2.6 Model 163

Diagnosis – Function Test

Preparation for Test

Note: Applies for vehicles **up to 12/99 production** only.
For vehicles as of 12/99 production see 11/2

1. Check condition of fuses: F 16, F 41, F 43, F 44

2. Check in – car temperature sensor suction venturi jet (B10/4) by placing a small piece of paper (approx. ” sq.) over suction venturi jet vent grille (arrow) with ignition “ON” . If there is sufficient ventilation the paper will remain on the vent grille.

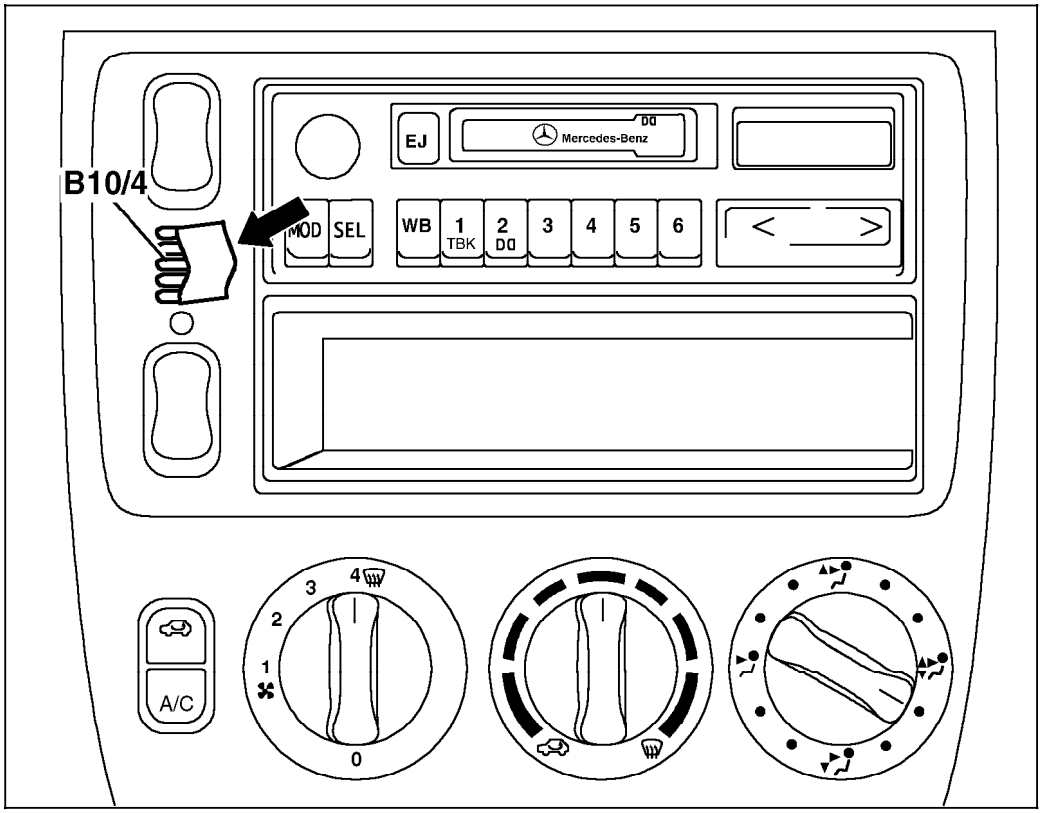
3. Run engine at idle (approx. 80˚C coolant temperature) when performing the entire test procedure.

4. Outside air temperature > 15˚C (58˚F).

5. Manually open center and side air outlets.

6. Ensure that the button is not depressed.

7. Set blower fan to stage 4.



P83.30-0785-11

Diagnosis – Function Test

Preparation for Test

Note: Applies for vehicles **as of 12/99 production** only

1. Check condition of fuses: F 16, F 41, F 43, F 44

2. Check in – car temperature sensor aspirator blower (B10/4) by placing a small piece of paper (approx. ” sq.) over aspirator blower vent grille (arrow) with ignition “ON” . If there is sufficient ventilation the paper will remain on the vent grille.

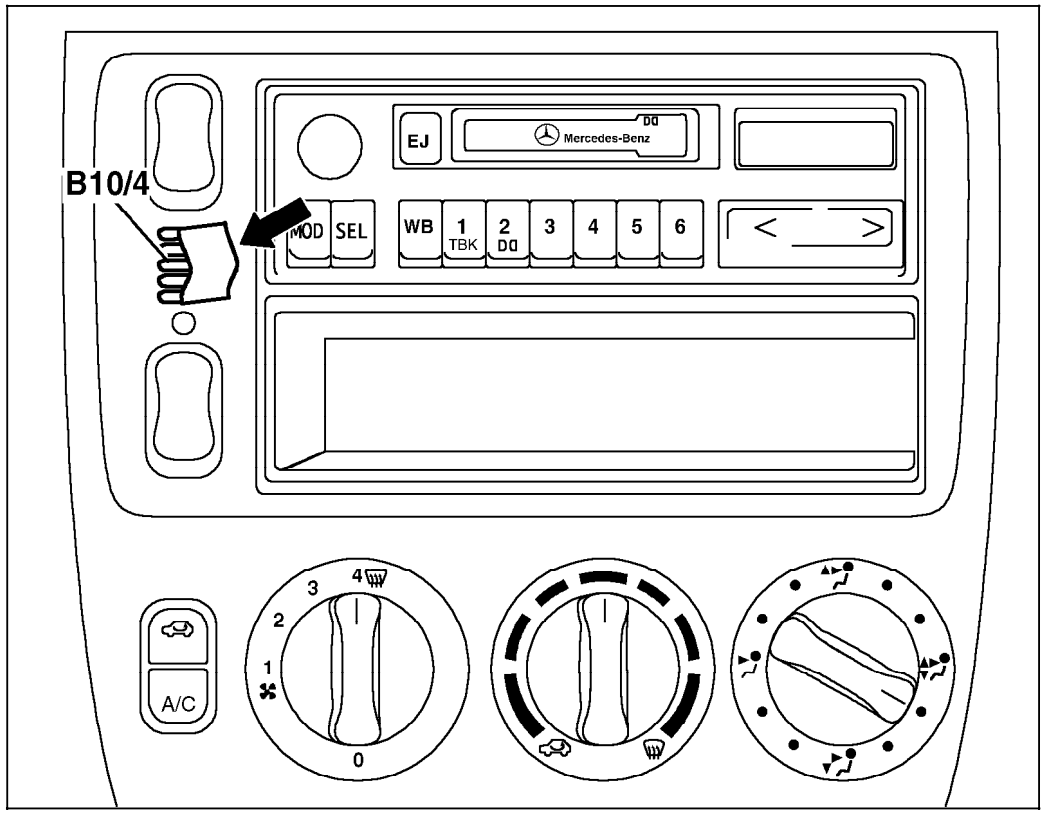
3. Run engine at idle (approx. 80˚C coolant temperature) when performing the entire test procedure.

4. Outside air temperature > 15˚C (58˚F).

5. Manually open center and side air outlets.

6. Ensure that the button is not depressed.

7. Set blower fan to stage **1**.



P83.30-0785-11

Beware of after-run timespan.

Diagnosis – Function Test

Review 11, 12, 15, 21, 22

Review ETM document: PE83.00-P-1100E

Test step/Test sequence		Test condition	Nominal value	Possible cause/Remedy [1]
⇒ 1.0	Defrost	Temperature selector wheel in "white range". A/C button indicator lamp **is** 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 ⇒ 1.0 – 9.0
⇒ 2.0	Normal ventilation in regulating mode	Temperature selector wheel in "white range". A/C button indicator lamp **is** 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. Coolant circulation pump runs at the same time.	23 ⇒ 8.0 – 9.0
⇒ 3.0	Economy setting **not** in heating mode	Temperature selector wheel in "blue range". A/C button indicator lamp **is not** illuminated. Air distribution dial set at 9 o'clock position.	Air venting from center air outlets (ambient temperature). A/C compressor **not** engaged.	23 ⇒ 8.0

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". A/C button indicator lamp **is not** 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 ⇒ 8.0
⇒ 5.0 Recirculation mode	button is illuminated. Set blower fan to stage 4.	Blower fan noise increases noticeablly.	Wiring, Recirculation switch, Recirculation/fresh air flap actuator motor (M39).

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

1. Review 11, 14, 15, 21, 22
2. Connect HHT, see section 0

Test step/Test sequence 	Test condition	Nominal value	Possible cause/Remedy [1)]
01 **Circuit 30**		11 – 14 V	Wiring, Battery.
02 **Engine temperature**	Ignition: **ON** Start engine and bring to operating temperature.	Operating temperature approx. 80° C	Wiring, ECT sensor (B11/4), All Activity Module (AAM) (N10).
03 **Outside air temperature**	Ignition: **ON**	Based on yearly season, approx. 20° C	Wiring, Outside temperature indicator temperature sensor (B14), All Activity Module (AAM) (N10).
04 **Blower relay (F1k21)** Voltage supply	Ignition: **ON** Blower set to stage 4	ON OFF	Wiring, F1k21, Blower motor (M2), All Activity Module (AAM) (N10).
05 **Engine cooling fan stage 1 relay (F1k26)**	Ignition: **ON**	ON OFF	Wiring, F1k26, Auxiliary fan (M4), All Activity Module (AAM) (N10).

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

Test step/Test sequence 	Test condition	Nominal value	Possible cause/Remedy [1)]
08 **Circulation pump relay (F1k19)**	Ignition: **ON**	ON OFF	Wiring, F1k19, Coolant circulation pump (M13), All Activity Module (AAM) (N10).
09 **Refrigerant pressure**	Start engine. A/C button is illuminated. Blower motor set to stage 4	12 bar	23 ⇒ 9.0
10 **A/C compressor (A9)**	Start engine. A/C button is illuminated. Blower motor set to stage 4	ON OFF	23 ⇒ 8.0, All Activity Module (AAM) (N10), A9
11 **Activate A/C system**	Ignition: ON	YES NO	Wiring, A/C pushbutton control module (N19), All Activity Module (AAM) (N10)

Version Coding

Version coding is performed via the HHT and is menu-driven.
Communication is possible as soon as the ignition key is inserted into the ignition switch (the ignition switch position is of no importance).
The version coding menu (position 1) is attained via the main menu and control module adaption (position 5).
Within the version coding two possibilities are available:

1. Readout of version code and transfer same to new control module.
2. Readout of version code/alter same.

In order to readout the version coding of the A/C system, the position 2 must be selected.
Listed within the above selection, the position 7 is used for version coding of the A/C system.
The selection of
1. A/C system installed
2. A/C system is not installed

can be used.

Version Coding	Selection
A/C system	Installed/Not installed

Diagnosis – Diagnostic Trouble Code (DTC) Memory

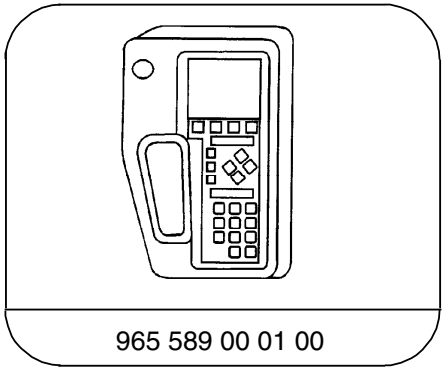
Notes regarding Diagnostic trouble Code Memory

- 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, short circuits and open circuits can not be differentiated from each other in every case.
- When reading out the DTC memory from any control module, all stored DTC's are shown, which means that some DTCs will be shown which do not apply to the current system being checked.

Prerequisite for reading out DTC Memory

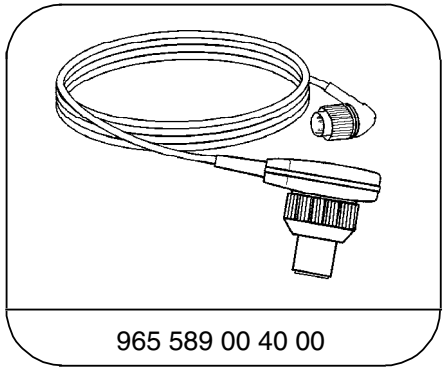
Electrical wiring diagrams:
Electrical Troubleshooting Manual, Model 163, Group 83
(available on the Workshop Information System [WIS] only).

Special Tools



965 589 00 01 00

Hand-Held-Tester



965 589 00 40 00

Test cable

Diagnosis – Diagnostic Trouble Code (DTC) Memory

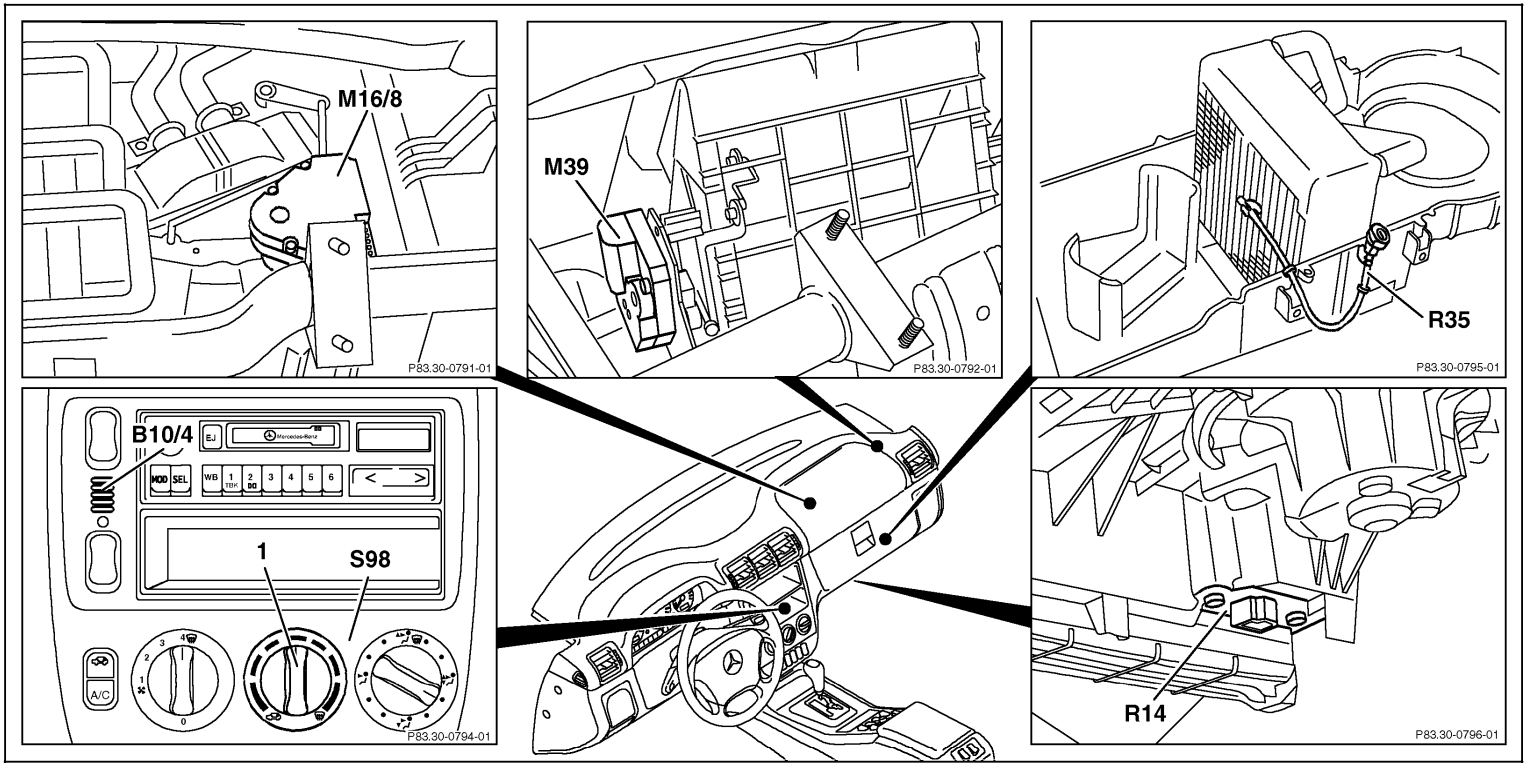
Prior to Test:

1. Review 11, 14, 15, 21, 22
2. Connect HHT, see section 0, and read out DTC fault codes.
3. When reading out the DTCs, be aware that same DTCs belong to other control modules, this means that DTCs will appear that do not apply to the system being checked.

DTC 	Possible cause	Hint	Remedy
No communication using the HHT is possible.	Diagnostic line		23
No DTC stored	No DTC recognized.	Complaint valid and present: See A/C Electrical Test Program - Test	23
B1232	Refrigerant pressure sensor (B12)		23⇒ 9.0
B1419	Electromagnetic clutch (A9k1)		Wiring, A9k1

Electrical Test Program – Component Locations

Components Location in Passenger Compartment



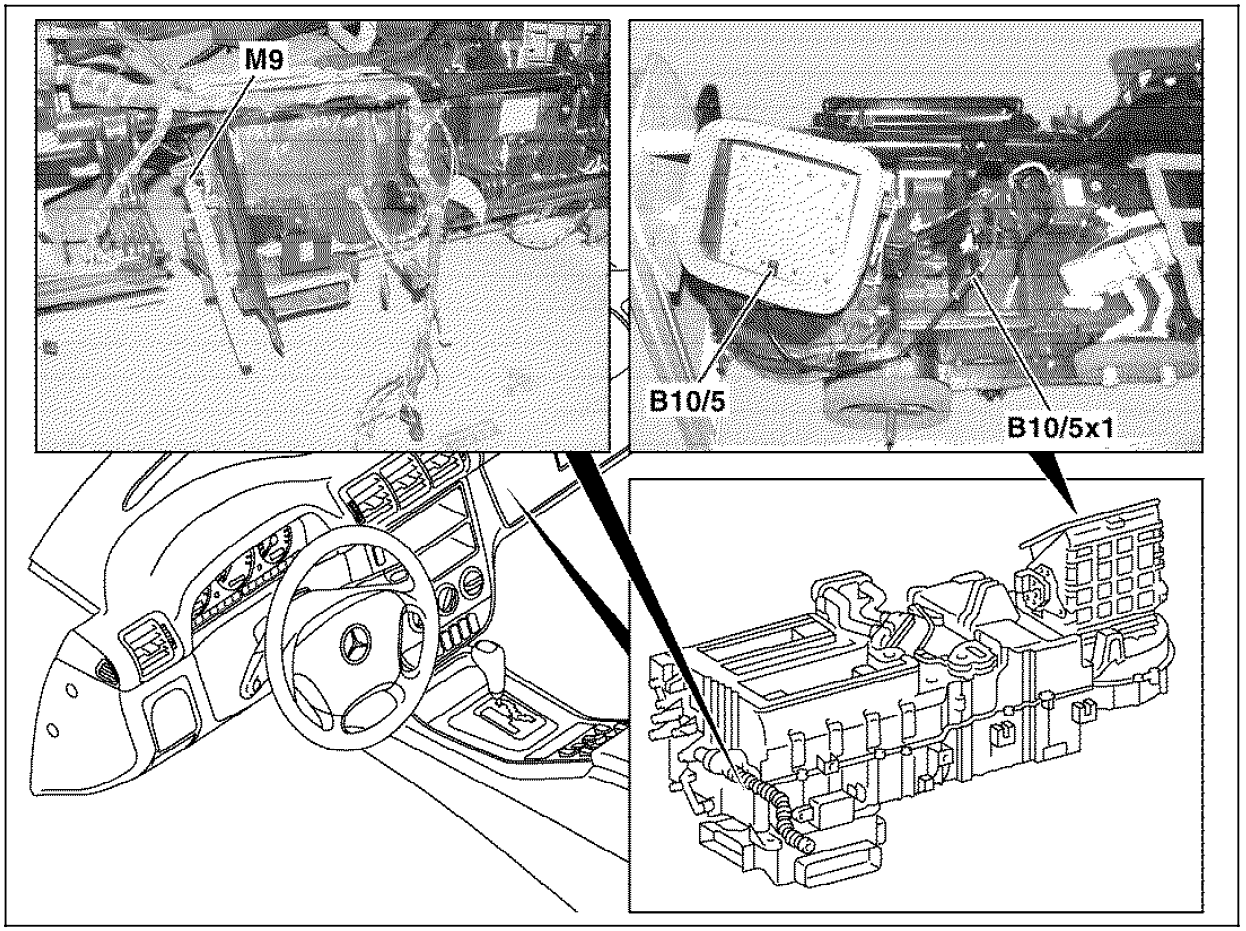
P83.30-0806-09

Figure 1

1	Temperature selector wheel	R14	Blower motor preresistor group
B10/4	In-car temperature sensor	R35	Icing protection temperature sensor
M16/8	Blend air flap actuator motor	S98	Heater/AC switch
M39	Recirculation air flap element		

Electrical Test Program – Component Locations

Components Location in Passenger Compartment
As of 12/99



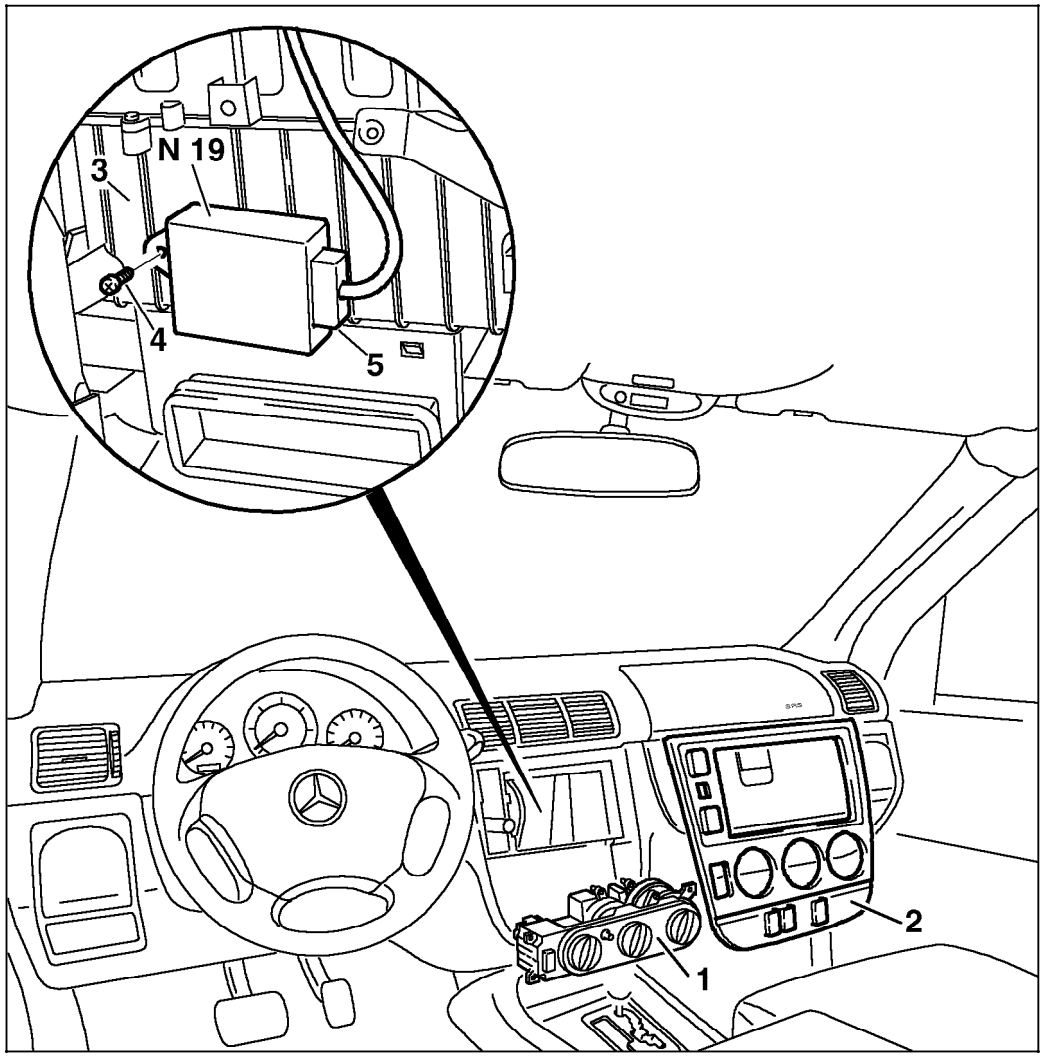
P83.30-3353-06

Figure 2

M9	In-car temperature sensor aspirator blower
B10/5	Outside temperature sensor
B10/5x1	Outside temperature sensor connector

Electrical Test Program – Component Locations

Components Location in Passenger Compartment



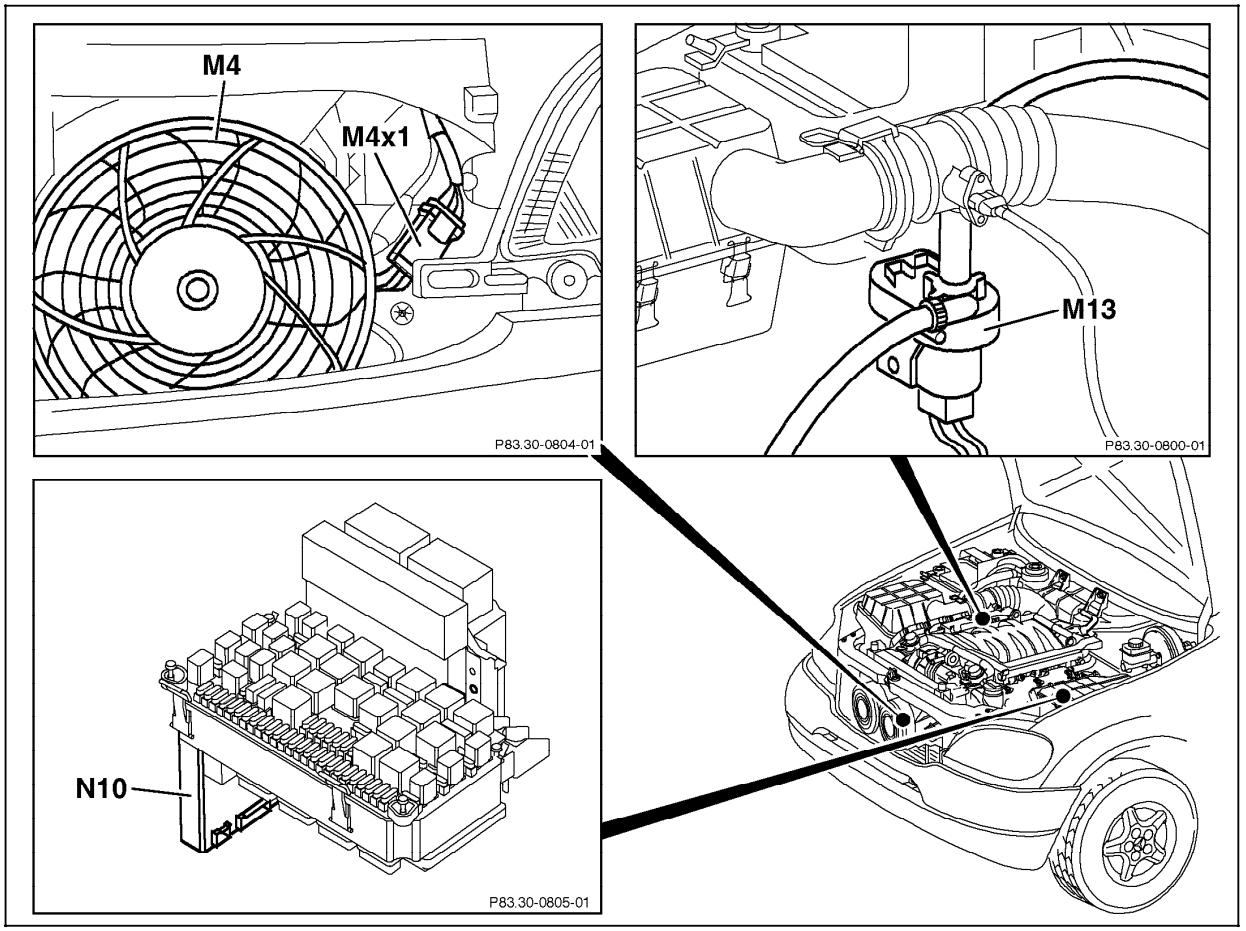
P83.30-0752-12

Figure 3

1	Heater/AC switch
2	Cover plate
3	A/C housing
4	Screw
5	Connector
N19	A/C pushbutton control module

Electrical Test Program – Component Locations

Components Location in Engine Compartment



P83.30-0803-06

Figure 4

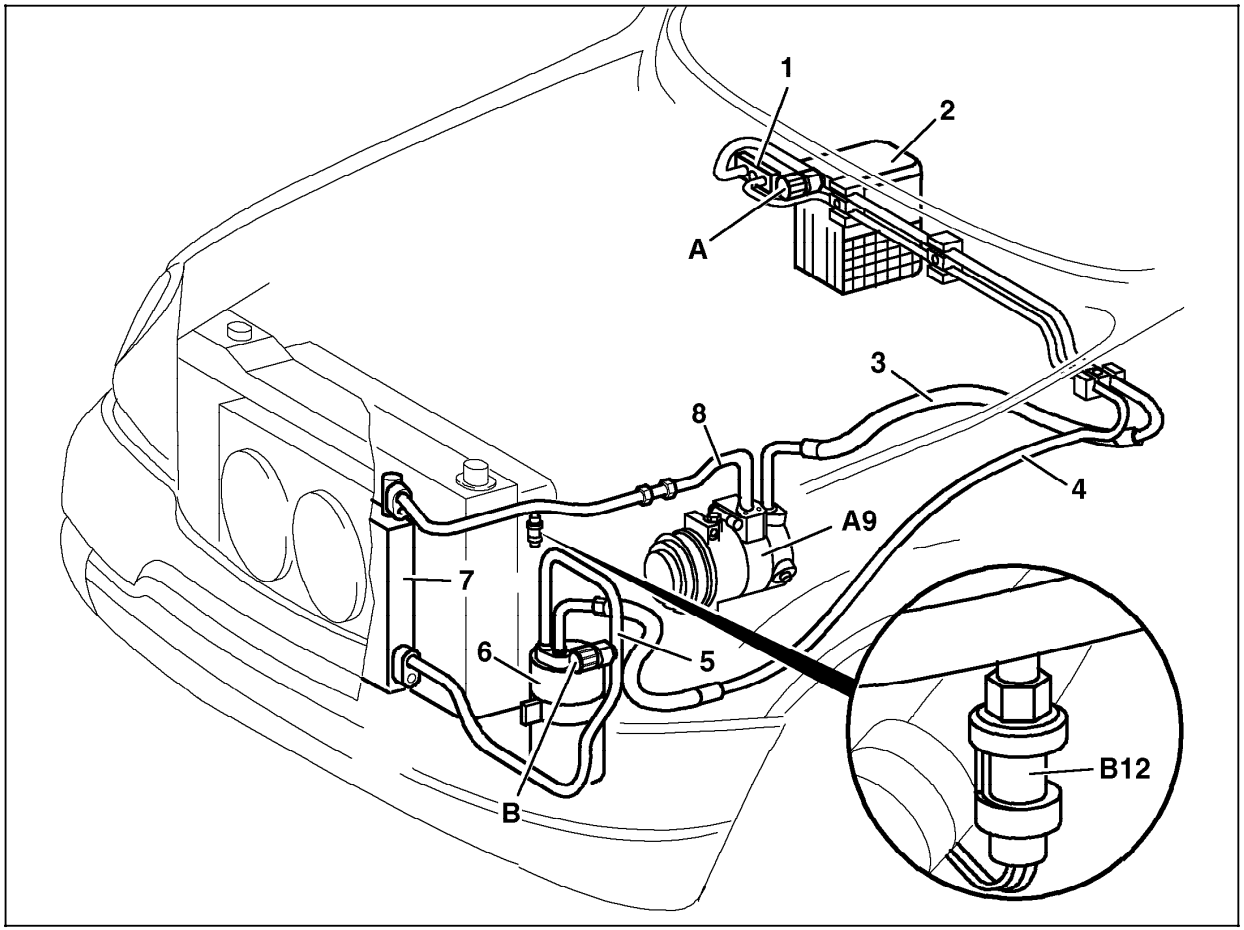
M4	Auxiliary Fan
M4x1	Auxiliary Fan connector
M13	Coolant circulation pump
N10	All Activity Module (AAM)

Electrical Test Program – Component Locations

Component Locations of the A/C System
Up to 11/99

1 Expansion valve
2 Evaporator
3 Suction line
4 High pressure line to evaporator
5 High pressure line to receiver/drier
6 Receiver/drier
7 Condenser
8 High pressure line to condensor

A Low pressure connection
B High pressure connection
A9 A/C compressor
B12 Refrigerant pressure sensor



P83.30-0784-06

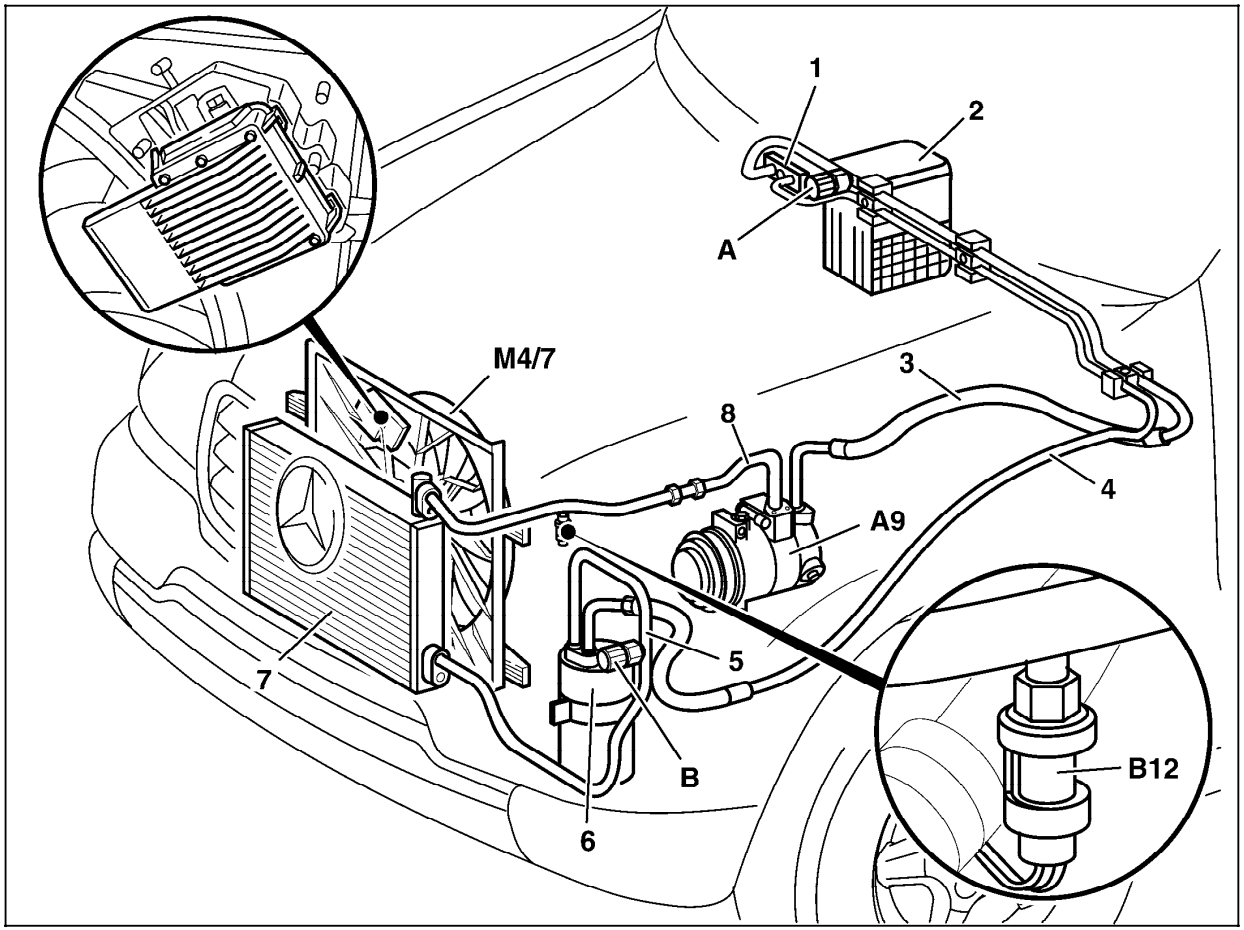
Figure 5

Electrical Test Program – Component Locations

Component Locations of the A/C System
As of 12/99

1 Expansion valve
2 Evaporator
3 Suction line
4 High pressure line to evaporator
5 High pressure line to condensor
6 Receiver/drier
7 Condenser
8 High pressure line to condensor

A Low pressure connection
B High pressure connection
A9 A/C compressor
B12 Refrigerant pressure sensor
M4/7 Engine/climate control electric cooling fan with integrated control
N76 Engine/climate control electric cooling fan control module (shown as insert)



P83.30-3356-06

Electrical Test Program – Preparation for Test

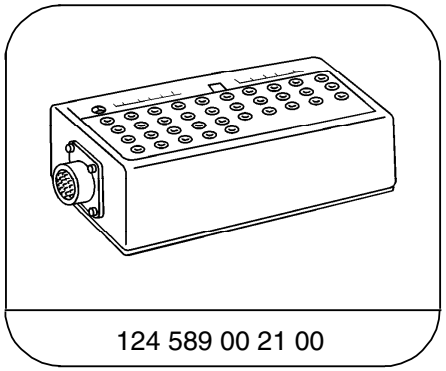
1. Review 11, 14, 15, 21, 22
2. Review electrical diagram: PE83.00-P-1100E
3. Connect HHT, after completion of all test erase DTC memory in N19
4. Review 12

Electrical wiring diagrams:
Electrical Troubleshooting Manual, Model 163, Group 83.
(available on the Workshop Information System [WIS] only).

i

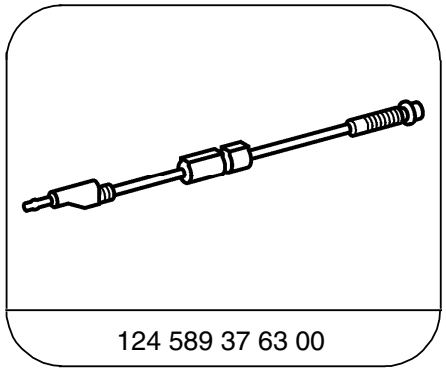
Testing of the Recirculated air flap element (M39) is performed in 11

Special Tools



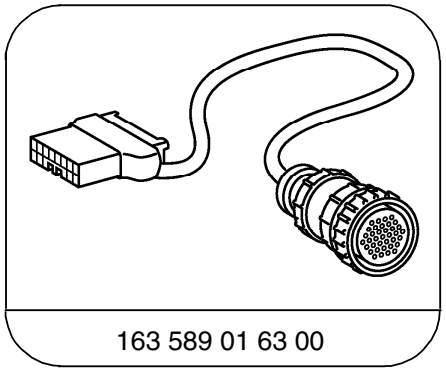
124 589 00 21 00

35-pin socket box



124 589 37 63 00

Fused cable



163 589 01 63 00

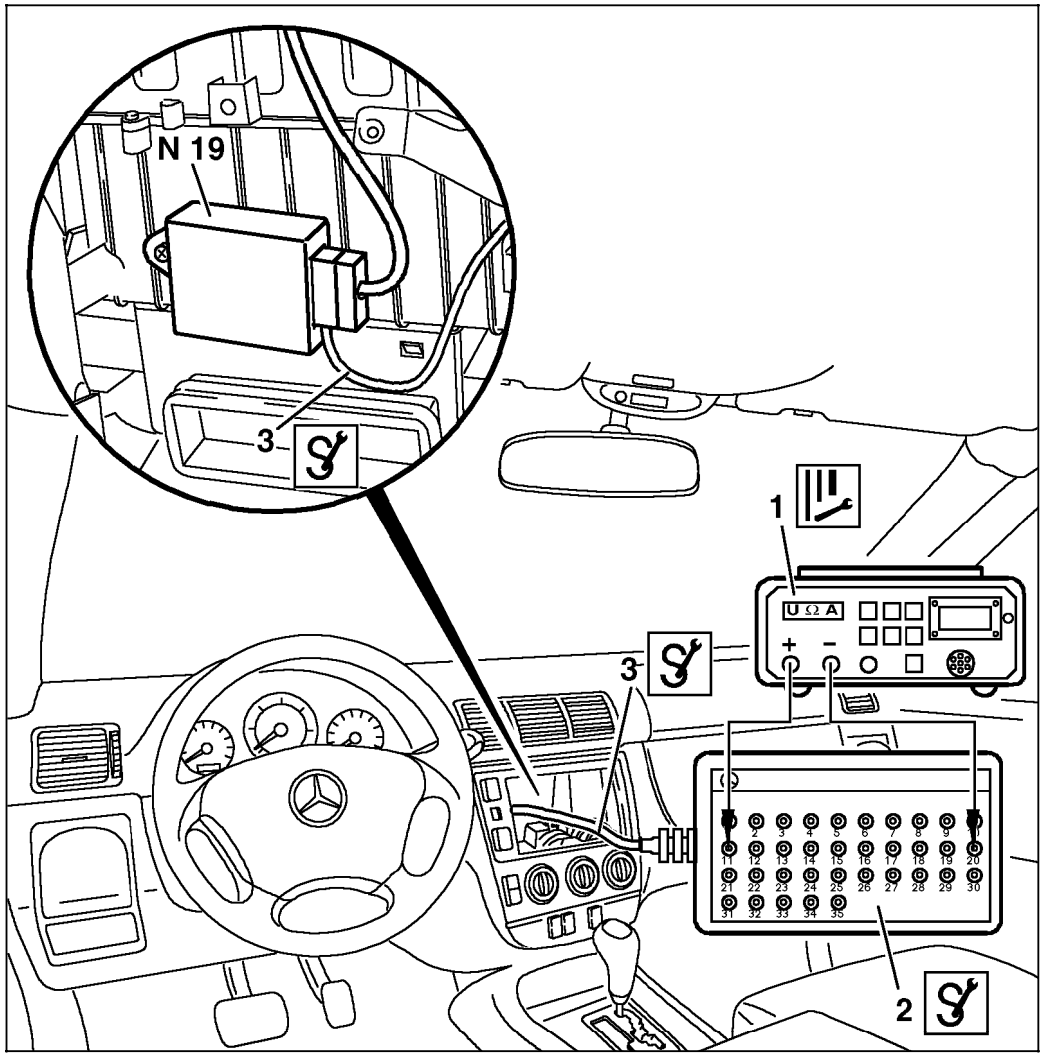
Test cable 14-pin

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



P83.30-0790-12

Figure 1

1 Multimeter

2 Socket Box

3 Test cable

N19 A/C pushbutton control module

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0		**Voltage supply Circuit 15**	N19 9 — (V) — 7	**Ignition: ON**	11-14 V	Wiring.
2.0		**Ground circuit 31** Resistance	N19 ⊥ — (Ω) — 9	**Ignition: OFF** Disconnect N19 from ⌨.	0 Ω	Wiring.
3.0		**In-car temperature sensor (B10/4)** Voltage	N19 9 — (V) — 12	**Ignition: ON** Temperature selector: Red range detent	°C V 20 1.9	Wiring, B10/4
3.1		**In-car temperature sensor (B10/4)** Resistance	N19 12 — (Ω) — 2	**Ignition: OFF** Disconnect N19 from ⌨.	°C kΩ 20 2.1 25 1.7 40 0.9	Wiring, B10/4
4.0		**Icing protection temperature sensor (R35)** Voltage	N19 9 — (V) — 11	Ignition: **ON**	°C V 0 2.0 – 2.4 15 1.4 – 1.8	Wiring, R35

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
4.1		**Icing protection temperature sensor (R35)** Resistance	N19 11 — Ω — 3	Ignition: **OFF** Disconnect N19 from ⌨.	°C kΩ 6 3.6 15 2.3 22 1.7 25 1.5	Wiring, R35
5.0		**Activation voltage Temperature reduction** Voltage	N19 9 — V — 2	Ignition: **ON** Temperature selector: From blue range detent turn temperature selector to red detent stop	 >2 V >3 V	Wiring, S98s2
5.1		**Activation voltage Temperature increase** Voltage	N19 9 — V — 5	Ignition: **ON** Temperature selector: From blue range detent turn temperature selector to red detent stop	 >3 V >4 V	Wiring, S98s2
6.0		**Actuator motor Blend air flap actuator motor (M16/8)** Voltage	N19 9 — V — 1	Ignition: **ON** Temperature selector: From blue range detent turn temperature selector to red detent stop	 <1V 11-14 V	Wiring, M16/8

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
6.1		**Actuator motor** **Blend air flap actuator motor (M16/8)** Resistance	N19 8 — Ω — 1	Ignition: **OFF** Disconnect N19 from .	0.12 kΩ	Wiring, M16/8
7.0		**Actuator motor** **Blend air flap actuator motor (M16/8)**	N19 9 — V — 8	Ignition: **ON** Temperature selector: From Red range detent stop turn temperature selector to blue detent	<1 V 11-14 V	Wiring, M16/8
8.0		**Activation of:** **A/C switch (S98s3) to A/C pushbutton control module (N19)** Voltage	N19 9 — V — 10	Ignition: **ON** A/C button is illuminated. Blower stage 4 A/C button is **not** illuminated, **OR** Blower stage= 0	<1 V 11 – 14 V	Wiring, S98s3

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
8.1		**Activation of:** **A/C pushbutton control module (N19) to All Activity Module (N10)** Voltage	N19 9 — (V) — 4 11 — (—) — 4	Ignition: **ON** A/C button is illuminated. Blower stage 4 Insert bridge: 124 589 37 63 00	 >3 V <1 V	Wiring, N19
9.0		**Refrigerant pressure sensor (B12)**	B12 A — (V) — B	Disconnect refrigerant pressure sensor connector Ignition: **ON**	4.75-5.25 V	Wiring, B12, N10
10.0		**Outside temperature sensor** **(B10/5)** Resistance (as of 12/99)	N19 3 — (Ω) — 12	Ignition: **OFF** Disconnect N19 from	°C kΩ 20 2.1 25 1.7 40 0.9 50 0.6	Wiring, B10/5