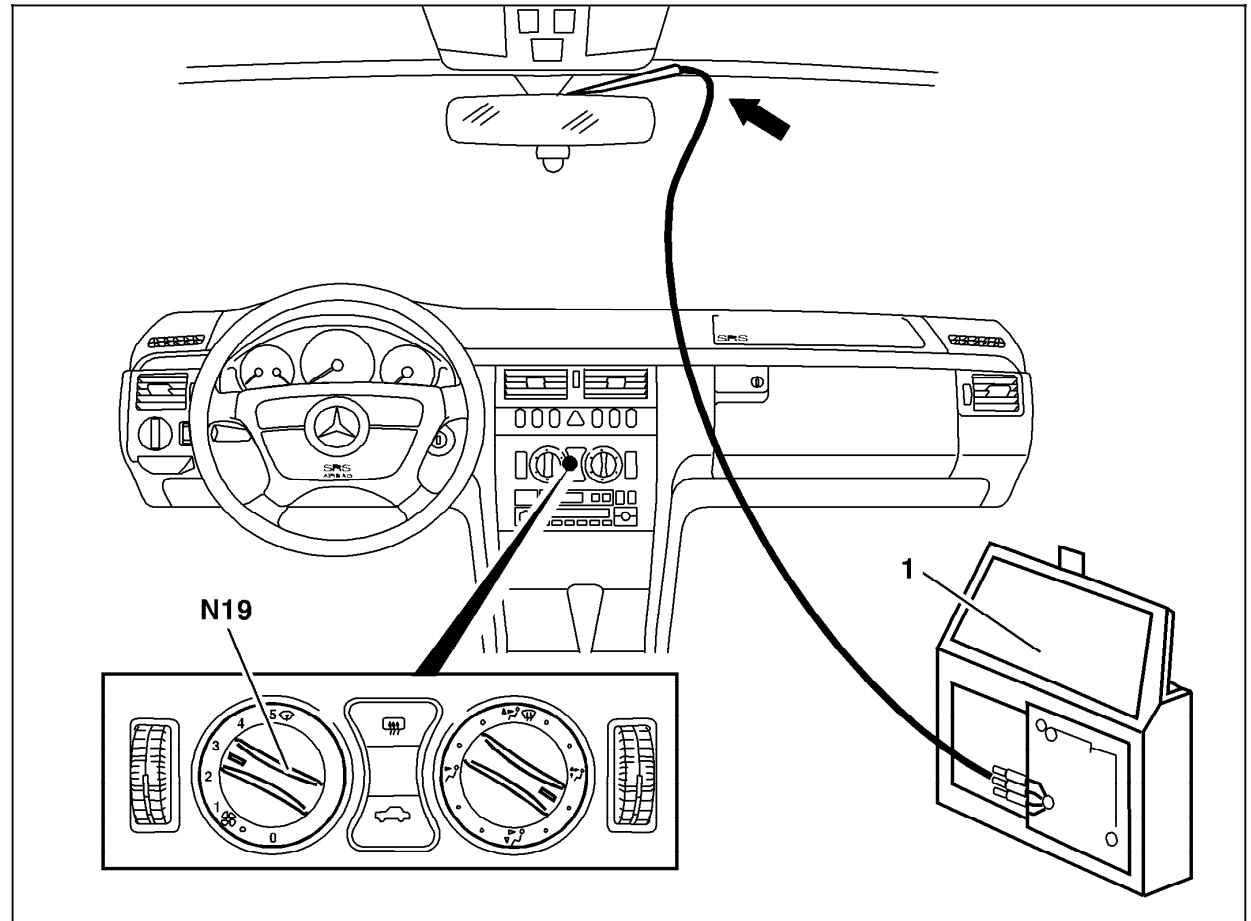


Figure 1

P83.30-3103-06

Quality Control and Heater Output Test Program – Test

B. Heater Output – Test

Test:

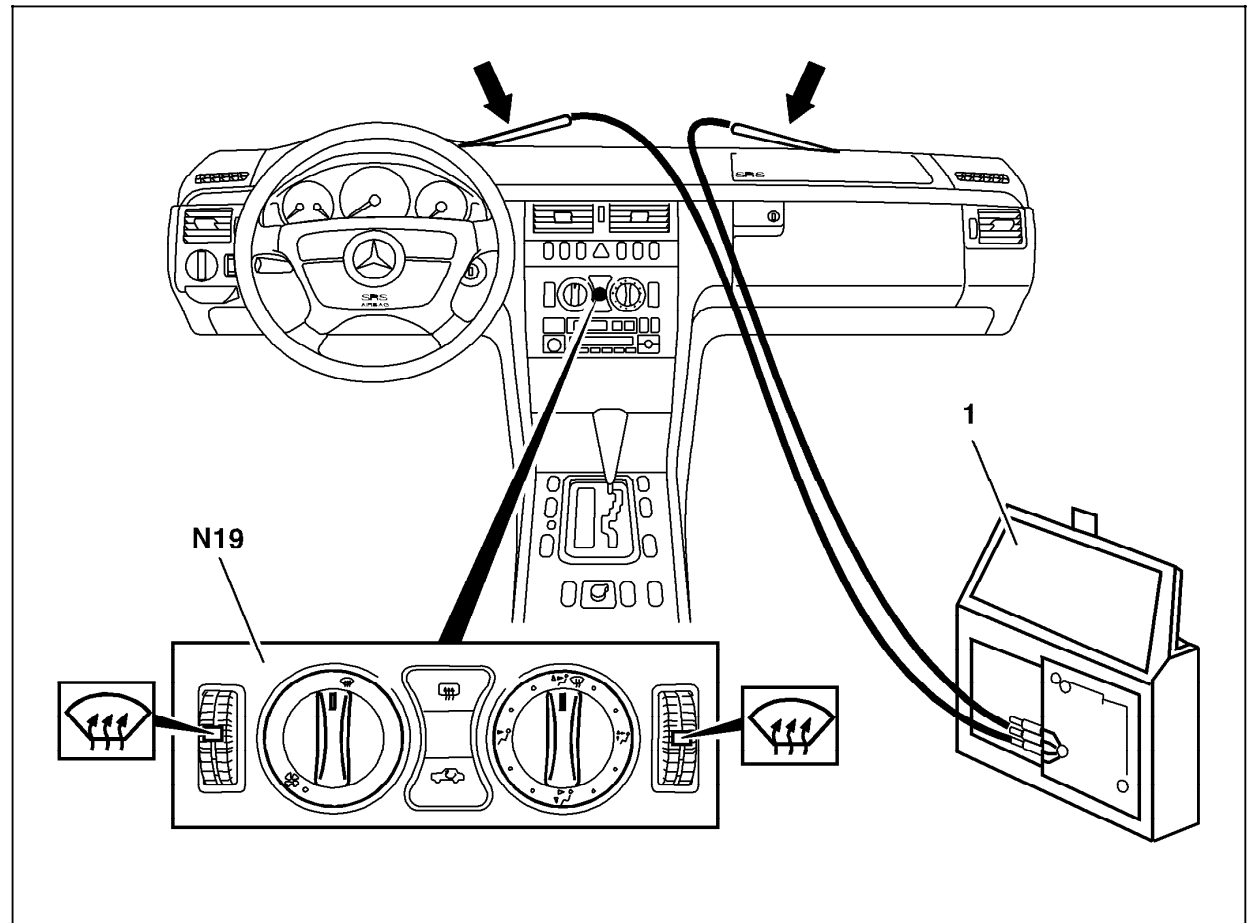
1. Review 51/1
2. Temperature selector wheel in "red field" detent.
3. Blower fan speed stage 5,
4. Set air distribution swith to 12 o'clock position (vertical).
5. Engine rpm = 2,000 rpm.
6. Test duration > 5 minutes.
7. Temperature measuring probe reads:
> 55 °C



If the above noted measurements are not attained, the following components and functions must be checked:

- Coolant temperature
- Coolant circulation pump (M13)
- Calcium deposits within cooling system and heater core
- Duovalve (Y21)

Figure 2



P83.30-3102-06