

#### 3.3 PSE Control Module (PSE) Models 170, 210

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#### Notes:

#### The PSE provides pressure or vacuum for the following systems:

- Central locking (CL), (pressure or vacuum) – activation via remote central locking (RCL), interior switch (CL) (S6/1s2) and via mechanical key.
- Remote trunk release (RTR), (pressure) – activation via remote trunk release switch (S15) or via remote central locking (RCL). (RTR for model 210 sedan only).
- Retractable rear head restraint (RHR), (vacuum) – activation via RHR unlocking switch (S6/1s3). (RTR for model 210 sedan only).

- Multi-contour seat (OSB), (pressure) – control of the working pressure via pressure switch in the PSE, as soon as the ignition ON signal is received via the CAN-interface. (OSB for model 210 only).
- Manifold Vacuum Assist (MVA), (vacuum) – control of the working vacuum via pressure switch in the PSE, as soon as the ignition ON signal is received via the CAN-interface. (MVA for model 210 only).

#### Diagnostic Trouble Code (DTC) Memory

- Pneumatic as well as electrical faults of the systems (CL, OSB, MVA, RTR and RHR) are recognized by the PSE and in the DTC memory. The DTC memory which has been integrated into the combination control module (N10-1 or N10-3). DTC memory can only be readout and erased using the Hand-Held-Tester (HHT).

#### CAUTION!

Erasing the Combination Control Module (N10-1 or N10-3) DTC memory, will also erase the DTC memory for the Convenience Feature (CF) and Mirror, steering column adjustment, heated mirrors (MSC).

#### Additional components of the PSE:

- Heated rear window relay
- ATA control module

#### Replacement of the combination control module (N10-1 or N10-3):

- Combination control modules being replaced must be programmed and version coded prior to connecting to the vehicle electrical system. Please review D.M., Body and Accessories, Vol. 1, section 2, 31, for details.

#### Diagnosis – Diagnostic Trouble Code (DTC) Memory (PSE)

##### Preparation for Test:

1. Fuses for PSE system and PSE control module ok,
2. Battery voltage 11 – 14 V,
3. Unlock vehicle via remote central locking,
4. Ignition: **ON**
5. Connect the Hand-Held Tester (HHT) to X11/4, according to diagram, see section 0.



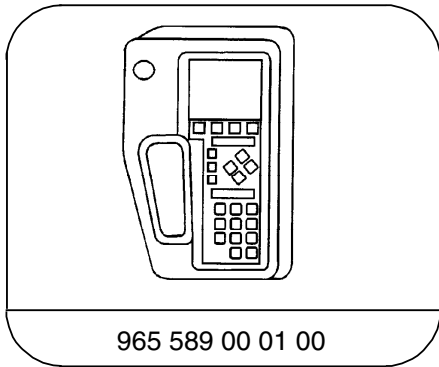
Readout DTC memory and note failure codes.

Perform repairs of noted failures as per fault table.

Interrupt PSE control module power supply for approx. 3 seconds to erase safety memory.

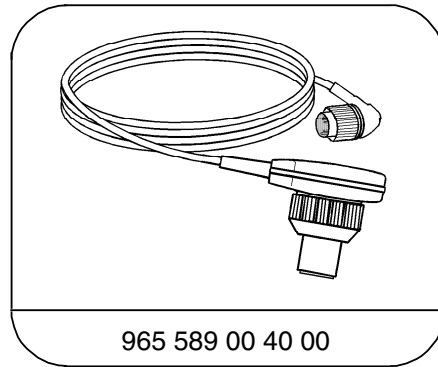
Since the DTC memory has been integrated into the combination control module (N10-1 or N10-3), DTC memory must be erased after replacement of the PSE control module.

##### Special Tools



965 589 00 01 00


Hand-Held-Tester



965 589 00 40 00


Test cable

#### Diagnosis – Diagnostic Trouble Code (DTC) Memory (PSE)

DTC 	Possible cause	Test step/Remedy <sup>1)</sup>
B1021	CAN data line, no communication with PSE control module (A37).	23 ⇒ 1.0 – 8.0, Combination control module (N10-1 or N10-3), PSE control module (A37).
B1024	CAN data line, LOW or combination control module (N10-1 or N10-3).	23 ⇒ 2.0, 4.0, 6.0, 8.0, Combination control module (N10-1 or N10-3).
B1025	CAN data line, High or combination control module (N10-1 or N10-3).	23 ⇒ 3.0, 5.0, 7.0, 8.0, Combination control module (N10-1 or N10-3).
B1100	Lock switch circuit SN1/SN2 from RCL control module (N54) to combination control module (N10-1 or N10-3) Γ1– or Γ1+.	4.5 23 ⇒ 19.0 – 20.0 4.7 23 ⇒ 25.0 – 26.0
B1116	RHR unlocking switch (S6/1s3), signal > 25 sec.	23 (PSE/RHR) ⇒ 1.0
B1117	Interior switch (CL) (S6/1s2), signal > 25 sec.	23 (PSE/CL) ⇒ 1.0

<sup>1)</sup> Observe Preparation for Test, see 22.

#### Diagnosis – Diagnostic Trouble Code (DTC) Memory (PSE)

DTC 	Possible cause	Test step/Remedy <sup>1)</sup>
B1124	Remote trunk release switch (S15), signal > 25 sec., ΓΓ–.	23 (PSE/RTR) ⇒ 1.0
B1436	Central locking – faulty function due to error signal from other consumers or CL pneumatic system leak.	32 ⇒ 1.0 – 8.0, 32 PSE/CL ⇒ 1.0 – 8.0
B1437	Retractable head restraint pneumatic system leak.	32 (PSE/RHR) ⇒ 1.0 – 3.0
B1438	Multi-contour seat, air pressure or safety time.	32 (PSE/OSB) ⇒ 1.0 – 4.0
B1439	Manifold vacuum assist, Time > max.	32 (PSE/MVA) ⇒ 1.0

<sup>1)</sup> Observe Preparation for Test, see 22.

#### Diagnosis – Recalling Actual Values with HHT

The following tests and activations are possible **via the Hand-Held Tester**.

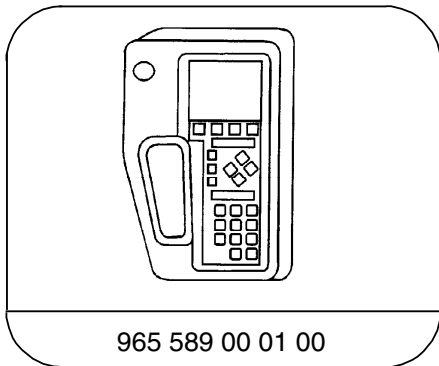
##### Actual values (functional condition)

- Interior switch (CL) (S6/1s2)
- RHR unlocking switch (S6/1s3)
- Left front door switch (S17/3)
- Right front door switch (S17/4)
- Remote trunk release switch (S15)
- Remote trunk release active status
- REST activated

##### Preparation for Test:

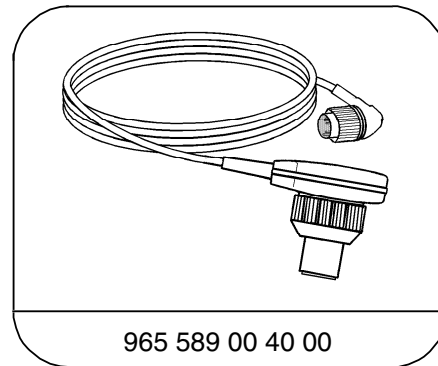
1. Fuses PSE system and PSE control module ok,
2. Battery voltage 11 – 14 V.
3. Ignition: **ON**
4. Connect the Hand-Held Tester (HHT) to X11/4, according to diagram, see section 0.

##### Special Tools



965 589 00 01 00

Hand-Held-Tester















965 589 00 40 00

Test cable

### 3.3 Pneumatic System Equipment (PSE)

Models 170, 210












#### Electrical Test Program – Test Actual Values

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0		Interior switch (CL): <b>open</b>		Interior switch (CL): press: close not pressed	ON OFF	23 PSE/CL ⇒ 1.0
2.0		Interior switch (CL): <b>close</b>		Interior switch (CL): press: open not pressed	ON OFF	23 PSE/CL ⇒ 1.0
3.0		RHR switch (model 210 sedan only)		RHR switch: pressed not pressed	ON OFF	23 PSE/RHR ⇒ 1.0
4.0		Left front door switch		Left front door switch: pressed not pressed	ON OFF	23 PSE/CL ⇒ 2.0
5.0		Right front door switch		Right front door switch: pressed not pressed	ON OFF	23 PSE/CL ⇒ 3.0
6.0		<b>Non-USA vehicles only, continue to next test step.</b>				

### 3.3 Pneumatic System Equipment (PSE)

Models 170, 210

#### Electrical Test Program – Test Actual Values

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
7.0		RTR switch (model 210 sedan only)		RTR switch:  pressed not pressed	ON OFF	23 PSE/RTR ⇒ 1.0
8.0		RTR switch “activated” (model 210 sedan only)			YES NO	23 PSE/RTR ⇒ 1.0
9.0		<b>REST</b> function		Pushbutton <b>REST</b> in N22 or N19/1:  illuminated not illuminated	ON OFF	D.M., Climate Control, 3.5, 23 ⇒ 22.0
10.0		Lock switch circuit 1		Vehicle locks press IR transmitter button –	ON OFF	4.5 23 ⇒ 8.0 4.7 23 ⇒ 14.0
11.0		Lock switch circuit 2		Vehicle unlocks press IR transmitter button –	ON OFF	4.5 23 ⇒ 9.0 4.7 23 ⇒ 15.0

#### Electrical Test Program – Component Locations (PSE)

#### Model 170

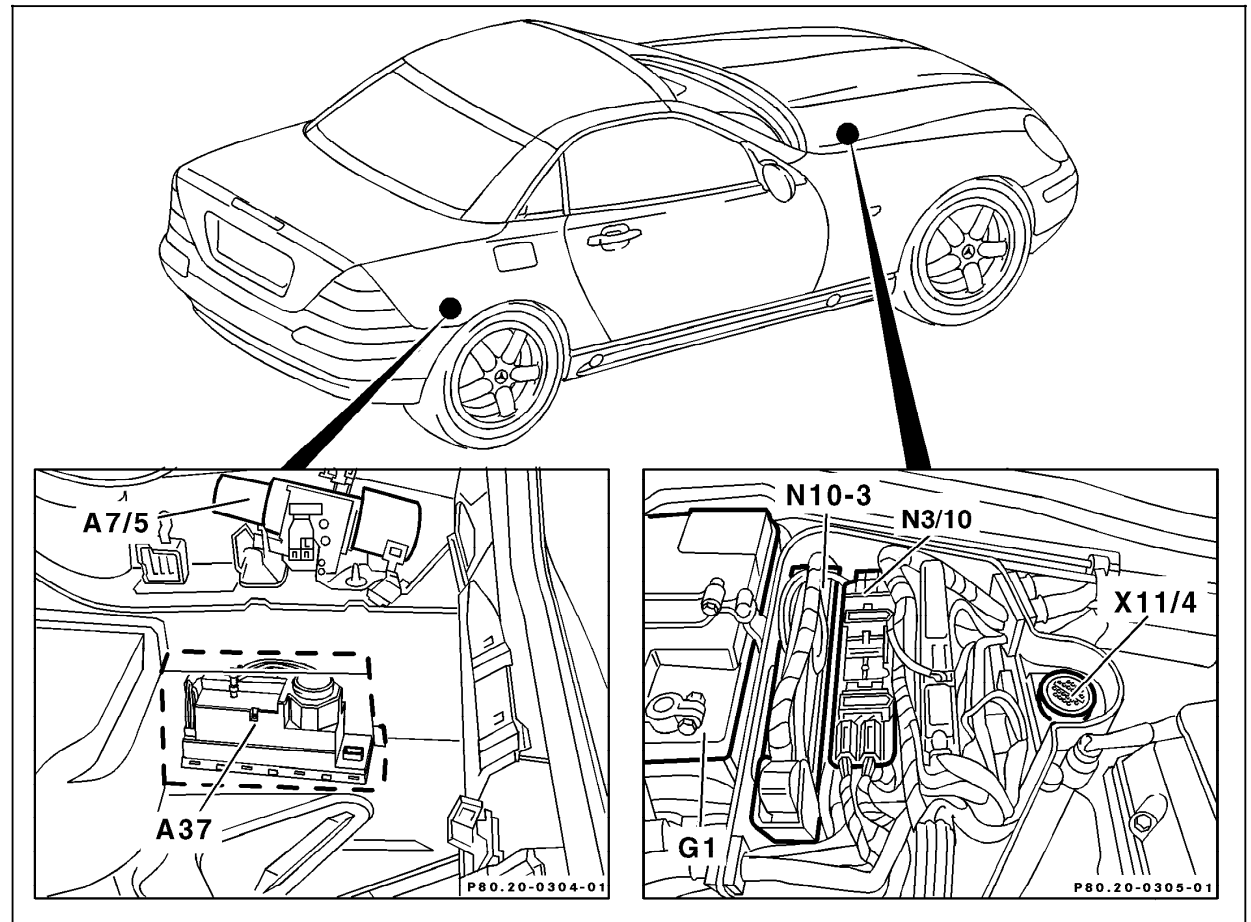


Figure 1

- A7/5 Retractable hardtop hydraulic unit
- A37 PSE control module, combined functions
- G1 Battery
- N3/10 Engine control module (ME-SFI)
- N10-1 Combination control module
- X11/4 Data link connector (DTC readout)

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#### Electrical Test Program – Component Locations (PSE)

Model 210

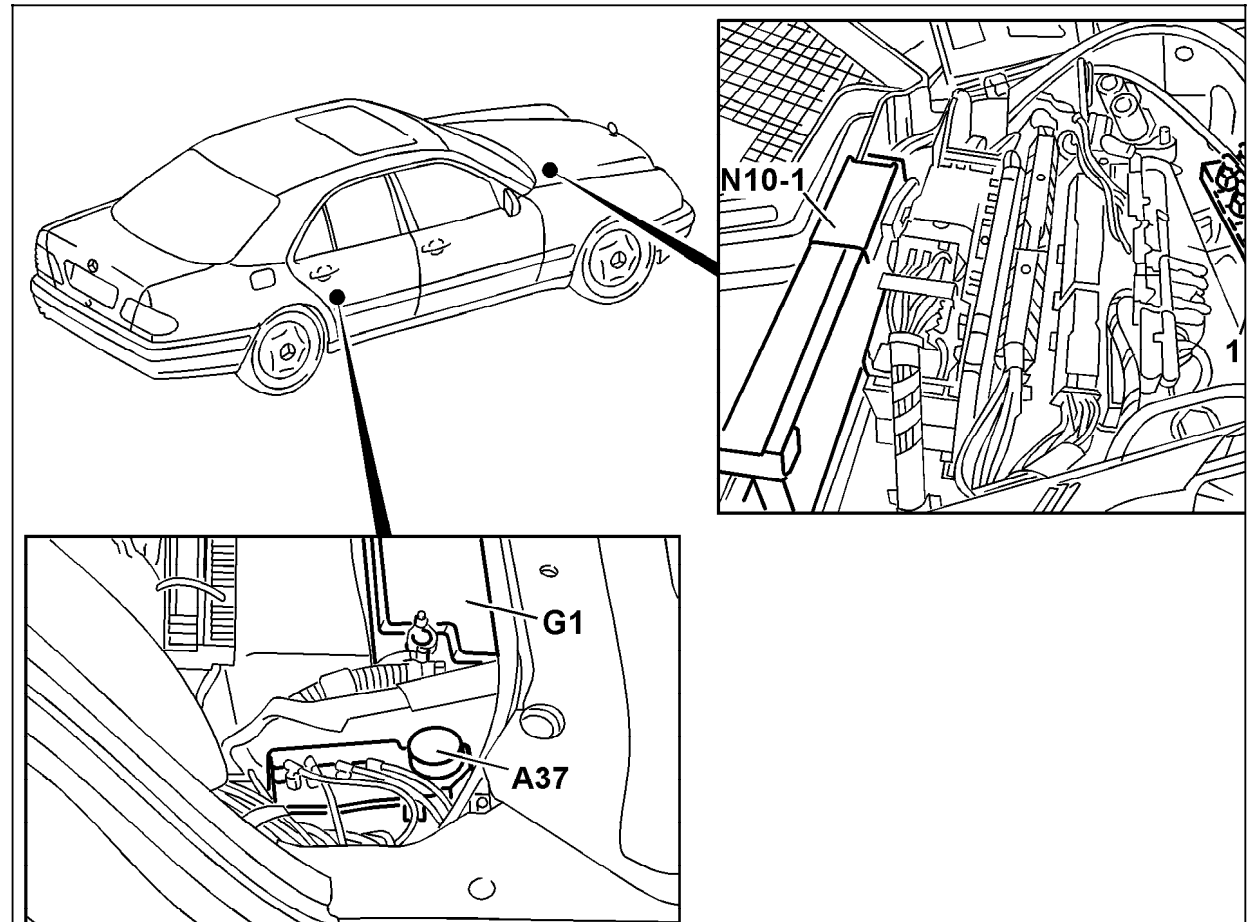


Figure 2

- A37 PSE control module, combined functions
- G1 Battery
- N10-1 Combination control module
- 1 Vacuum distribution block

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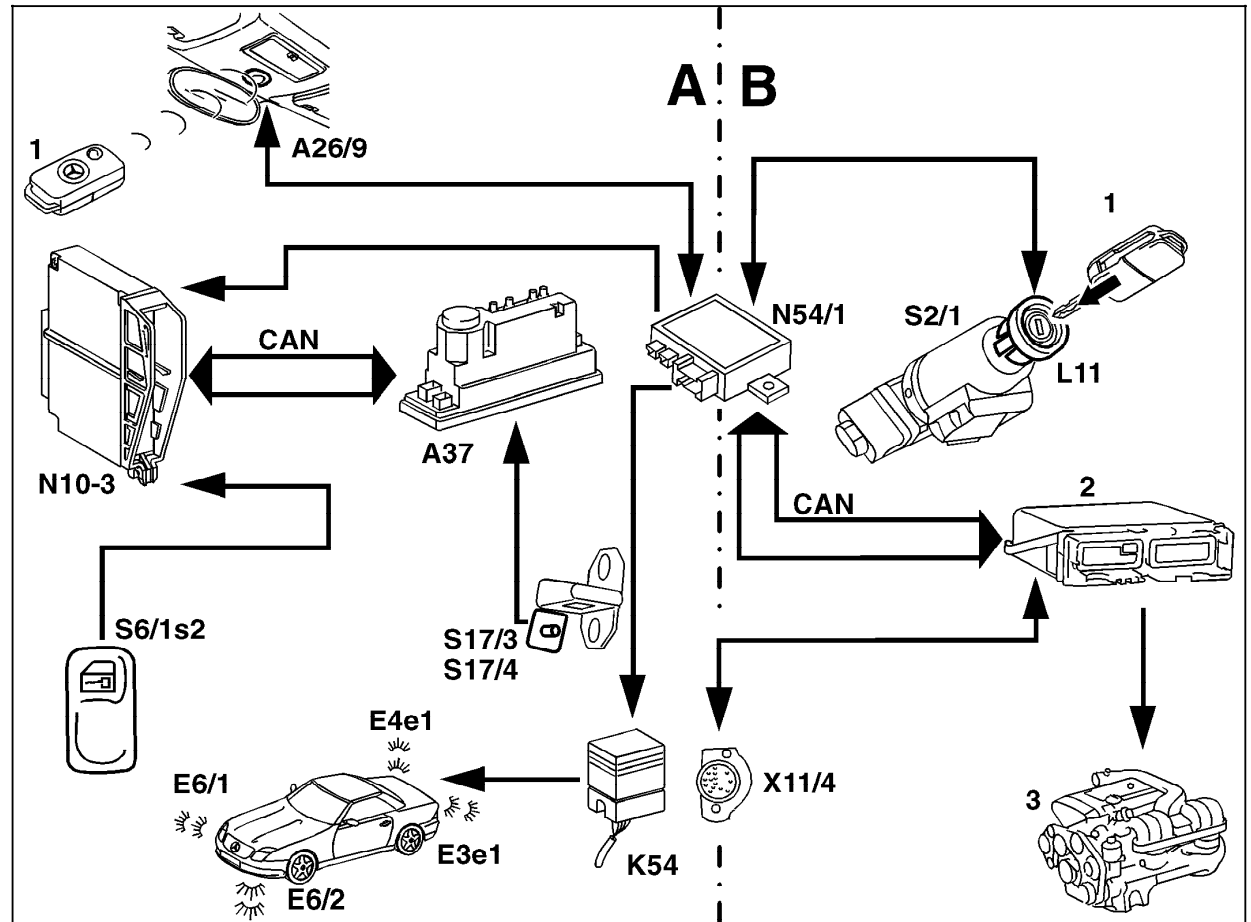
#### Electrical Test Program – Connection of Components

#### Model 170

Figure 1

- A IR transmitter for CL
- B DAS 2 (Activation of motor electronics via transponder)

- A26/9 RCL receiver (roof frame)
- A37 PSE control module, combined functions
- CAN Control-Area-Network
- E3e1 Turn signal lamp
- E4e1 Turn signal lamp
- E6/1 Left turn signal lamp
- E6/2 Right turn signal lamp
- K54 Locking cofirmation relay module
- L11 Coil for transponder
- N10-3 Combination control module
- N54/1 IR DAS control module
- S2/1 Ignition/starter switch
- S6/1s2 Interior switch (CL)
- S6/1s3 RHR unlocking switch
- S17/3 Left front door switch
- S17/4 Right front door switch
- X11/4 Data link connector (DTC readout)
- Y65/3 RTR control valve (CL)
- 1 IR transmitter
- 2 Engine control module
- 3 Engine



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#### Electrical Test Program – Connection of Components

Model 210 up to 05/96  
(sedan shown)

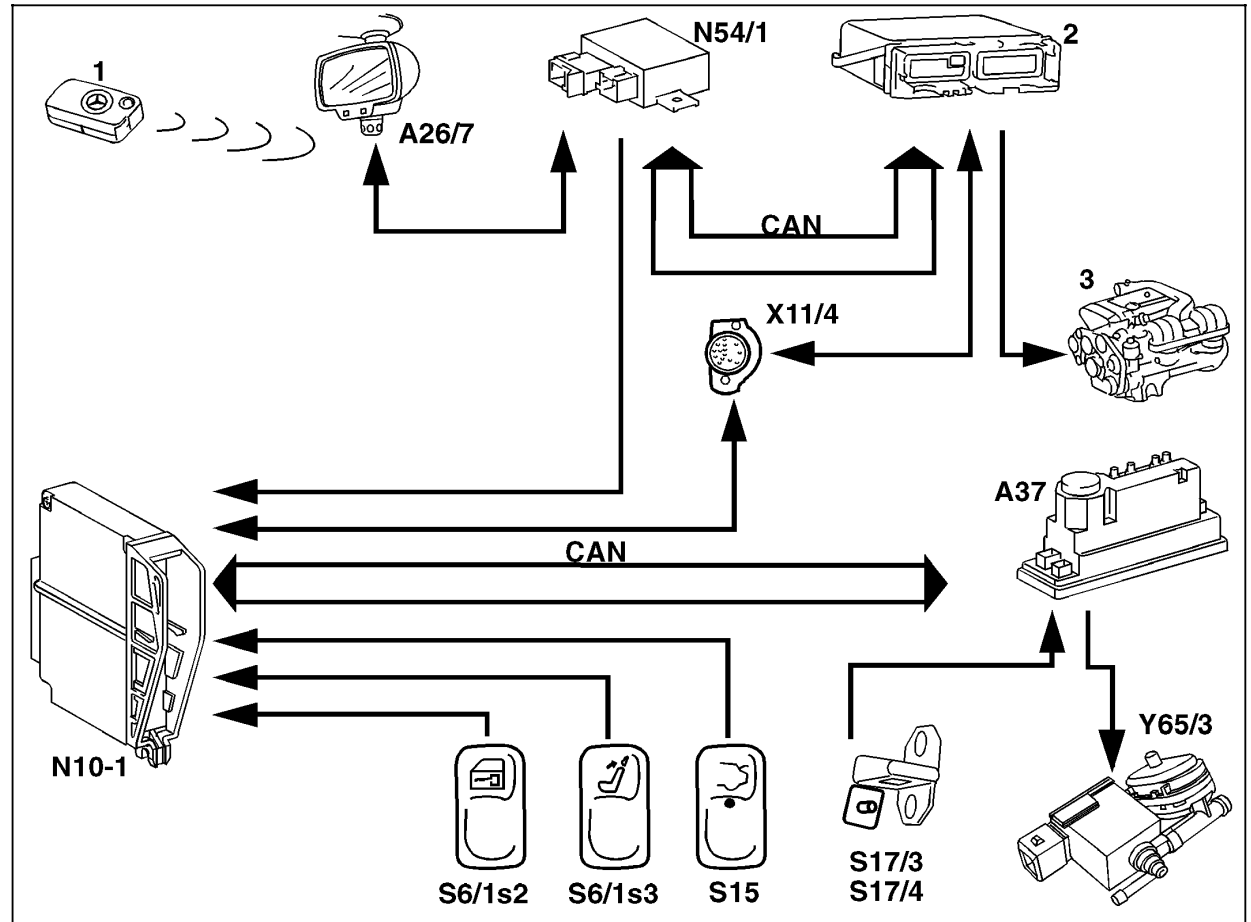


Figure 2

- A26/7 RCL receiver (interior rearview mirror)
- A37 PSE control module, combined functions
- CAN Control-Area-Network
- N10-1 Combination control module
- N54/1 IR DAS control module
- S6/1s2 Interior switch (CL)
- S6/1s3 RHR unlocking switch
- S15 Remote trunk lid switch (CL)
- S17/3 Left front door switch
- S17/4 Right front door switch
- X11/4 Data link connector (DTC readout)
- Y65/3 RTR control valve (CL)
- 1 IR transmitter with transponder
- 2 Engine control module
- 3 Engine

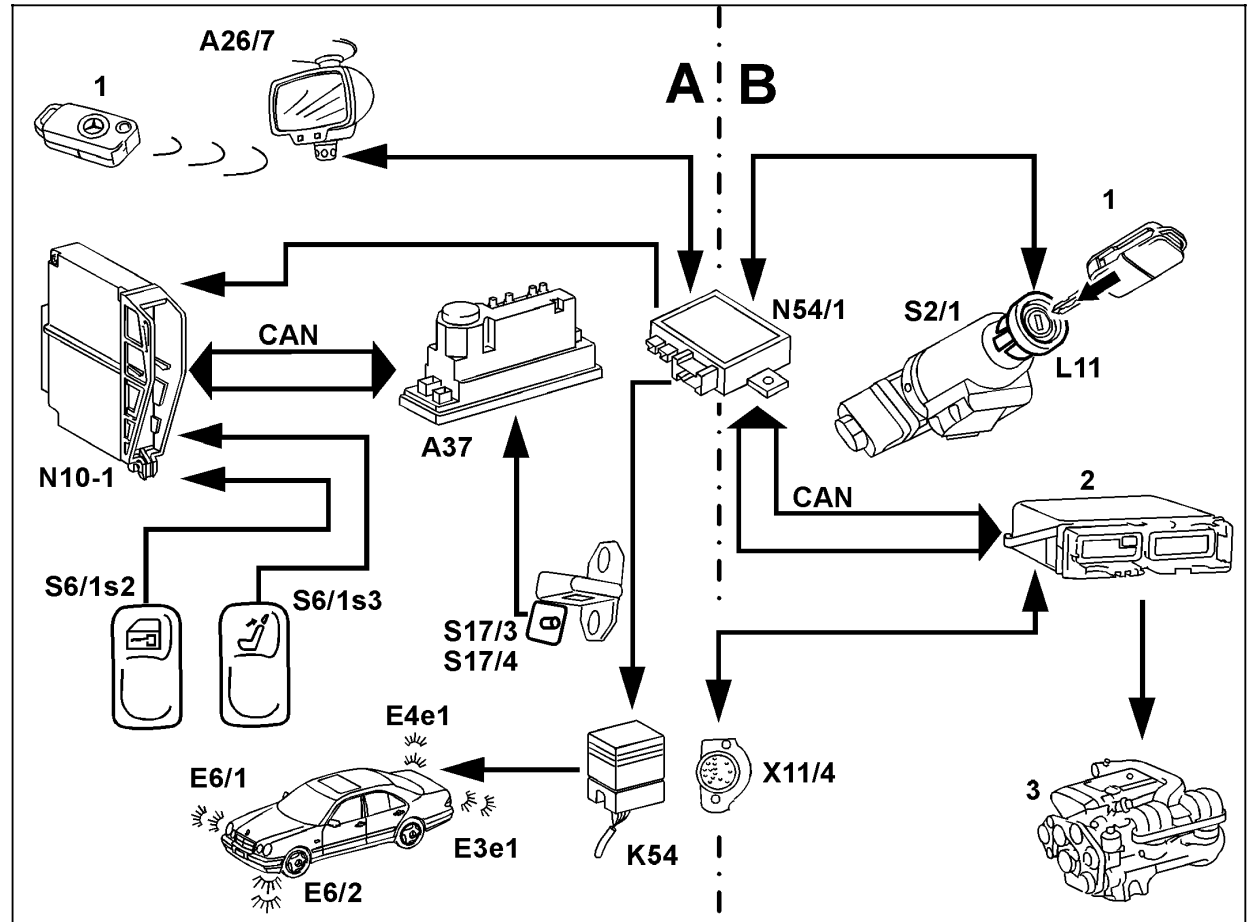
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#### Electrical Test Program – Connection of Components

**Model 210 as of 06/96**  
(sedan shown)

Figure 3

- A IR transmitter for CL
- B DAS 2 (Activation of motor electronics via transponder)
  
- A26/7 RCL receiver (interior rearview mirror)
- A37 PSE control module, combined functions
- CAN Control-Area-Network
- E3e1 Turn signal lamp
- E4e1 Turn signal lamp
- E6/1 Left turn signal lamp
- E6/2 Right turn signal lamp
- K54 Locking cofirmation relay module
- L11 Coil for transponder
- N10-1 Combination control module
- N54/1 IR DAS control module
- S2/1 Ignition/starter switch
- S6/1s2 Interior switch (CL)
- S6/1s3 RHR unlocking switch
- S15 Remote trunk lid switch (CL)
- S17/3 Left front door switch
- S17/4 Right front door switch
- X11/4 Data link connector (DTC readout)
- Y65/3 RTR control valve (CL)
- 1 IR transmitter with transponder
- 2 Engine control module
- 3 Engine



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#### Electrical Test Program - Preparation for Test

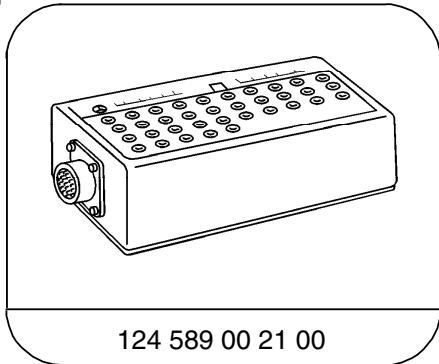
##### Preparation for Test:

1. Fuses for PSE system and PSE control module ok,
2. Battery voltage 11 – 14 V,
3. Provide access to PSE control module (A37),
4. Provide access to combination control module (N10-1 or N10-3),
5. Connect socket box with test cable according to connection diagram, see 22, Figure 1 – 3.

##### Electrical Wiring Diagrams:

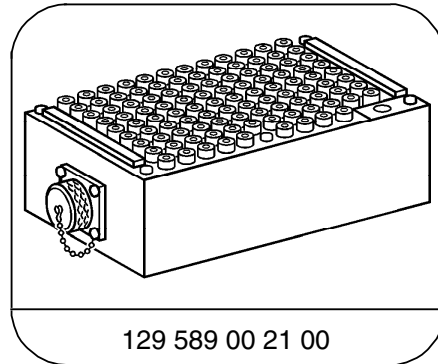
See Electric Troubleshooting Manual, Model 170, (please see future ETM), Model 210, Volume 2, group 80

##### Special Tools



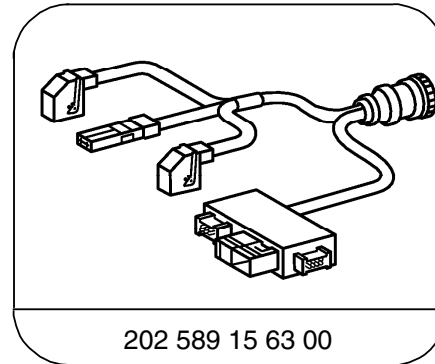
124 589 00 21 00

35-pin socket box



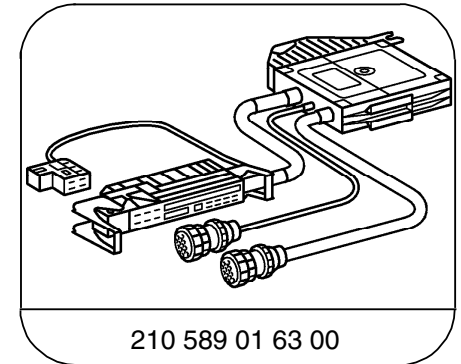
129 589 00 21 00

126-pin socket box



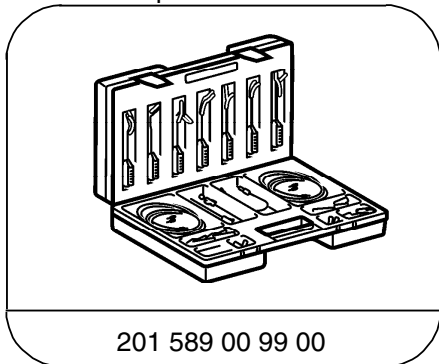
202 589 15 63 00

18-pin and 12-pin CAN test cable



210 589 01 63 00

78-pin test cable



201 589 00 99 00

Electrical connecting set

### 3.3 Pneumatic System Equipment (PSE)

Models 170, 210

#### Conventional tools, test equipment

Description	Brand, model, etc.
Multimeter <sup>1)</sup>	Fluke models 23, 83, 85, 87

<sup>1)</sup> Available through the MBUSA Standard Equipment Program.

#### Electrical Test Program - Preparation for Test

Connection Diagram - Socket Box  
Model 170

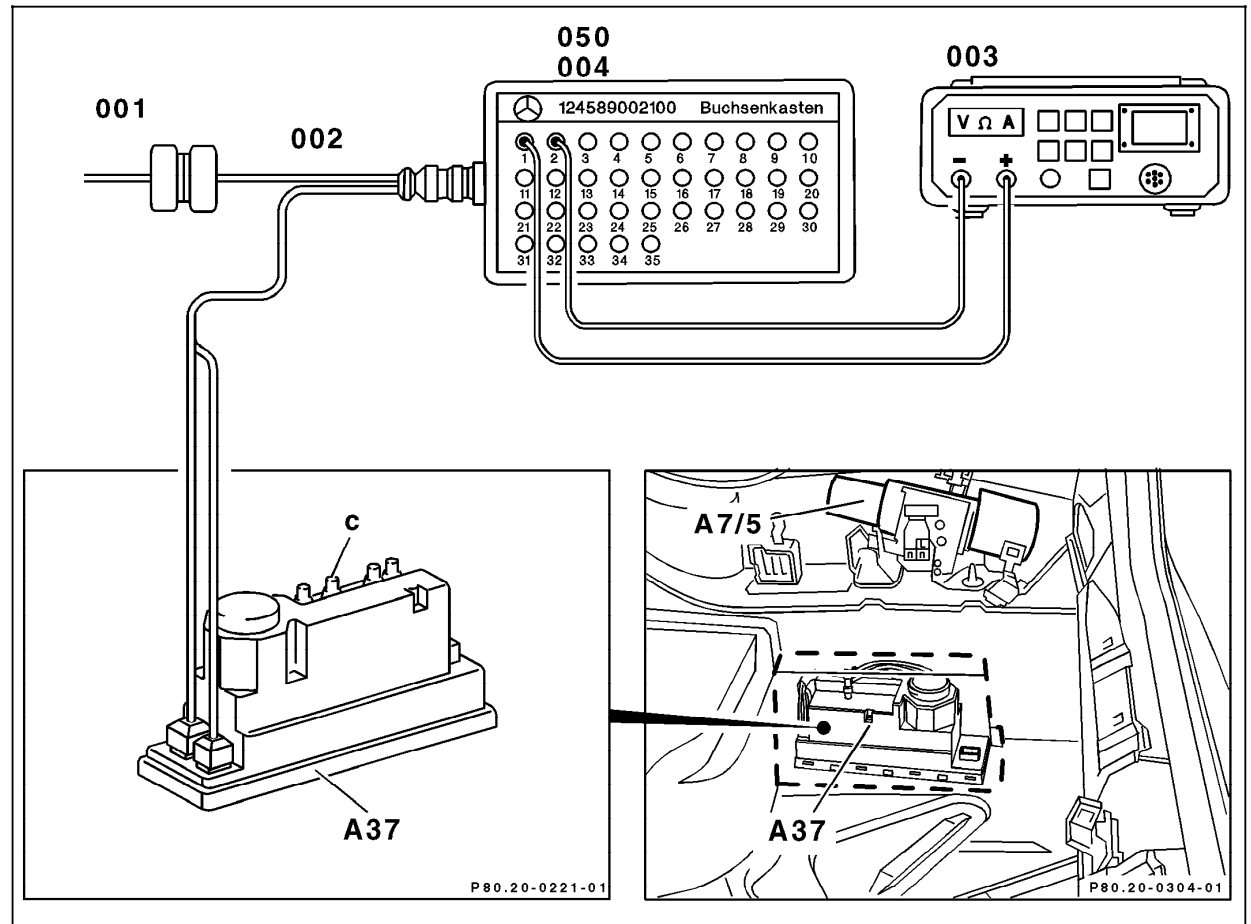


Figure 1

- A37 PSE control module, combined functions
- 001 PSE control module connector
- 002 Test cable
- 003 Multimeter
- 004/050 Socket box (35-pole)

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#### Electrical Test Program - Preparation for Test

**Connection Diagram - Socket Box**  
**Model 210**  
 (sedan shown)

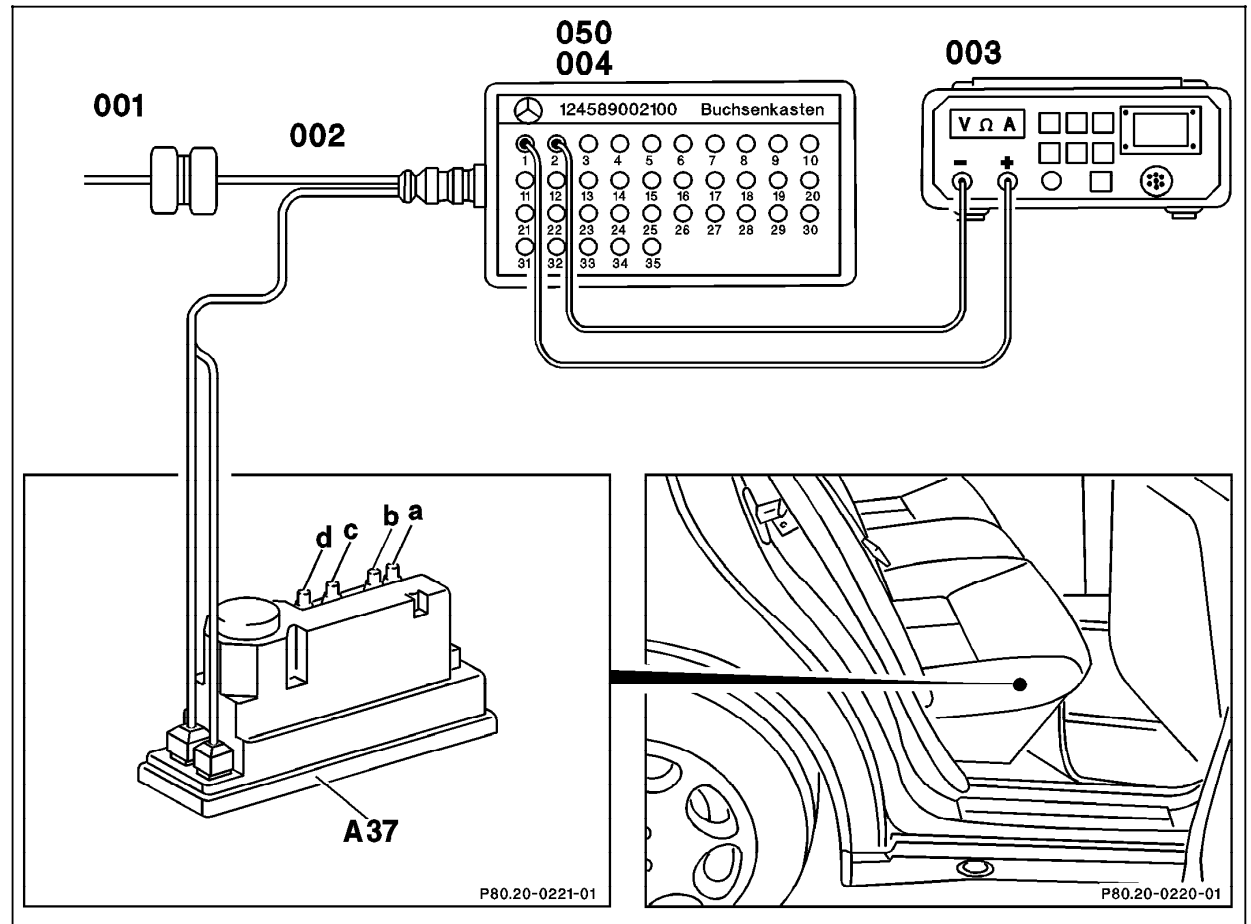


Figure 2

- A37 PSE control module, combined functions
- 001 PSE control module connector
- 002 Test cable
- 003 Multimeter
- 004/050 Socket box (35-pole)



#### Electrical Test Program - Preparation for Test

#### Connection Diagram - Socket Box

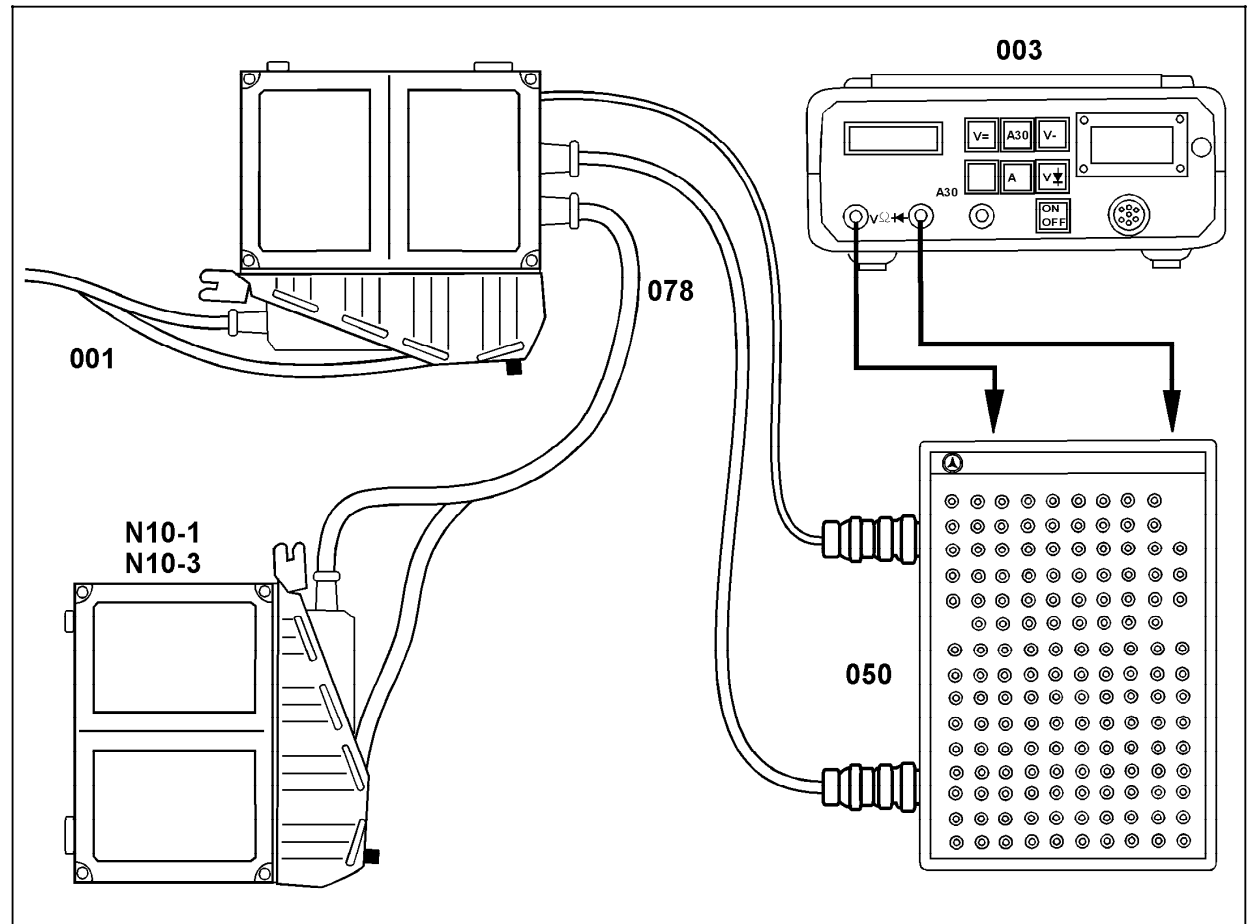


Figure 3













- N10-1 Combination control module (model 210)
- N10-3 Combination control module (model 170)
- 001 PSE control module connector
- 002 Test cable
- 003 Multimeter
- 050 Socket box (35-pole)

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#### Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0	B1021	<b>PSE control module (A37)</b> Voltage supply Circuit 30	A37 3 —  (2) ←  → A37 1 —  (2)	—	11 – 14 V	⇒ 1.1, Circuit 31
1.1		Circuit 30	←  (2) ←  → A37 1 —  (2)		11 – 14 V	Circuit 30
2.0	B1021 B1024	<b>CAN L data line</b> PSE/combination control module (N10-1 or N10-3) —//—	A37 (1) 9 —  (1) ←  → N10-1 N10-3 (A) 62 —  (A)	Disconnect A37 from . Disconnect combination control module (N10-1 or N10-3) from . Disconnect left and right front seat ESA control modules (N32/1, N32/2).	< 1 Ω	Wiring.
3.0	B1021 B1025	<b>CAN H data line</b> PSE/combination control module (N10-1 or N10-3) —//—	A37 (1) 10 —  (1) ←  → N10-1 N10-3 (A) 78 —  (A)	Disconnect A37 from . Disconnect combination control module (N10-1 or N10-3) from . Disconnect left and right front seat ESA control modules (N32/1, N32/2).	< 1 Ω	Wiring.

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
4.0	B1021 B1024	<b>CAN L data line</b> PSE/combination control module (N10-1 or N10-3) Γ1+	A37  9 ←  → 1 (1) (2)	Disconnect A37 from  . Disconnect ground wire from  . Disconnect combination control module (N10-1 or N10-3). Disconnect left and right front seat ESA control modules (N32/1, N32/2).	>20 kΩ	Wiring.
5.0	B1021 B1025	<b>CAN H data line</b> PSE/combination control module (N10-1 or N10-3) Γ1+	A37  10 ←  → 1 (1) (2)	Disconnect A37 from  . Disconnect ground wire from  . Disconnect combination control module (N10-1 or N10-3). Disconnect left and right front seat ESA control modules (N32/1, N32/2).	>20 kΩ	Wiring.
6.0	B1021 B1024	<b>CAN L data line</b> PSE/combination control module (N10-1) Γ1-	A37  3 ←  → 9 (2) (1)	Disconnect A37 from  . Disconnect combination control module (N10-1 or N10-3). Disconnect left and right front seat ESA control modules (N32/1, N32/2).	>20 kΩ	Wiring.



#### Electrical Test Program – Component Locations

#### Model 170

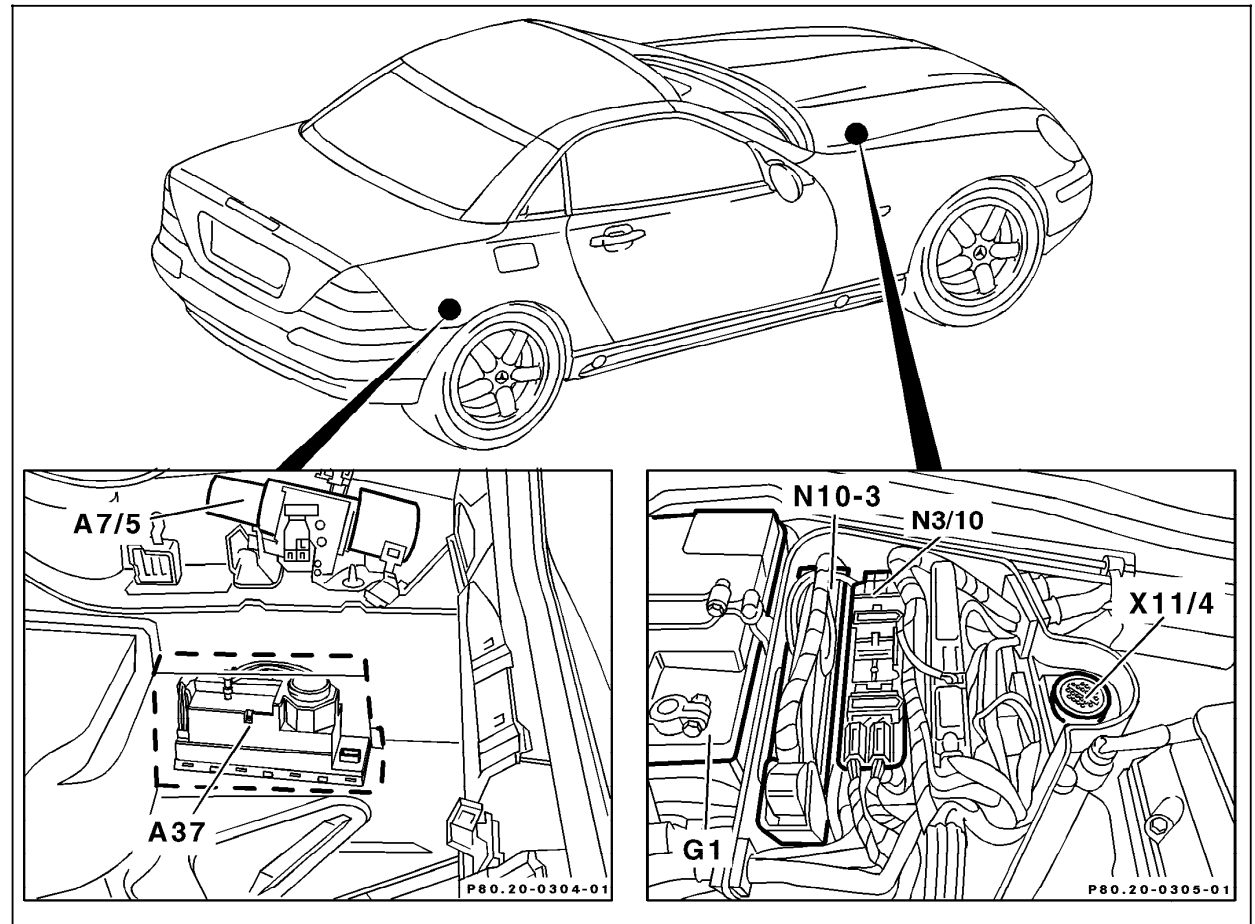


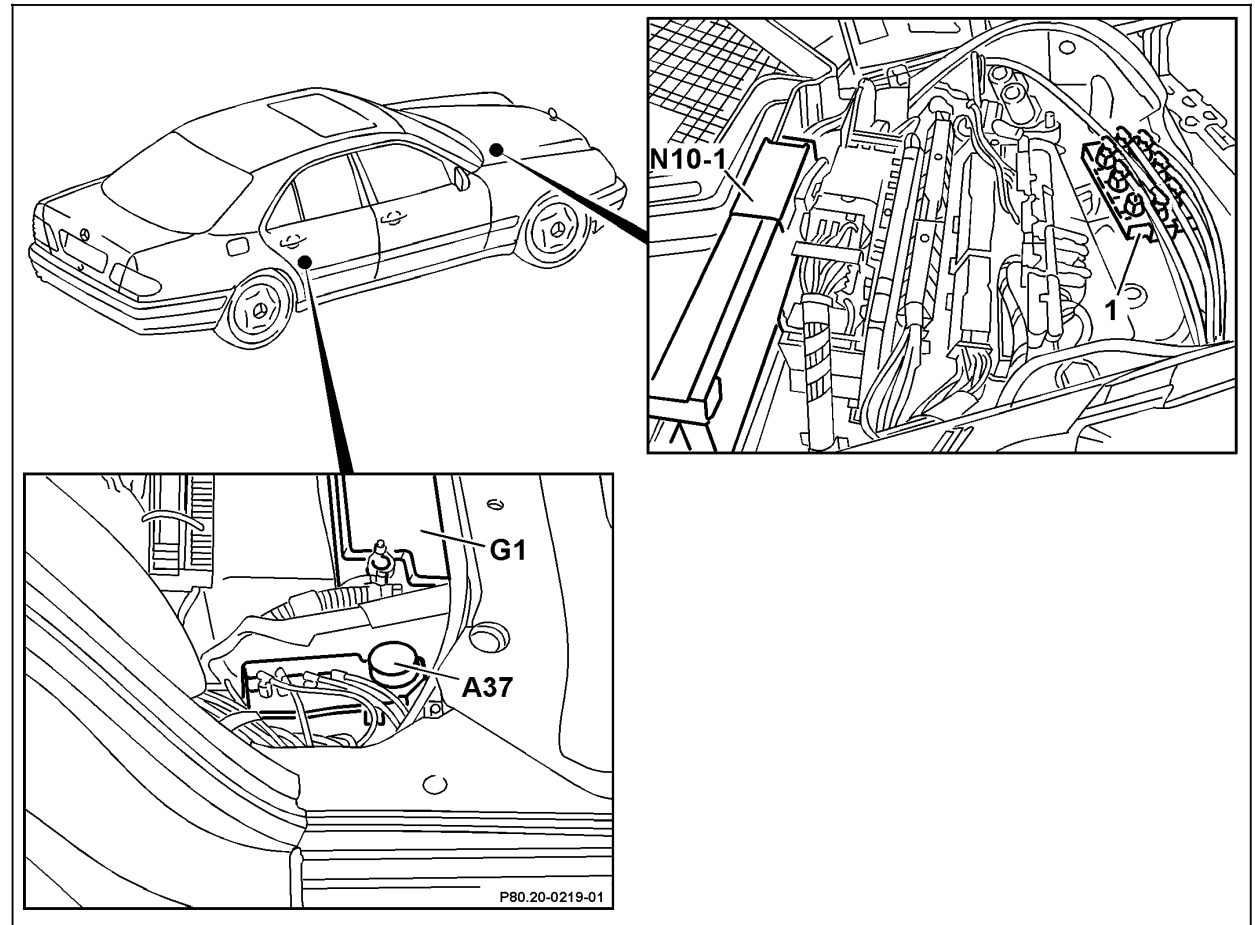
Figure 1

- A7/5 Retractable hardtop hydraulic unit
- A37 PSE control module
- G1 Battery
- N3/10 Engine control module (ME-SFI)
- N10-3 Combination control module
- X11/4 Data link connector (DTC readout)

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#### Electrical Test Program – Component Locations

##### Model 210



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#### Pneumatic Test Program - Preparation for Test

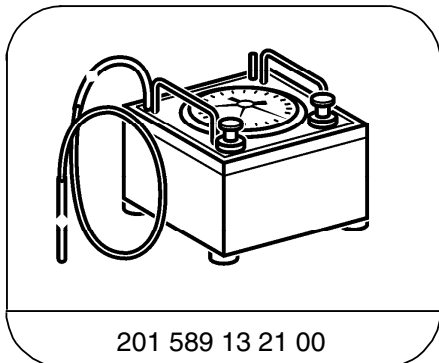
##### Preparation for Test:

1. Fuses for PSE system and PSE control module ok,
2. Battery voltage 11 – 14 V.
3. Unlock vehicle using IR transmitter.
4. Connect reservoir with vacuum Y-distributor to vacuum/pressure tester.
6. Provide access to PSE control module (A37) and disconnect PSE pneumatic multiple connector (do not disconnect wiring harness).
7. Connect vacuum/pressure tester with reservoir to PSE control module (see 32, Figure 1).

##### Parts Required for Test:

1	Reservoir	107 800 08 19
1	Y-distributor	117 078 01 45
3	Plug	210 800 00 53
1	Connection hose, 50 mm long	007 997 61 82
2	Pneumatic line, 1 m long	000 158 14 35

##### Special Tools



201 589 13 21 00

Tester

##### Notes:

1. Before testing the safety switch time of the consumers, as well as between the tests for **OSB** (pressure) and **MVA** (vacuum), interrupt the PSE control module power supply for at least 3 seconds.
2. After completing the **PSE** control module test, do not operate any system which would require vacuum or pressure for approx. 10 minutes.
3. The connections on the PSE control module are marked with their German acronyms. Reference to these connections in this test are made to their U. S. equivalents. In other words:  
 ZV (German) = CL (U.S.),  
 SRU (German) = MVA (U.S.),  
 OSL (German) = OSB (U.S.).

Pneumatic Test Program - Preparation for Test

Connection Diagram - Vacuum/Pressure Tester with Reservoir

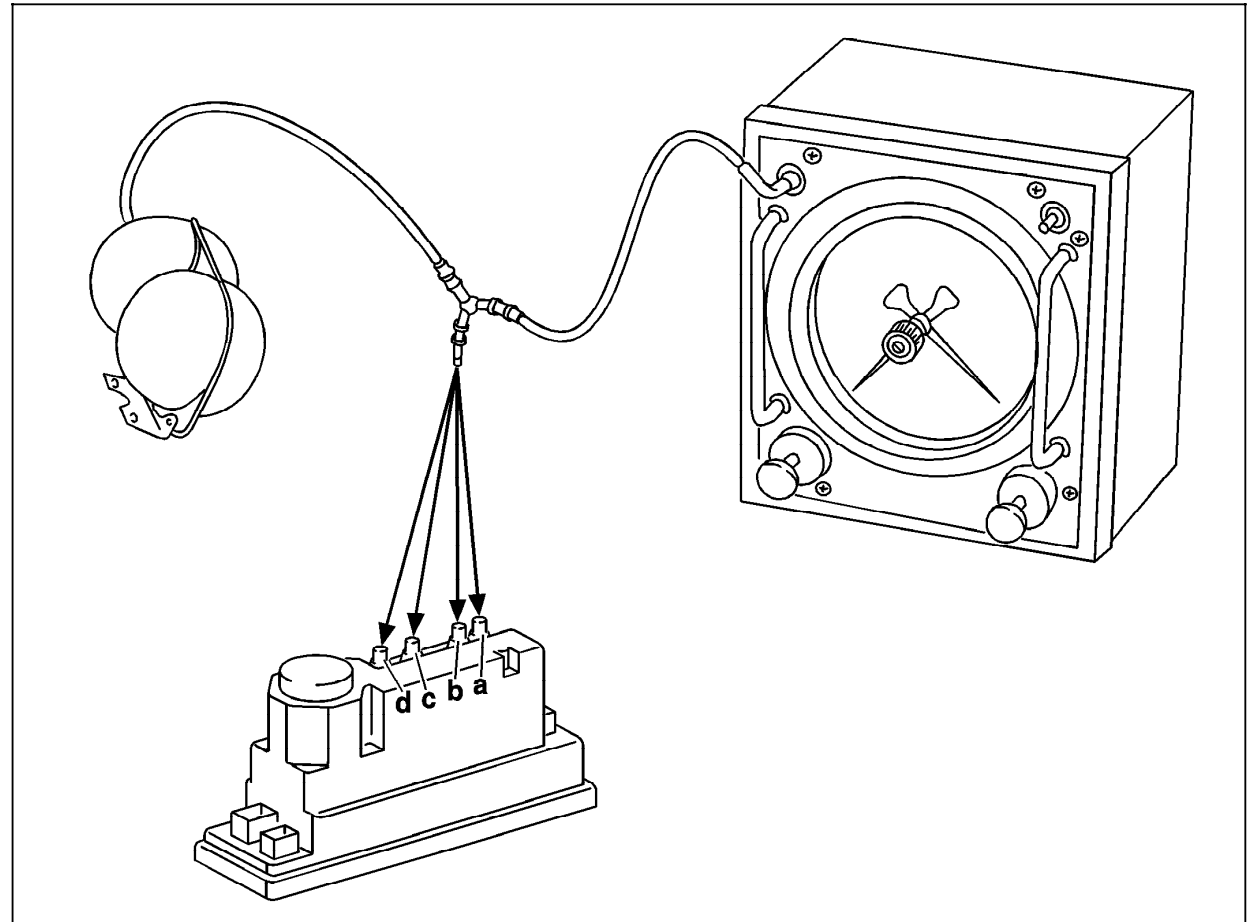


Figure 1

- a Multi-contour seat pneumatic connection
- b MVA pneumatic connection
- c CL/RTR pneumatic connection
- d RHR pneumatic connection

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#### Pneumatic Test Program - PSE Control Module Test

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0	<b>Central locking system</b> Vacuum supply	<b>PSE</b> control module connector <b>CL</b> to <b>black</b> connector on tester.	Cap connections on the <b>PSE</b> control module: <b>Bosch: RHR, MVA</b> Close front doors.  Lock vehicle using interior switch (CL).	450 mbar in 1.2 sec.	23 PSE/CL ⇒ 1.0
2.0	<b>Central locking system</b> Pressure supply	<b>PSE</b> control module connector <b>CL</b> to <b>yellow</b> connector on tester.	Cap connections on the <b>PSE</b> control module: <b>Bosch: RHR, MVA</b> Close front doors.  Unlock vehicle using interior switch (CL).	450 mbar in 0.8 s	23 PSE/CL ⇒ 1.0
3.0	<b>Multi-contour seat</b> Pressure supply (model 210 only)	<b>PSE</b> control module connector <b>OL</b> to <b>yellow</b> connector on tester.	Cap connections on the <b>PSE</b> control module: <b>RHR, KLA, CL</b> Turn ignition OFF, ON	Pump runs after approx. 4 sec. delay. 450 mbar in 0.8 s	2.1 23 ⇒ 1.0–3.0 PSE control module (A37), Combination control module (N10-1).

#### Pneumatic Test Program - PSE Control Module Test

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
4.0	<b>Retractable rear head restraints</b> Vacuum supply (model 210 only)	<b>PSE</b> control module connector <b>RHR</b> to <b>black</b> connector on tester.	Cap connections on the <b>PSE</b> control module: <b>Bosch: CL, MVA</b> Retractable rear head restraints up. Ignition: <b>ON</b> Press RHR unlocking switch	450 mbar in 1.2 s	23 PSE/RHR ⇒ 1.0
5.0	<b>Manifold vacuum assist</b> Vacuum supply (model 210 only)	<b>PSE</b> control module connector <b>KLA or MVA</b> to <b>black</b> connector on tester.	Cap connections on the <b>PSE</b> control module: <b>Bosch: RHR, CL</b>  Turn ignition OFF, ON	Pump runs after approx. 8 sec. delay. 450 mbar in 1.2 s	2.1 23 ⇒ 1.0–3.0 PSE control module (A37), Combination control module (N10-1).
6.0	<b>Remote trunk release</b> Pressure supply (model 210 only)	<b>PSE</b> control module connector <b>CL</b> to <b>yellow</b> connector on tester.	Cap connections on the <b>PSE</b> control module: <b>Bosch: RHR, MVA</b>  With vehicle unlocked, press remote trunk release button.	450 mbar in 1.2 s	23 PSE/RTR ⇒ 1.0

#### Pneumatic Test Program - PSE Control Module Test

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
7.0	<b>Central locking</b> Safety switch time	–	Cap connections on the <b>PSE</b> control module: <b>Bosch: RHR, MVA</b> Close front doors.  Unlock vehicle using interior switch (CL).	Pump runs 10±1 sec.	23 PSE/CL ⇒ 1.0, PSE control module (A37).
8.0	<b>Additional Consumers</b> Safety switch time	–	Cap connections on the <b>PSE</b> control module: <b>Bosch: CL, MVA</b> Turn Ignition: <b>ON</b>  Press RHR button.	Pump runs 60 sec.	23 PSE/RTR ⇒ 1.0–8.0, 2.1 23 ⇒ 1.0–3.0, Combination control module (N10-1).