

### 3.1 Backup Assist (PSE/BA) Model 140

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Diagnosis - Function Test (Backup Assist)

Preliminary work:

Diagnosis - Diagnostic Trouble Code (DTC) Memory ..... 11 PSE (3.1)

Component Locations

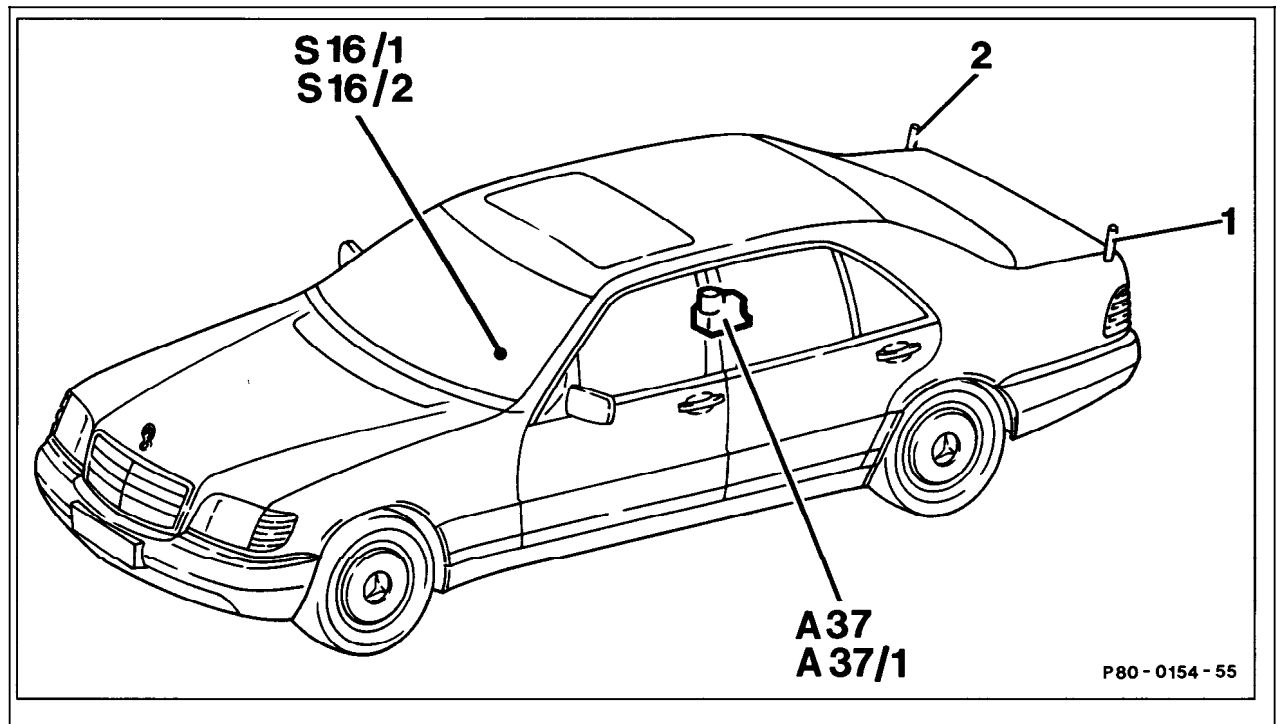


Figure 1

- A37, A37/1 PSE control module
- 1 Left backup assist mast
- 2 Right backup assist mast
- S16/1 Starter lock-out/backup lamp switch

P80-0154-55

#### Diagnosis - Function Test (Backup Assist)

##### Preparation for Test:

1. Check fuse F4-3 and fuse F4-11.
2. Battery voltage 11 – 14 V.
3. Ignition: **ON**.

Test step/Test scope	Test condition	Nominal value	Possible cause/Remedy <sup>1)</sup>
⇒ 1.0 Extend backup assist masts	Engage reverse gear.	Both backup assist masts extend after approx. 0.5 seconds.	<p>Backup assist masts do not extend and pump motor in PSE control module (A37, A37/1) <b>does not run</b>.</p> <p>23 PSE ⇒ 1.0, 23 ⇒ 1.0.</p> <p>Backup assist masts do not extend even though pump motor in PSE control module (A37, A37/1) <b>runs</b>.</p> <p>32 PSE ⇒ 3.0, 32 ⇒ 1.0.</p>

1) Observe Preparation for Test, see 22.

#### Diagnosis - Function Test (Backup Assist)

Test step/Test scope	Test condition	Nominal value	Possible cause/Remedy <sup>1)</sup>
⇒ 2.0 Retract backup assist masts	After 2 second delay, select range other than reverse.	Both backup assist masts retract after approx. 10 seconds.	<p>Backup assist masts do not retract and pump motor in PSE control module (A37, A37/1) <b>does not run</b>.</p> <p>23 PSE ⇒ 1.0, 23 ⇒ 1.0.</p> <p>Backup assist masts do not retract even though pump motor in PSE control module (A37, A37/1) <b>runs</b>.</p> <p>32 PSE ⇒ 4.0, 32 ⇒ 2.0.</p>
⇒ 3.0 Retract backup assist masts	Backup assist masts extended Ignition: <b>OFF</b>	Both backup assist masts retract immediately.	<p>Backup assist masts do not retract and pump motor in PSE control module (A37, A37/1) <b>does not run</b>.</p> <p>23 PSE ⇒ 1.0, 23 ⇒ 1.0.</p> <p>Backup assist masts do not retract even though pump motor in PSE control module (A37, A37/1) <b>runs</b>.</p> <p>32 PSE ⇒ 4.0, 32 ⇒ 2.0.</p>

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

Electrical Test Program - Component Locations (Backup Assist)

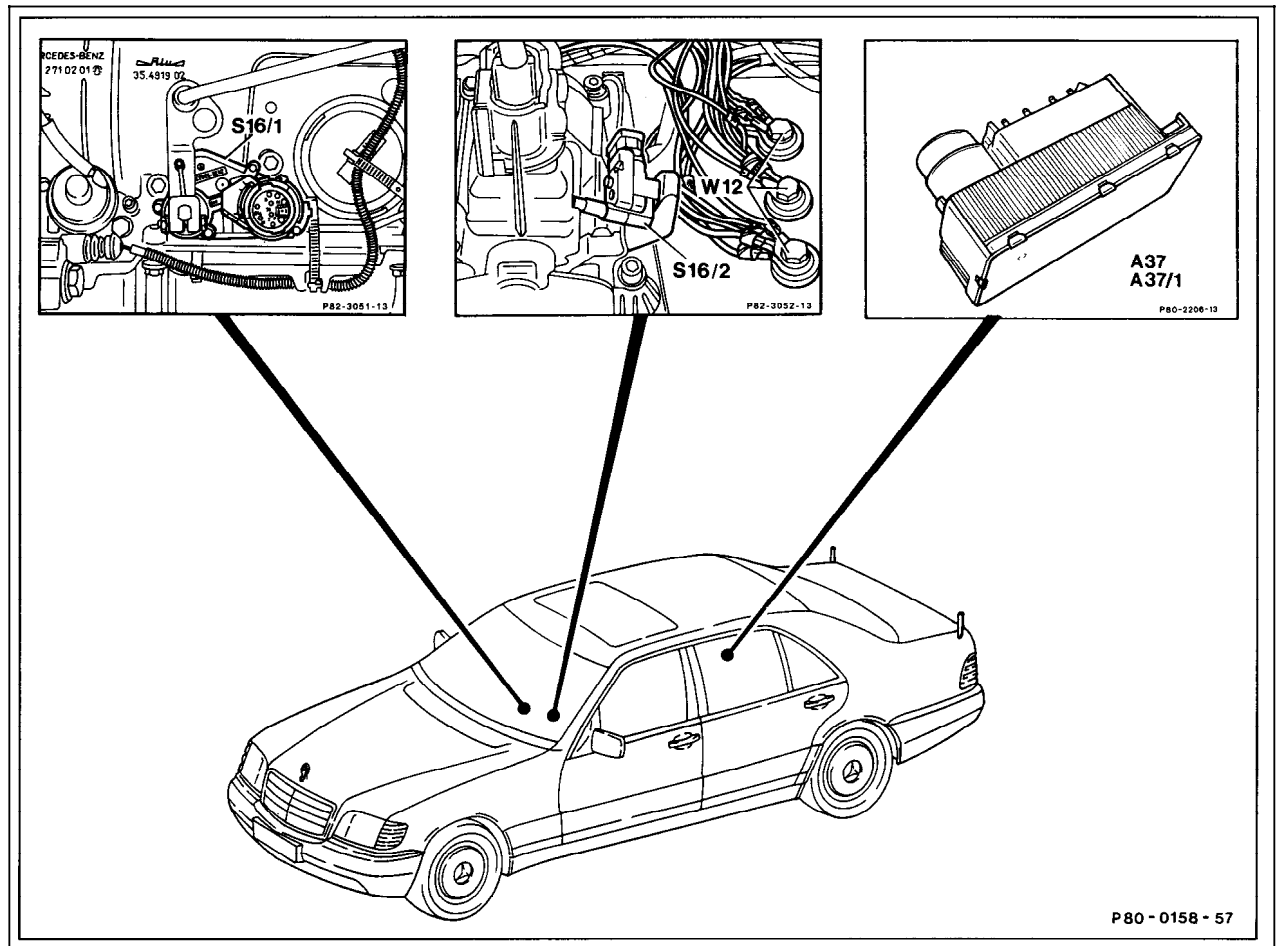


Figure 1  
A37, A37/1 PSE control module  
S16/1 Starter lock-out/backup lamp switch

P80 - 0158 - 57

P80-0158-57

#### Electrical Test Program - Preparation for Test (Backup Assist)

Preliminary work:

Diagnosis - Diagnostic Trouble Code (DTC) Memory ..... 11 PSE

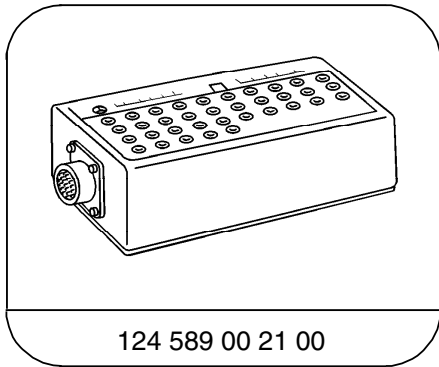
#### Preparation for Test:

1. Check fuse F4-3 and fuse F4-11.
2. Provide access to PSE control module (A37, A37/1).
3. Connect socket box with test cable according to connection diagram, see 22 Fig.1.

#### Electrical wiring diagrams

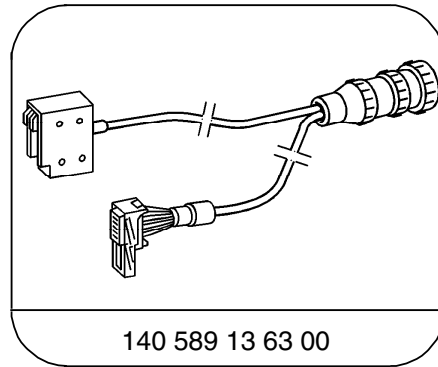
See Electrical Troubleshooting Manual, Model 140, Volume 2.

#### Special Tools



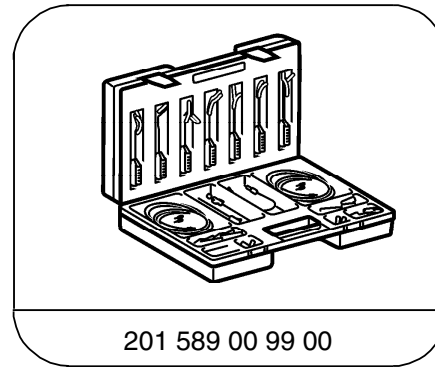
124 589 00 21 00

35-pin socket box



140 589 13 63 00

21-pin test cable



201 589 00 99 00

Electrical connecting set

#### Equipment

Multimeter <sup>1)</sup>	Fluke models 23, 83, 85, 87
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<sup>1)</sup> Available through the MBUSA Standard Equipment Program.

## Electrical Test Program - Preparation for Test (Backup Assist)

Connection Diagram - Socket Box

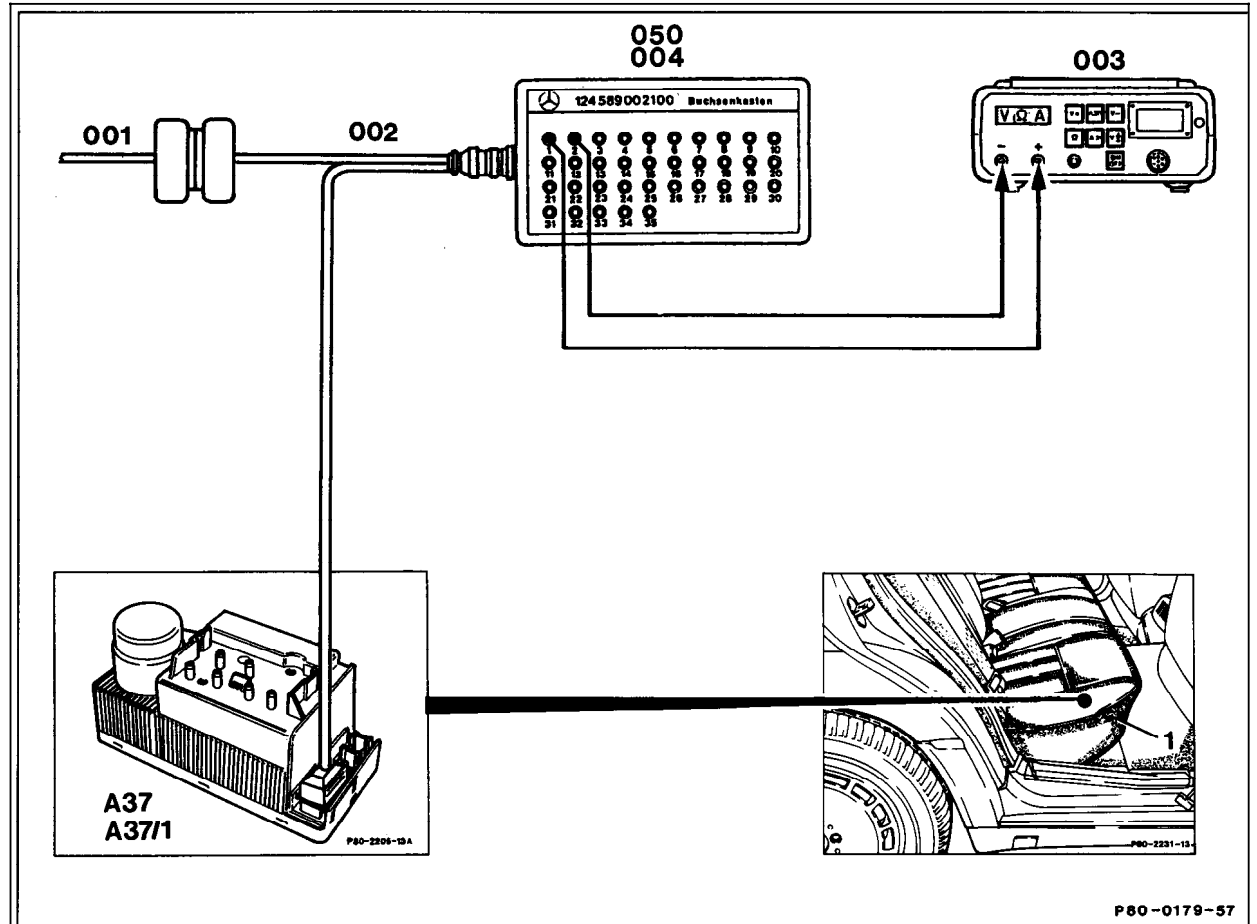


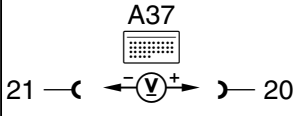
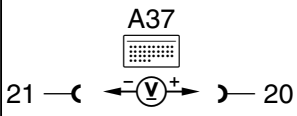

Figure 1

- 001 PSE control module connector
- 002 Test cable
- 003 Multimeter
- 004/050 Socket box (35-pole)
- A37, A37/1 PSE control module

P80-0179-57

P80-0179-57

#### Electrical Test Program - Test (Backup Assist)

Test step	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 1.0	<b>Starter lock-out/backup lamp switch (S16/1)</b>	 <p>A37 21 —( —( ←(V)→ —( —( —) 20</p>	Ignition: <b>ON</b>  Selector lever position: <b>N</b>  Selector lever position: <b>R</b>	<1 V  11 – 14 V	Wiring, ⇒ 1.1, PSE control module (A37 or A37/1).  Wiring, ⇒ 1.1, A37 or A37/1.
⇒ 1.1	S16/1	 <p>A37 21 —( —( ←(V)→ —( —( —) 20</p>	Disconnect PSE control module (A37 or A37/1) from  Ignition: <b>ON</b>  Selector lever position: <b>N</b>  Selector lever position: <b>R</b>	<1 V  11 – 14 V	Wiring, S16/1.  Wiring, S16/1.



Pneumatic Test Program - Component Locations (Backup Assist)

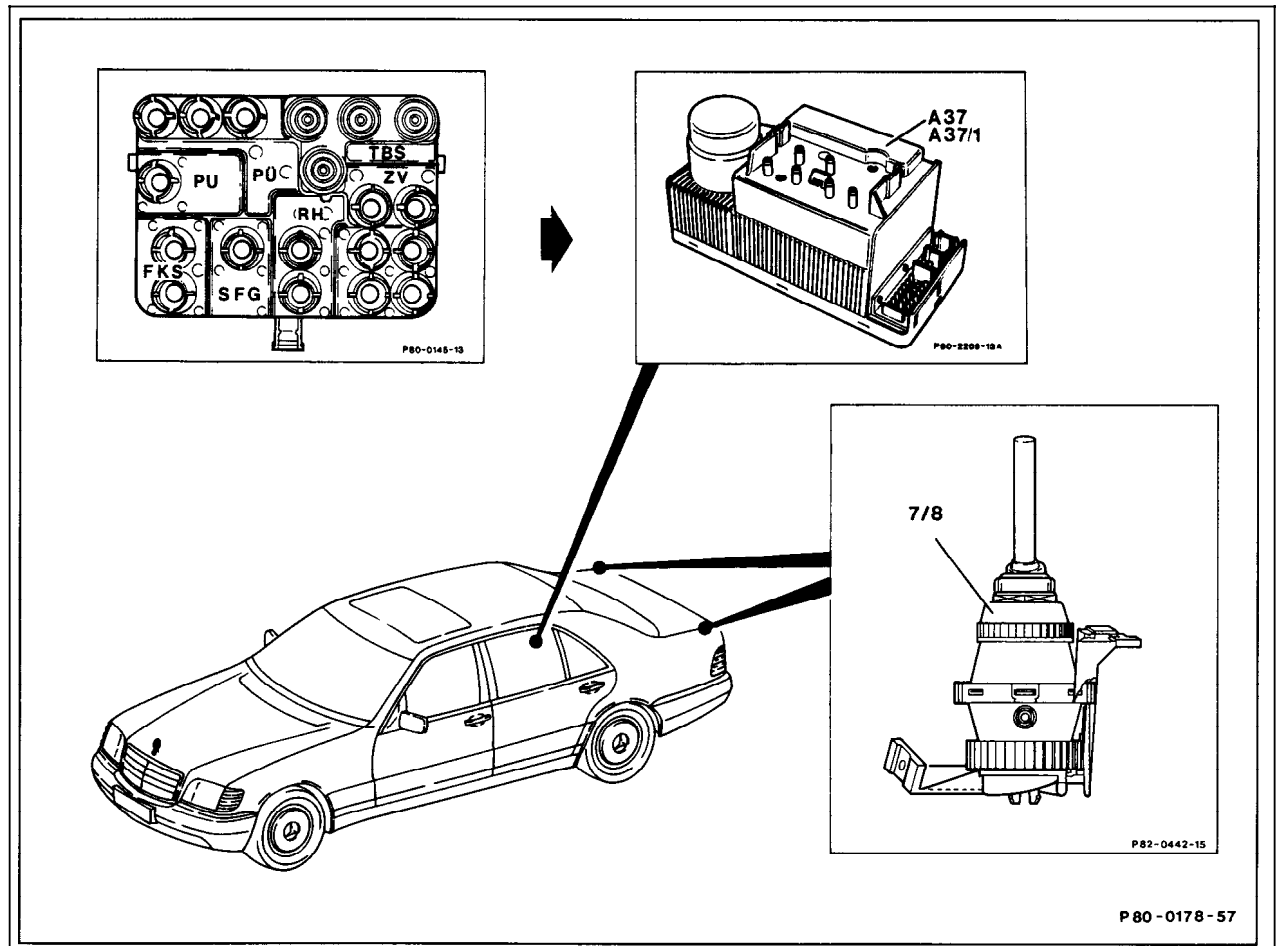


Figure 1

7/8 Backup assist actuator  
 A37, A37/1 PSE control module

P 80 - 0178 - 57

P80-0178-57

#### Pneumatic Test Program – Test (BA)

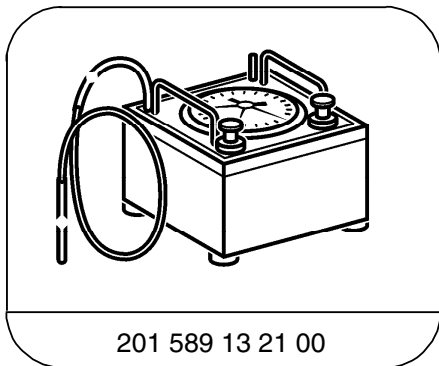
Preliminary work:

Diagnosis - Diagnostic Trouble Code (DTC) Memory .....	11 PSE
PSE Control Module Test .....	32 PSE

#### Data (mbar)

Test procedure	Permissible deviation
Allowable system leakage at 600 mbar pressure or 300 mbar vacuum in 1 minute.	30 mbar
Allowable leakage of actuators with lines at 600 mbar pressure or 300 mbar vacuum in 1 minute.	25 mbar

#### Special Tools



201 589 13 21 00

Tester

#### Pneumatic Test Program – Test (BA)

#### A. Entire system

##### Preparation for Test:

Vehicles up to 07/94:

1. Disconnect pneumatic multiple connector from PSE control module.
2. Connect tester to bottom side of pneumatic multiple connector at **RH** (BA) using connector 129 805 04 44.

Vehicles as of 08/94:

1. Disconnect **orange** pneumatic line with socket from PSE control module.
2. Connect tester to disconnected pneumatic line using connector 129 805 04 44.

##### Parts Required for Test:

1	Connector	129 805 04 44
2	Connection hose, 50 mm long	007 997 61 82
1	Pneumatic line, 1 m long	000 158 14 35

##### Note:

The connections on the PSE control module and pneumatic multiple connector are marked with their German acronyms. In other words:

**ZV** (German) = **CL** (English),

**RH** (German) = **BA** (English),

**FKS** (German) = **RHR** (English),

**SFG** (German) = **RTG** (English),

**PÜ/P+ (OSL)** (German) = **PÜ/P+ (OSB)** (English),

**PU/P- (SRU)** (German) = **PU/P- (MVA)** (English).

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0	<b>Complete system pressurized</b>	<b>Yellow</b> connector on tester. Connector <b>RH</b> on bottom side of multiple connector.	Apply 600 mbar pressure to entire system.	Pressure loss 30 mbar in 1 minute	33 PSE ⇒ 1.0, 32 ⇒ 3.0
2.0	<b>Complete system evacuated</b>	<b>Black</b> connector on tester. Connector <b>RH</b> on bottom side of multiple connector.	Apply 300 mbar vacuum to entire system.	Vacuum loss 30 mbar in 1 minute	33 PSE ⇒ 2.0, 32 ⇒ 4.0

#### Pneumatic Test Program – Test (BA)

#### B. Individual lines with actuators

##### Preparation for Test:

Vehicles up to 07/94:

1. Pry off **orange** backup assist (BA) pneumatic line at pneumatic multiple connector (using a 7 mm open end wrench).
2. Connect tester in sequence to each of the **orange** BA pneumatic lines using connector 007 997 61 82.

Vehicles as of 08/94:

1. Disconnect **orange** BA pneumatic lines at pneumatic distributor.
2. Connect tester in sequence to each of the **orange** BA pneumatic lines using connector 007 997 61 82.

##### Note:

1. If an actuator does not operate correctly and no leakage is found, check the respective lines for kinks or blockages.
2. On vehicles as of approx. 06/94, the disconnected pneumatic lines are to be reconnected to the distributor with connector 007 997 61 82.

##### Parts Required for Test:

- |   |                       |               |
|---|-----------------------|---------------|
| 1 | Connector, 50 mm long | 007 997 61 82 |
|---|-----------------------|---------------|

Letters on the distributor indicate to which of the actuators the pneumatic line leads.

A → Left actuator

B → Right actuator

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
3.0	<b>Line and actuator pressurized</b>	<b>Yellow</b> connector on tester.	Apply 600 mbar pressure to line and actuator.	Pressure drop 25 mbar in 1 minute	32 ⇒ 5.0, 32 ⇒ 7.0
4.0	<b>Line and actuator evacuated</b>	<b>Black</b> connector on tester.	Apply 300 mbar vacuum to line and actuator.	Vacuum loss 25 mbar in 1 minute	32 ⇒ 6.0, 32 ⇒ 8.0

#### Pneumatic Test Program – Test (BA)

#### C. Actuators

##### Preparation for Test:

1. Provide access to actuator, see SMS, Repair Instructions, Job No. 82–400.
2. Connect vacuum/pressure tester to pneumatic connection of actuator.

##### Parts Required for Test:

- |   |                       |               |
|---|-----------------------|---------------|
| 1 | Pneumatic line        | 129 800 62 15 |
| 1 | Connector, 50 mm long | 007 997 61 82 |

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
5.0	<b>Actuator holds pressure.</b>	<b>Yellow</b> connector on tester	Apply 600 mbar pressure to actuator.	Pressure drop 25 mbar in 1 minute	Actuator leaks. Replace actuator.
6.0	<b>Actuator holds vacuum.</b>	<b>Black</b> connector on tester	Apply 300 mbar vacuum to actuator.	Vacuum loss 25 mbar in 1 minute	Actuator leaks. Replace actuator.

#### Pneumatic Test Program – Test (BA)

#### D. Lines

##### Preparation for Test:

1. Connect tester to one end of pneumatic line and plug other end with cap 000 987 29 45.

##### Parts Required for Test:

- |   |                       |               |
|---|-----------------------|---------------|
| 1 | Cap                   | 000 987 29 45 |
| 1 | Connector, 50 mm long | 007 997 61 82 |

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
7.0	<b>Line holds pressure.</b>	<b>Yellow</b> connector on tester.	Apply 600 mbar pressure to line.	Pressure drop 0 mbar in 1 minute	Pneumatic line leaks. Repair/replace line.
8.0	<b>Line holds vacuum.</b>	<b>Black</b> connector on tester.	Apply 300 mbar vacuum to line.	Vacuum loss: 0 mbar in 1 minute	Pneumatic line leaks. Repair/replace line.