

## 3.2 Adaptive Damping System (ADS)

Models 129.063/067/076, 140

3.2 Model 129.063/067/076 up to 09/95  
Model 140 up to 06/94

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Diagnosis – Function Test

Components Locations

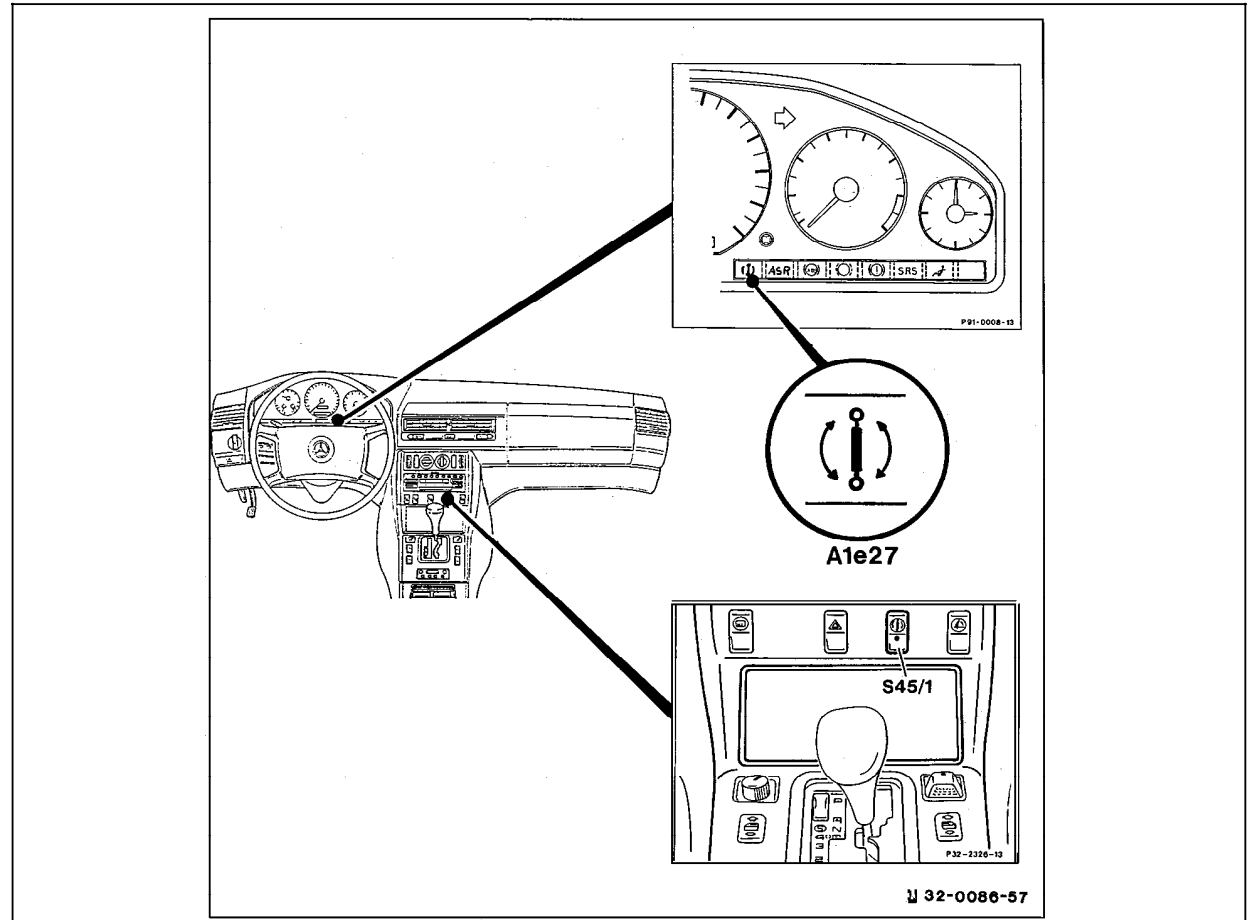


Figure 1

- A1e27 ADS MIL
- S45/1 Comfort/sport switch (ADS)

U32-0086-57

#### Diagnosis – Function Test

Test step/Test sequence	Test condition	Nominal value	Possible cause/Remedy <sup>1)</sup>
⇒ 1.0    ADS MIL (A1e27)	Ignition: <b>ON</b>  Engine: <b>at Idle</b>	A1e27 comes on.  A1e27 goes out.	Wiring, A1e27 23 ⇒ 5.0, ADS control module (N51) 23⇒ 1.0  Steering angle sensor (N49) not initialized, turn steering wheel from right to left stop, DTC stored in memory, read out DTC 12, Wiring, ADS control module (N51), Circuit 61 23 ⇒ 2.0
⇒ 2.0    Comfort/sport switch (S45/1)	Switch (S45/1) set to: <b>Sport</b>  <b>Comfort</b>	Indicator lamp in switch (S45/1): <b>ON</b>  <b>OFF</b>	Wiring, S45/1 23 ⇒ 11.0.

1) Observe Preparation for Test, see 22.

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

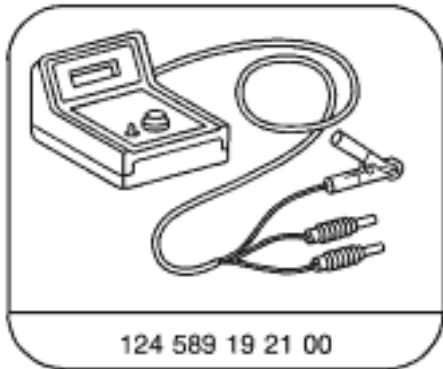
#### Test Preparation for DTC Readout

1. Connect impulse counter scan tool or Hand-Held Tester (HHT) to the data link connector (X11/4) according to the connection diagram as shown in section 0.

**Note:** Connect yellow wire from impulse counter scan tool to:  
ADS control module (N51) socket 11  
Base module (N16/1) socket 8

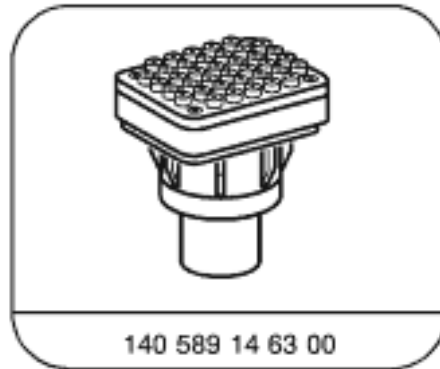
2. Read out any stored DTC's from ADS control module (N51) and BM (N16/1).

#### Special Tools



124 589 19 21 00

Pulse counter



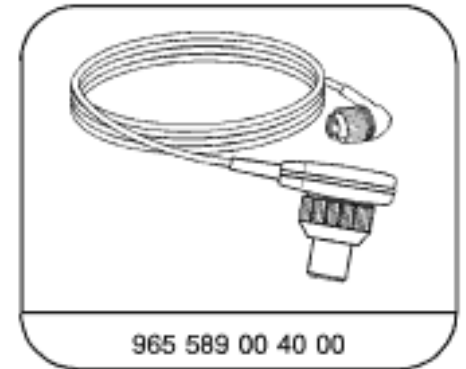
140 589 14 63 00

Adapter



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 <sup>1)</sup>
1 —	No fault in system.	In case of complaint: 23 and 33 (entire test)
2 002	ADS control module (N51)	Replace N51.
3 003	Body acceleration sensor (B24)	23 ⇒ 7.0
4 004	Wheel acceleration sensor (B24/1)	23 ⇒ 6.0
5 005	Steering angle sensor (N49)	23 ⇒ 9.0
6 006	Left/right front axle solenoid valve 1 (Y51y1, Y52y1)	23 ⇒ 14.0, 16.0
7 007	Left/right front axle solenoid valve 2 (Y51y2, Y52y2)	23 ⇒ 15.0, 17.0
8 008	Left/right rear axle solenoid valve 1 (Y53y1, Y54y1)	23 ⇒ 12.0
9 009	Left/right rear axle solenoid valve 2 (Y53y2, Y54y2)	23 ⇒ 13.0
10 010	<i>Not for U.S.A. vehicles.</i>	
11 011	<i>Not for U.S.A. vehicles.</i>	
12 012	<b>Model 129</b> Left front (VSS) from ABS or ABS/ASR control module <b>Model 140</b> Right front (VSS) from ABS or ABS/ASR control module	23 ⇒ 4.0

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

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

Diagnostic trouble code (DTC)  	Possible cause	Test step/Remedy <sup>1)</sup>
<b>Model 129 only</b> 13            013	Oil level switch (S44)	23 ⇒ 18.0
14            014	Steering angle sensor (N49) not initialized	23 ⇒ 10.0
15            015	Comfort/sport switch (S45/1), short circuit	23 ⇒ 11.0
16            016	<i>Not for U.S.A. vehicles.</i>	
17            017	Vehicle load sensor (N51/1)	23 ⇒ 8.0
18            018	ADS MIL (A1e27)	23 ⇒ 5.0
19            019	Voltage supply too low	23 ⇒ 1.0
20            020	Steering angle sensor (N49)	23 ⇒ 9.0
21            021	Voltage supply too high	23 ⇒ 1.0
22            022	Comfort/sport switch (S45/1)	23 ⇒ 11.0
23            023	<i>Not for U.S.A. vehicles.</i>	

1) Observe Preparation for Test, see 22.

#### Diagnosis – Complaint Related Diagnostic Chart

Complaint/Problem	Possible cause	Remedy/Test step <sup>1)</sup>
ADS MIL (A1e27) comes on with engine running	Steering angle sensor (N49) not initialized  DTC stored	Turn steering wheel from right to left stop. 12 DTC Memory
Damping too hard/too soft		12 DTC Memory
Vehicle level too low (base level)		34 ⇒ 1.0 (SMS, Job No. 40-300)
Vehicle lowers at rear axle		Visually check for external leaks
Hydraulic oil level too low		Visually check for external leaks
<b>Model 129 only</b> Vehicle lowers with engine off		Visually check for external leaks 34 ⇒ 1.0
<b>Model 129 only</b> Vehicle lowers with engine running		33 ⇒ 1.0
<b>Model 129 only</b> Vehicle lowers at front axle		Visually check for external leaks 34 ⇒ 1.0 36 ⇒ 1.0
<b>Model 129 only</b> Vehicle does not lift at one or both axles		33 ⇒ 1.0 32 ⇒ 1.0

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

#### Electrical Test Program – Component Locations

#### Components in Passenger Compartment

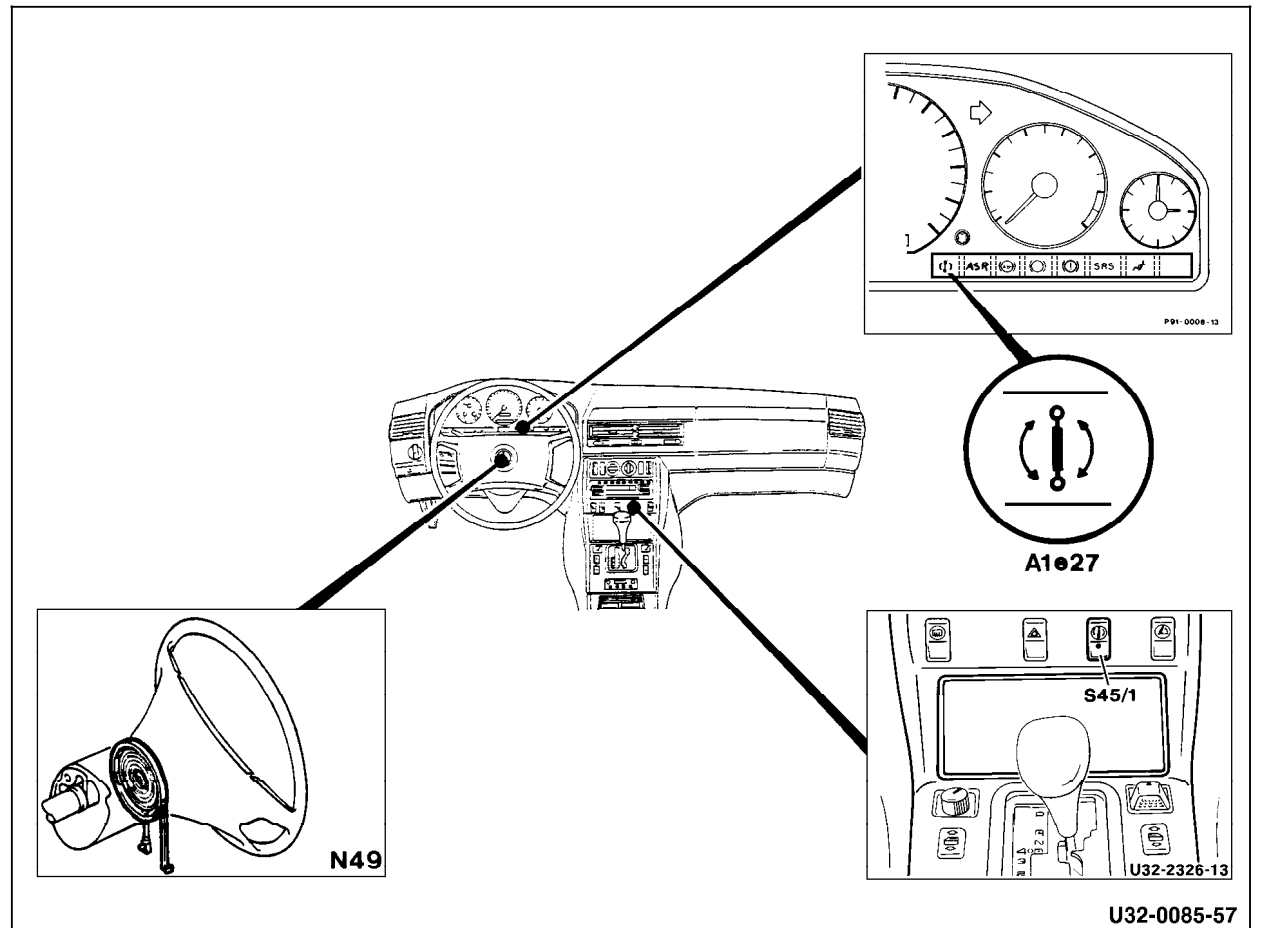


Figure 1

- A1e27 ADS MIL
- N49 Steering angle sensor
- S45/1 Comfort/sport switch

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#### Electrical Test Program – Component Locations

Components on Front Axle and in Engine Compartment  
Model 129

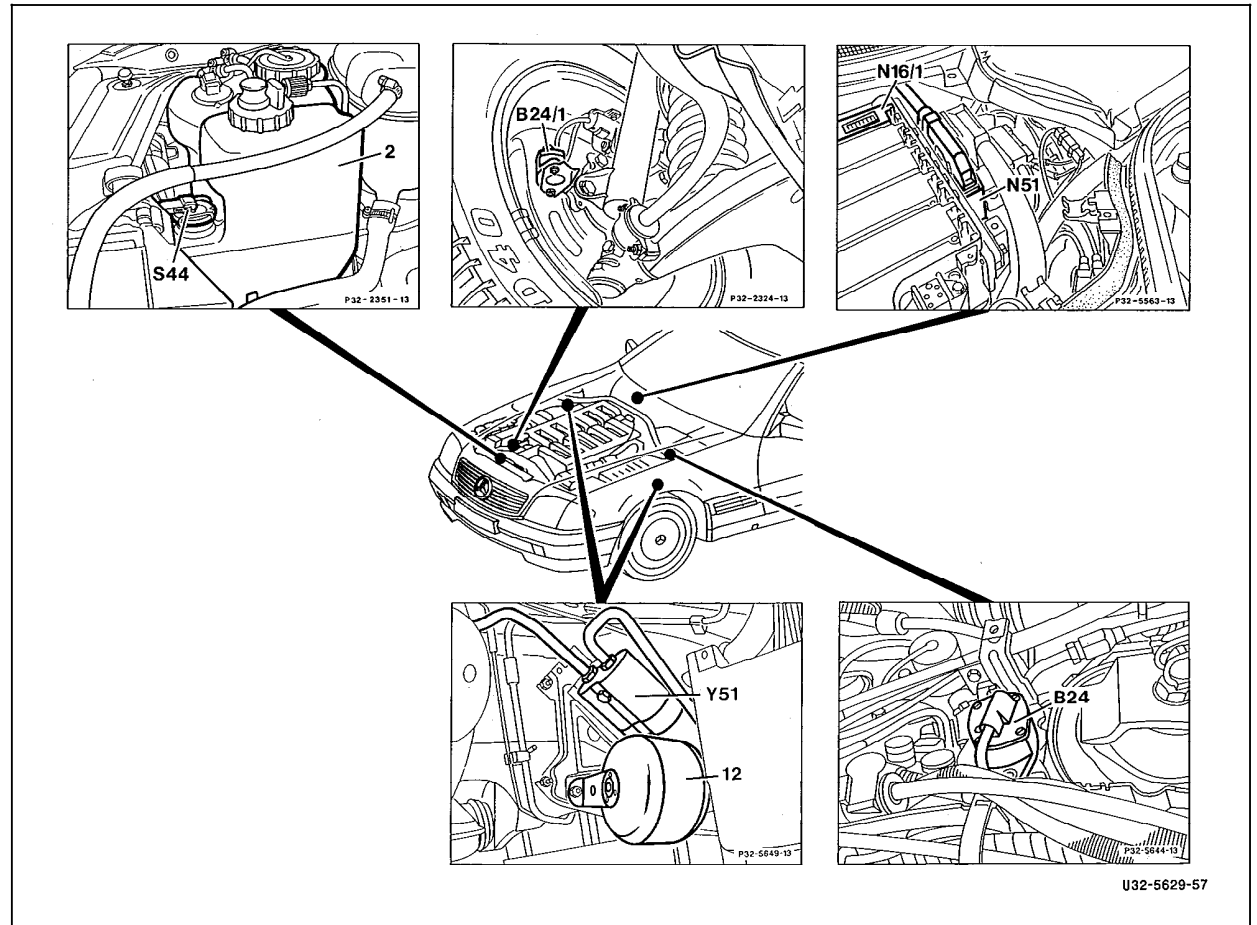


Figure 2

- B24 Body acceleration sensor
- B24/1 Wheel acceleration sensor
- N51 ADS control module
- S44 Oil level switch
- Y51 Left front axle damper valve assembly
- Y52 Right front axle damper valve assembly

#### Electrical Test Program – Component Locations

Components in rear of Vehicle  
Model 129

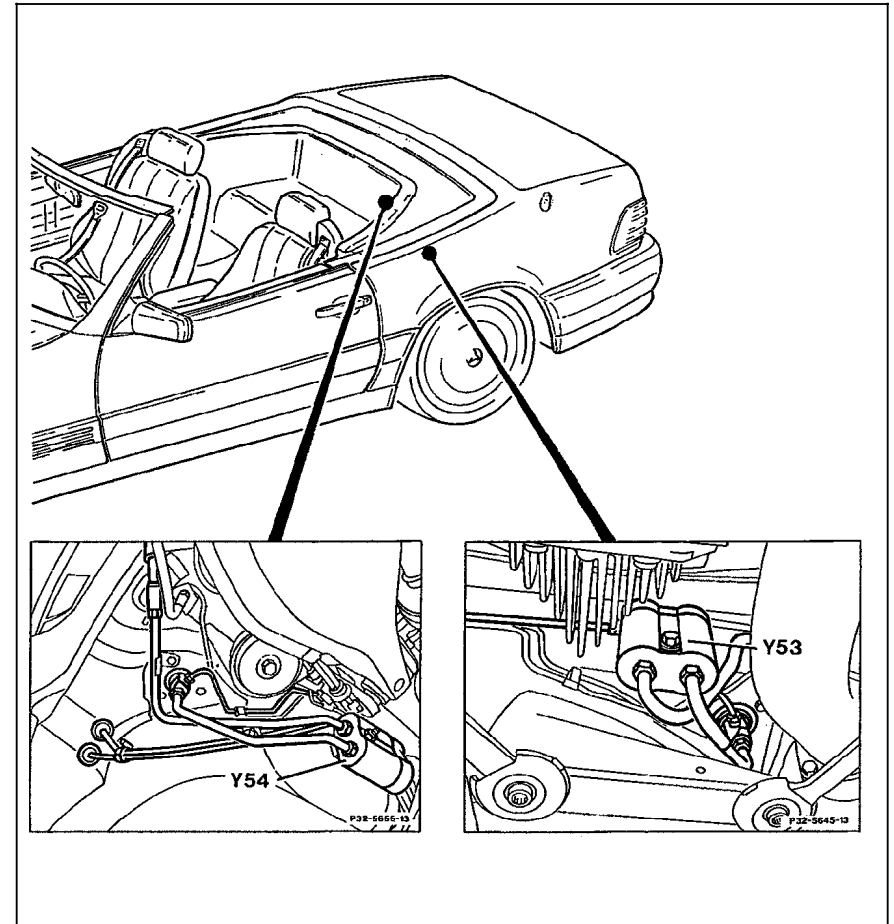


Figure 3

- Y53 Left rear axle damper valve assembly
- Y54 Right rear axle damper valve assembly

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#### Electrical Test Program – Component Locations

Components in Engine Compartment and on Chassis  
Model 140

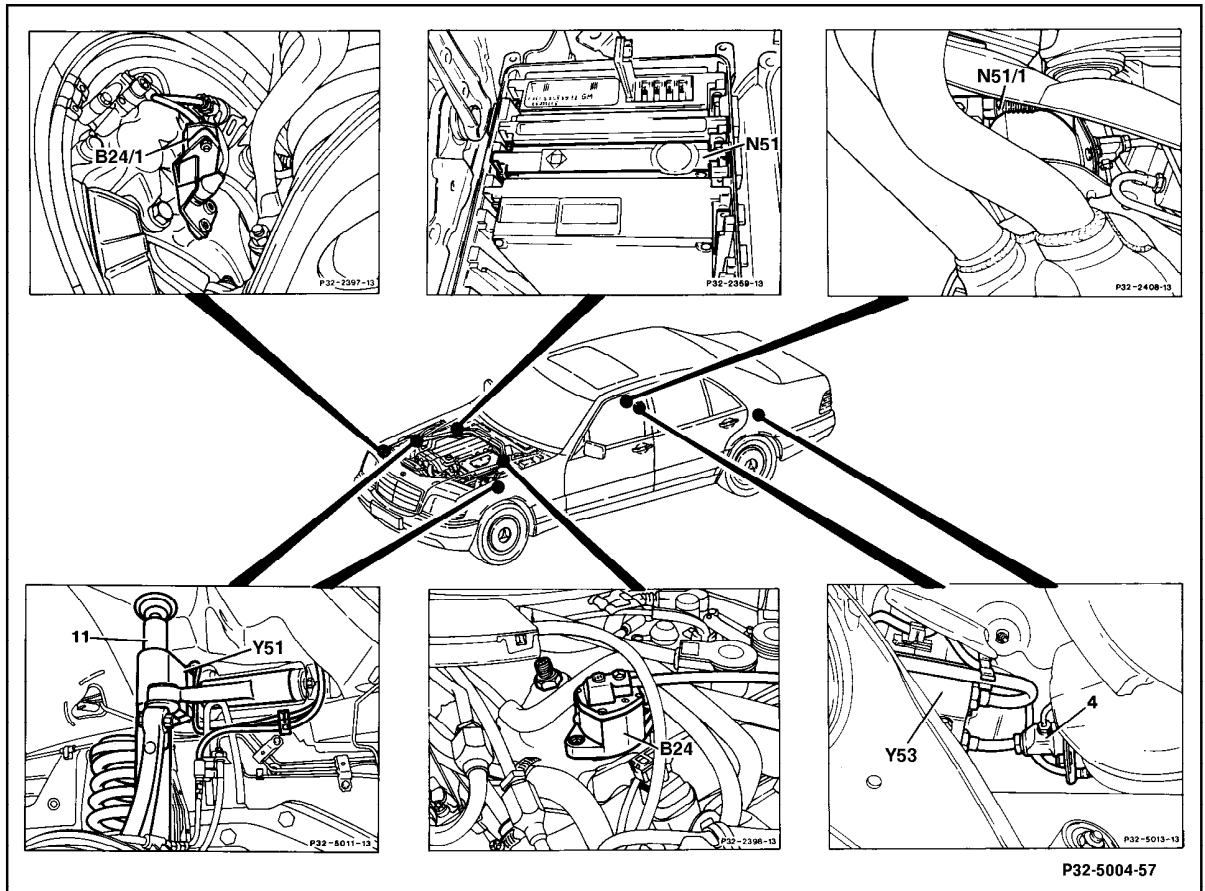


Figure 4

- B24 Body acceleration sensor
- B24/1 Wheel acceleration sensor
- N51 ADS control module
- N51/1 Vehicle load sensor
- Y51 Left front axle damper valve assembly
- Y52 Right front axle damper valve assembly (not shown)
- Y53 Left rear axle damper valve assembly
- Y54 Right rear axle damper valve assembly (not shown)

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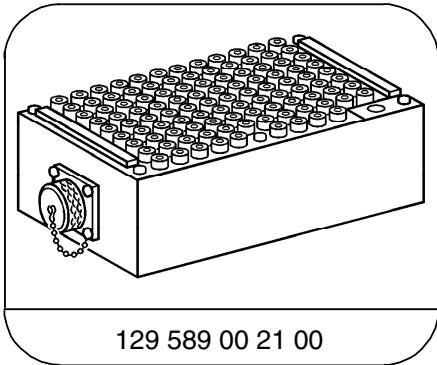
### Electrical Test Program – Preparation for Test

1. Ignition: **OFF**
2. **Model 129**  
Provide access to ADS control module (N51).
- Model 140**  
Remove ADS control module (N51).
3. Connect socket box with contact module 4 and contact box or test cable according to connection diagrams on following pages.

#### Electrical wiring diagrams:

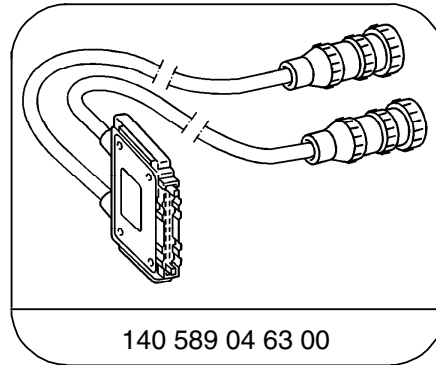
Electrical Troubleshooting Manual, Model 129, Volume 1, Group 32  
Model 140, Volume 2, Group 32.

#### Special Tools



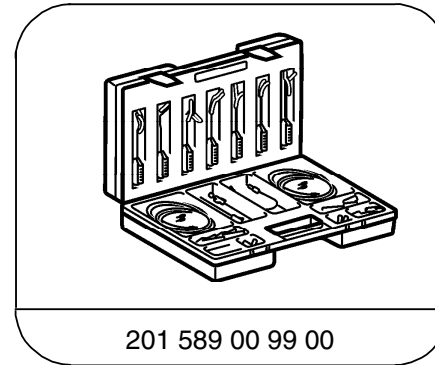
129 589 00 21 00

126-pin socket box



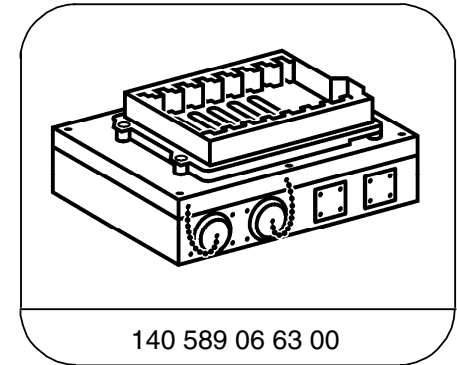
140 589 04 63 00

Contacting module 4



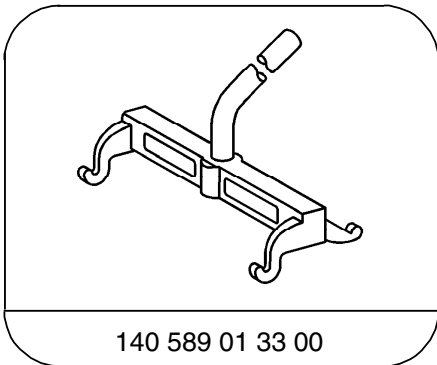
201 589 00 99 00

Electrical connecting set



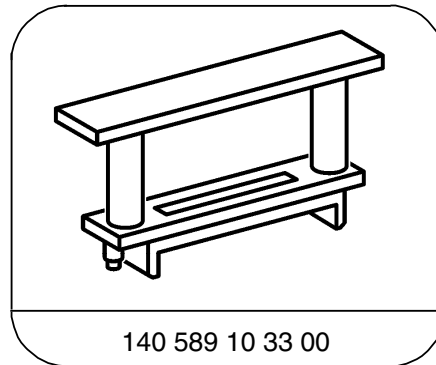
140 589 06 63 00

Contacting box



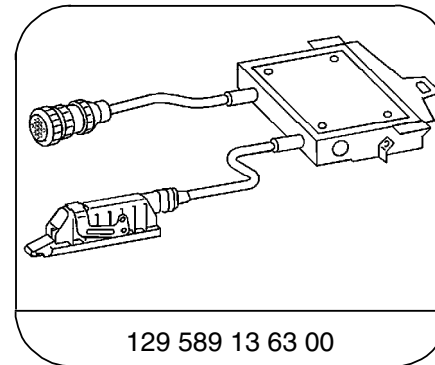
140 589 01 33 00

Mounting lever



140 589 10 33 00

Spacer



129 589 13 63 00

41-pin test cable

### Electrical Test Program – Preparation for Test

#### Conventional tools, test equipment

Description	Brand, model, etc.
Multimeter <sup>1)</sup>	Fluke models 23, 83, 85, 87
Signal generator <sup>1)</sup>	Sun, DTR 8416

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

#### Electrical Test Program – Preparation for Test

Connection Diagram - Socket Box  
Model 129

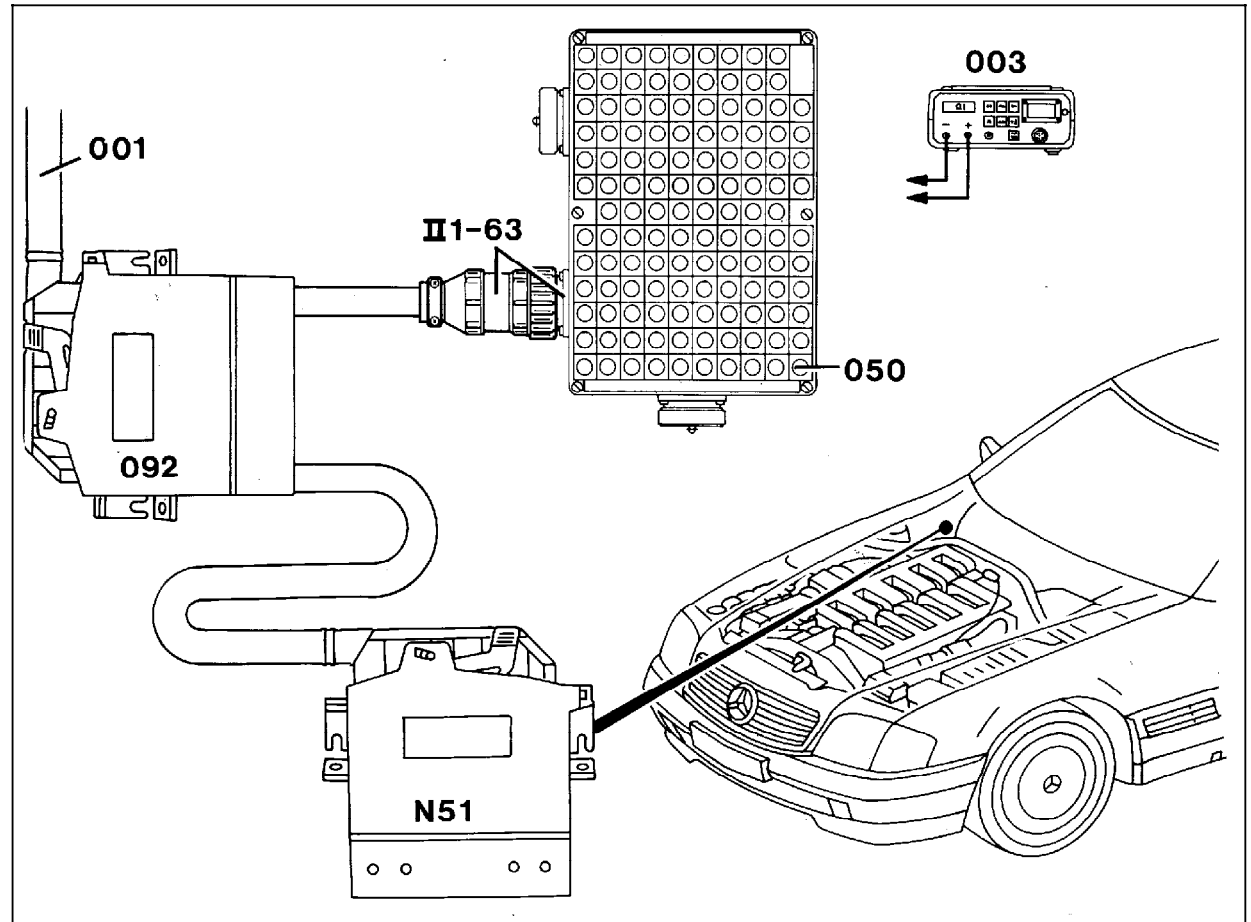


Figure 1

- 001 ADS control module connector
- 003 Multimeter
- 050 Socket box (126-pole)
- 092 Test cable
- N51 ADS control module

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#### Electrical Test Program – Preparation for Test

Connection Diagram - Socket Box  
Model 140

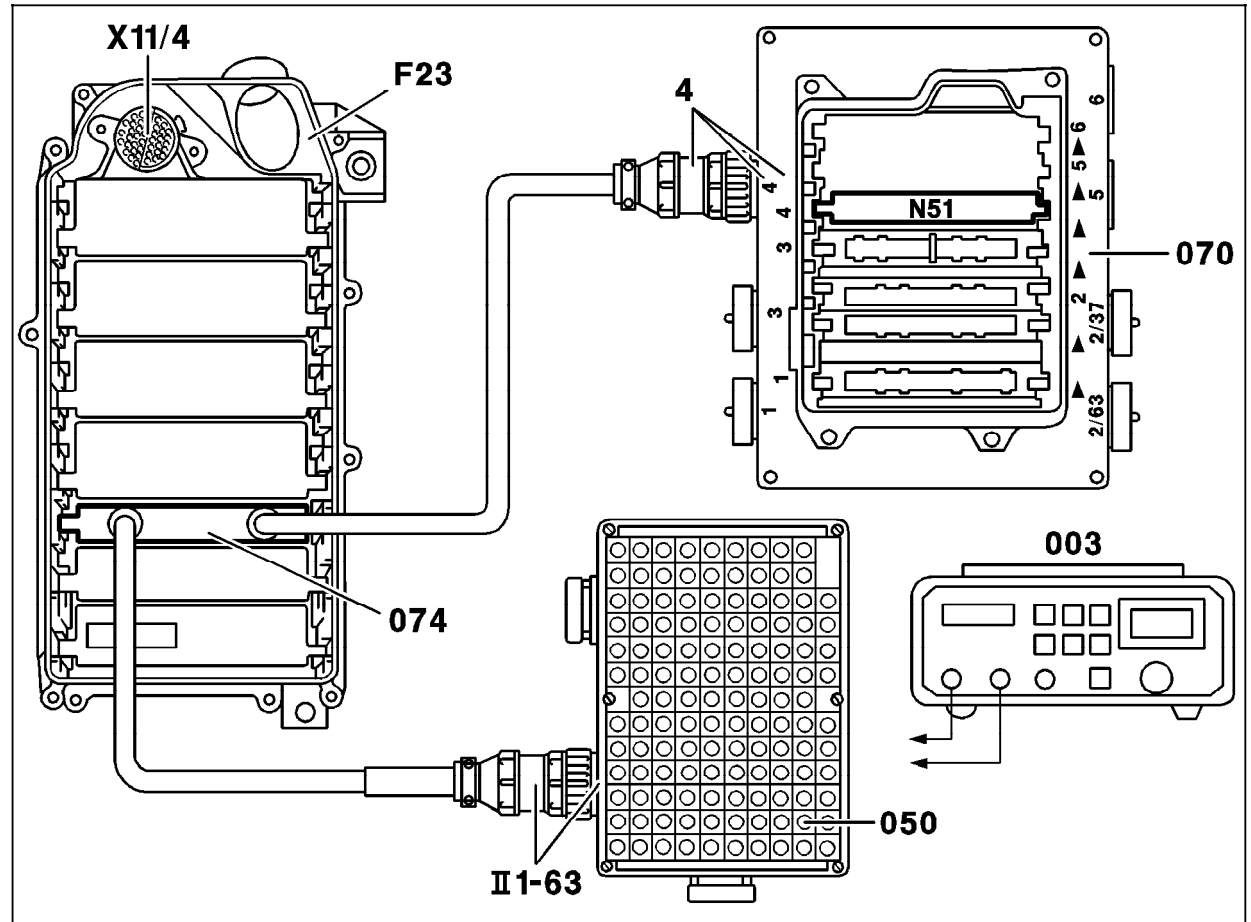


Figure 2

- 003 Multimeter
- 050 Socket box (126-pole)
- 070 Contact box
- 074 Contact module 4
- F23 Module box
- N51 ADS control module
- X11/4 Data link connector (DTC readout)

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#### Electrical Test Program – Preparation for Test

Connection Diagram - Socket Box  
Model 129

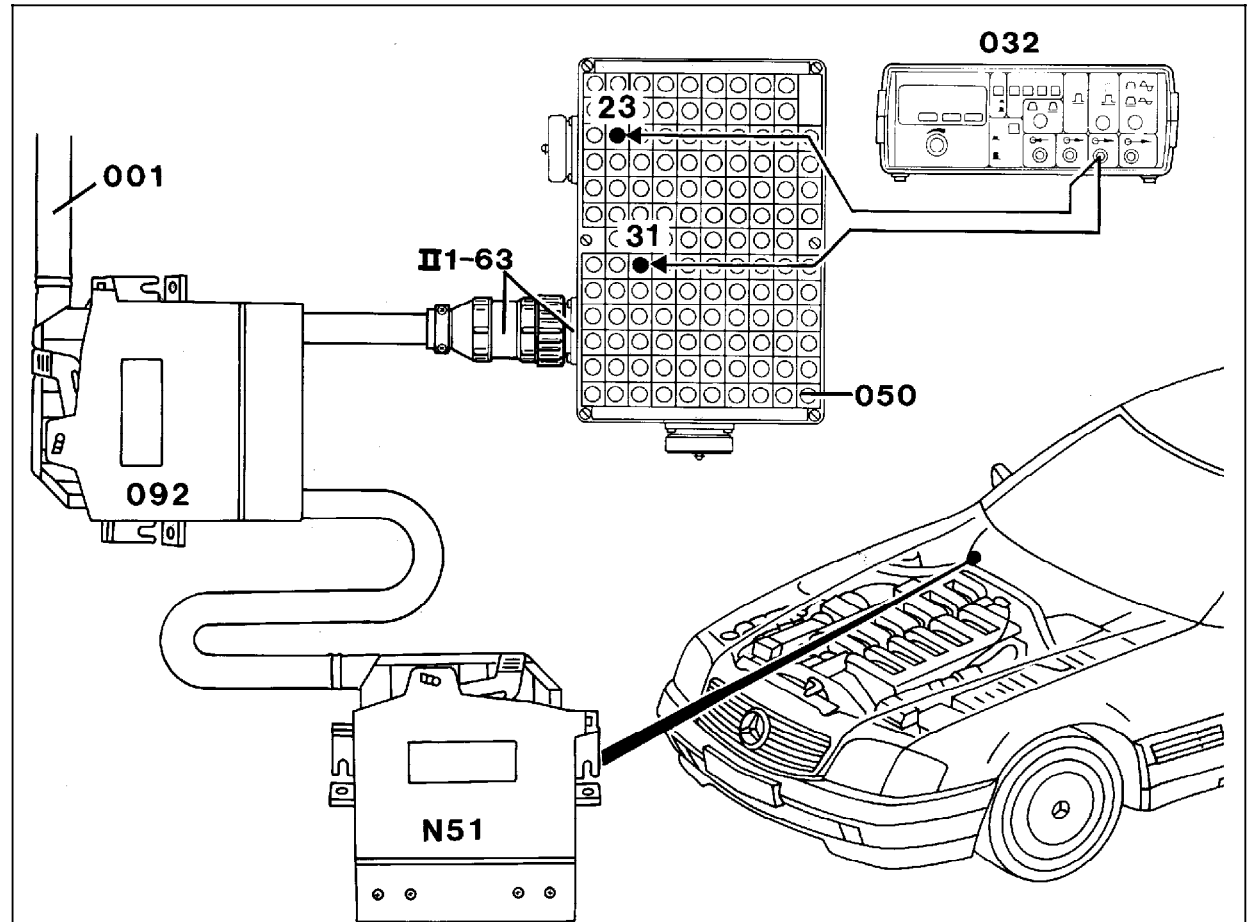


Figure 3

- 001 ADS control module connector
- 032 Signal generator
- 050 Socket box (126-pole)
- 092 Test cable
- N51 ADS control module

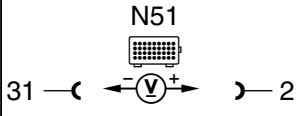

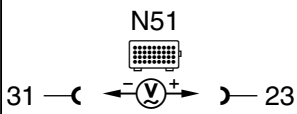

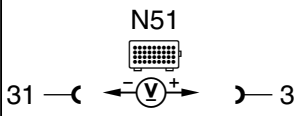
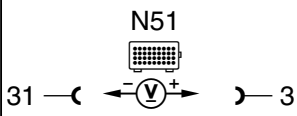
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#### Electrical Test Program – Test

Test step DTC	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 1.0	<b>ADS control module (N51)</b> Voltage supply Circuit 87SA	<p>N51</p> <p>31 —( ←(V)→ )— 29</p> <p>31 —( ←(V)→ )— 28</p>	Ignition: <b>ON</b>	11 – 14 V	⇒ 1.1, <b>Model 129</b> W27, Figure 4 <b>Model 140</b> W15, Figure 3, Wiring.
⇒ 1.1	Voltage supply from BM (N16/1)	<p>N51</p> <p><b>Model 129</b> W27 ←(V)→ 29 W27 ←(V)→ 28 (Figure 4)</p> <p><b>Model 140</b> W16/1 ←(V)→ 29 W16/1 ←(V)→ 28 (Figure 5)</p>	Ignition: <b>ON</b> <b>Note for test connection</b> Model 129 <b>Note for test connection</b> Model 140	11 – 14 V	Fuse (F3) on BM (N16/1), 1.1 23, Wiring.
⇒ 2.0	<b>Circuit 61 voltage</b>	<p>N51</p> <p>31 —( ←(V)→ )— 4</p>	Ignition: <b>ON</b>  Engine: <b>at Idle</b>	< 1 V  11 – 14 V	Wiring, Generator (G2).

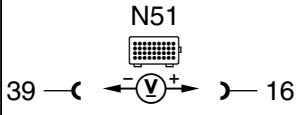
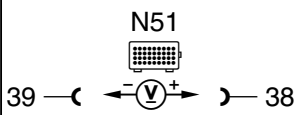
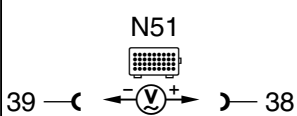
#### Electrical Test Program – Test

Test step <b>DTC</b>	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 3.0	<b>Diagnosis output</b>	 <p>N51 31 —( ←(V)→ )— 2</p>	Ignition: <b>ON</b>	10 – 14 V	Wiring, ADS control module (N51).
⇒ 4.0	 <b>Front vehicle speed signal</b> (129 - left, 140 - right) (from ABS or ABS/ASR control module)	 <p>N51 31 —( ←(V)→ )— 23</p>	Raise front of vehicle. Ignition: <b>ON</b> Turn left (129) or right (140) front wheel by hand approx. 1 rotation/second	3 V ~	5.2 23 or D.M., Chassis and Drivetrain Vol. 2 section 6.2 23, Wiring, ADS control module (N51).
⇒ 5.0	 <b>ADS MIL (A1e27)</b>	 <p>N51 31 —( ←(V)→ )— 3</p>	Ignition: <b>ON</b>  Engine: <b>at Idle</b>	< 1 V A1e27: <b>ON</b>  11 – 14 V A1e27: <b>OFF</b>	Wiring, ⇒ 5.1, N51  12, Wiring, N51
⇒ 5.1	Wiring	 <p>N51 31 —( ←(V)→ )— 3</p>	Ignition: <b>OFF</b> Disconnect control module (N51). Ignition: <b>ON</b>	11 – 14 V	Wiring, A1e27

Electrical Test Program – Test

Test step DTC	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 6.0	4 <b>Wheel acceleration sensor (B24/1)</b> Voltage supply  Static sensor signal (off)  Dynamic sensor signal (on)	<p>N51 35 —(V)— 15</p>	Ignition: <b>ON</b>	4.75 – 5.25 V	Wiring, B24/1, ADS control module (N51).
		<p>N51 35 —(V)— 36</p>	Ignition: <b>ON</b>	2.35 – 2.65 V	Wiring, B24/1, N51
		<p>N51 35 —(V)— 36</p>	Vigorously move right front section of vehicle up and down by hand	> 1 mV ~  Note: The value changes with the movement of the vehicle. Nominal value can only be attained with digital multimeter set to mV ~.	B24/1, N51

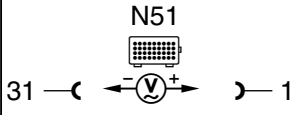
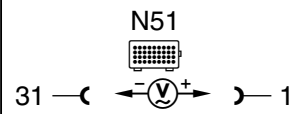
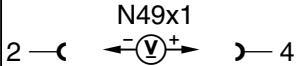
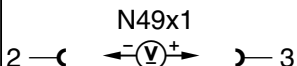
#### Electrical Test Program – Test

Test step DTC	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 7.0	<b>Body acceleration sensor (B24)</b> Voltage supply  Static sensor signal (off)  Dynamic sensor signal (on)	  	Ignition: <b>ON</b>   Vigorously move left front section of vehicle up and down by hand	4.75 – 5.25 V  2.35 – 2.65 V  > 5 mV ~  Note: The value changes with the movement of the vehicle. Nominal value can only be attained with digital multimeter set to mV ~.	Wiring, B24, N51  Wiring, B24, N51  B24, N51

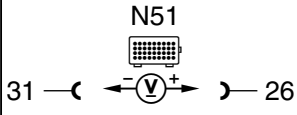
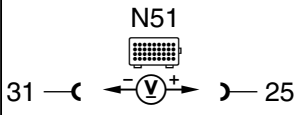
Electrical Test Program – Test

Test step DTC	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 8.0 Model 140 only	<b>Vehicle load sensor (N51/1)</b> Voltage supply	<p>N51 8 —( )— ←(V)→ —( )— 6</p>	Ignition: <b>ON</b>	4.75 – 5.25 V	Wiring, N51/1, Figure 8, N51
	Static sensor signal (off)	<p>N51 8 —( )— ←(V)→ —( )— 7</p>	Ignition: <b>ON</b>	< 1.5 V	Wiring, N51
	Dynamic sensor signal (on)	<p>N51 8 —( )— ←(V)→ —( )— 7</p>	Ignition: <b>ON</b> Load trunk > 177 lbs. (80kg).	Voltage increase > 10 mV  <b>Note:</b> Voltage increase with load.	N51/1


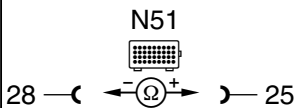

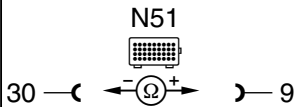
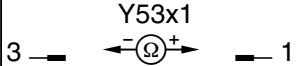
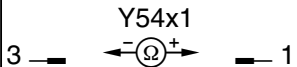
#### Electrical Test Program – Test

Test step <b>DTC</b>	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 9.0 5 20	<b>Steering angle sensor (N49)</b> Signal	N51 	Ignition: <b>ON</b>	> 3 V ~	Wiring, ⇒ 9.1, ADS control module (N51).
⇒ 9.1	Steering angle sensor	N51 	Ignition: <b>OFF</b> Disconnect control module (N51). Ignition: <b>ON</b>	> 3 V ~	Wiring, ⇒ 9.2, ⇒ 9.3, N49
⇒ 9.2	Voltage supply Circuit 30a	N49x1 	Ignition: <b>OFF</b> Disconnect connector (N49x1).	11 – 14 V	Wiring.
⇒ 9.3	Voltage supply Circuit 87L	N49x1 	Ignition: <b>ON</b>	11 – 14 V	Wiring.
⇒ 10.0 14	<b>Steering angle sensor (N49)</b> Initialization		Engine: <b>at Idle</b> Turn steering wheel from right to left stop.	A1e27 goes out.	⇒ 9.0

Electrical Test Program – Test

Test step DTC	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 11.0 15 22	<b>Comfort/sport switch (S45/1)</b>	 <p>N51 31 —( —( ←(V)→ —( —) 26</p>	<p>Engine: <b>at Idle</b> Hold switch S45/1 in: <b>Comfort</b> setting</p> <p>Release switch (neutral)</p>	<p>11 – 14 V Indicator lamp in switch: <b>OFF</b></p> <p>&lt; 1 V Indicator lamp in switch: <b>OFF</b></p>	<p>⇒ 11.1, Wiring, ADS control module (N51).</p>
		 <p>N51 31 —( —( ←(V)→ —( —) 25</p>	<p>Engine: <b>at Idle</b> Hold switch S45/1 in: <b>Sport</b> setting</p> <p>Release switch (neutral)</p> <p><b>Comfort</b> setting (press switch briefly)</p>	<p>11 – 14 V Indicator lamp in switch: <b>ON</b></p> <p>11 – 14 V Indicator lamp in switch: <b>ON</b></p> <p>Indicator lamp in switch: <b>OFF</b></p>	<p>Wiring, ⇒ 11.1, N51</p>

#### Electrical Test Program – Test


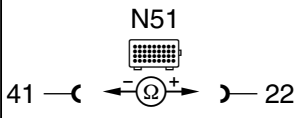

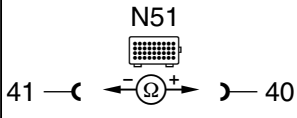

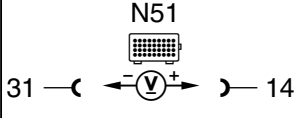
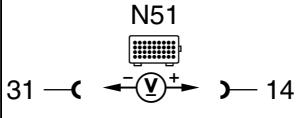
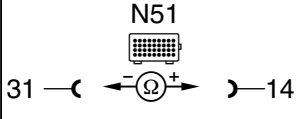
Test step DTC	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 11.1	Comfort/sport switch (S45/1) Comfort		Ignition: <b>OFF</b> Disconnect control module (N51). Hold switch S45/1 in: <b>Comfort</b> setting  Release switch (neutral)	< 1 Ω  > 20 kΩ	Wiring, S45/1, ⇒ 11.2
⇒ 11.2	Comfort/sport switch (S45/1) Sport		Ignition: <b>OFF</b> Disconnect N51. Hold switch S45/1 in: <b>Sport</b> setting  Release switch (neutral)	< 1 Ω  > 20 kΩ	Wiring, S45/1
⇒ 12.0	 Left/right rear axle damper valve assembly, rear axle solenoid valve 1 (Y53y1, Y54y1)		Ignition: <b>OFF</b> Disconnect control module (N51).	5 – 8 Ω	⇒ 12.1, ⇒ 12.2, Wiring.
⇒ 12.1	Rear axle solenoid valve 1 (Y53y1)		Disconnect connector (Y53x1). (Figure 8 or 12)	10 – 16 Ω	Wiring, Left rear axle damper valve assembly (Y53).
⇒ 12.2	Rear axle solenoid valve 1 (Y54y1)		Disconnect connector (Y54x1). (Figure 9 or 12)	10 – 16 Ω	Wiring, Right rear axle damper valve assembly (Y54).



#### Electrical Test Program – Test

Test step DTC	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 13.0	9 <b>Left/right rear axle damper valve assembly, rear axle solenoid valve 2 (Y53y2, Y54y2)</b>		Ignition: <b>OFF</b> Disconnect control module (N51).	5 – 8 Ω	⇒ 13.1, ⇒ 13.2, Wiring.
⇒ 13.1	Rear axle solenoid valve 2 (Y53y2)		Disconnect connector (Y53x1). (Figure 8 or 12)	10 – 16 Ω	Wiring, Rear axle solenoid valve 2 (Y53y2).
⇒ 13.2	Rear axle solenoid valve 2 (Y54y2)		Disconnect connector (Y54x1). (Figure 9 or 12)	10 – 16 Ω	Wiring, Rear axle solenoid valve 2 (Y54y2).
⇒ 14.0	6 <b>Left front axle damper valve assembly, front axle solenoid valve 1 (Y51y1)</b>		Ignition: <b>OFF</b> Disconnect control module (N51).	10 – 176Ω	Wiring, Front axle solenoid valve 1 (Y51y1).
⇒ 15.0	7 <b>Left front axle damper valve assembly, front axle solenoid valve 2 (Y51y2)</b>		Ignition: <b>OFF</b> Disconnect control module (N51).	10 – 16 Ω	Wiring, Front axle solenoid valve 2 (Y51y2).

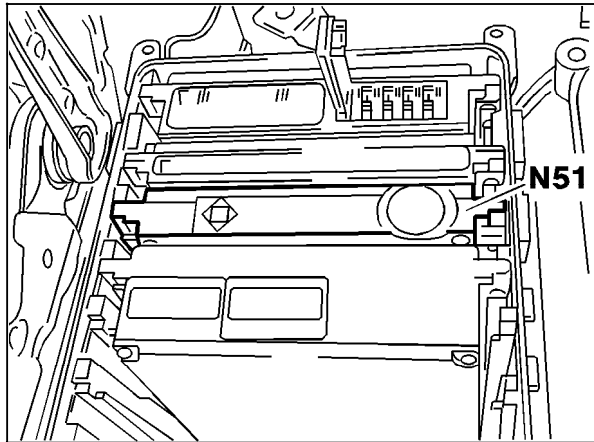
#### Electrical Test Program – Test

Test step DTC	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 16.0	 <b>Right front axle damper valve assembly, front axle solenoid valve 1 (Y52y1)</b>		Ignition: <b>OFF</b> Disconnect control module (N51).	10 – 16 Ω	Wiring, Right front axle damper valve assembly (Y52).
⇒ 17.0	 <b>Right front axle damper valve assembly, front axle solenoid valve 2 (Y52y2)</b>		Ignition: <b>OFF</b> Disconnect control module (N51).	10 – 16 Ω	Wiring, Right front axle damper valve assembly (Y52).
⇒ 18.0 <b>Model 129 only</b>	 <b>Oil level switch (S44)</b> Activation		Oil level between “MAX” and “MIN” Ignition: <b>ON</b>	11 – 14 V	Determine cause of leak, refill if necessary. ⇒ 5.1, ADS control module (N51).
⇒ 18.1	Wiring		Disconnect S44. Bridge sockets 1 and 2 on connector.	< 1 V	Wiring.
⇒ 18.2	Internal resistance		Ignition: <b>ON</b> Disconnect N51.	> 20 kΩ	Wiring, S44

Electrical Test Program – Test

Test step DTC	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 19.0	<i>Non-USA vehicles only, continue to next test step.</i>	–	–	–	–
⇒ 20.0	<i>Non-USA vehicles only, continue to next test step.</i>	–	–	–	–
⇒ 21.0	<i>Non-USA vehicles only, continue to next test step.</i>	–	–	–	–
⇒ 22.1	<i>Non-USA vehicles only.</i>	–	–	–	–

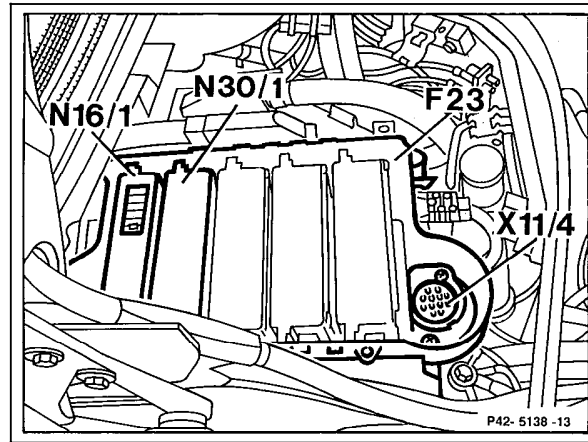
#### Electrical Test Program – Test



P32-2359-13

Figure 1  
Model 140

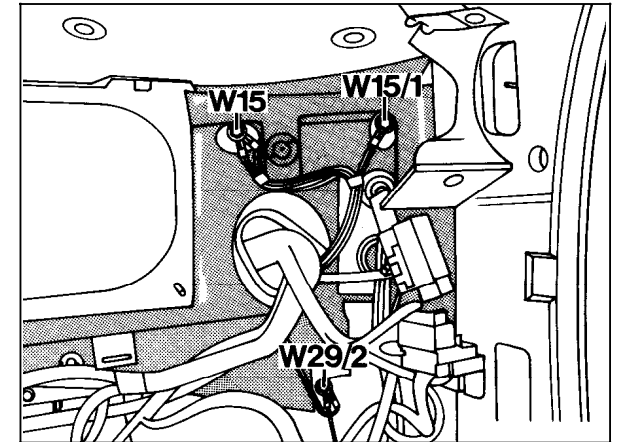
- N16/1 Base module (BM)
- N51 ADS control module



P42-5138-13

Figure 2  
Model 129

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

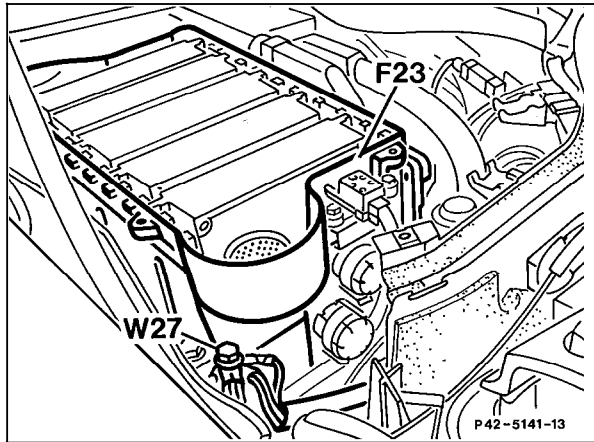


P54-2796-13

Figure 3  
Model 140

- W15 Ground (electronics output ground right footwell)

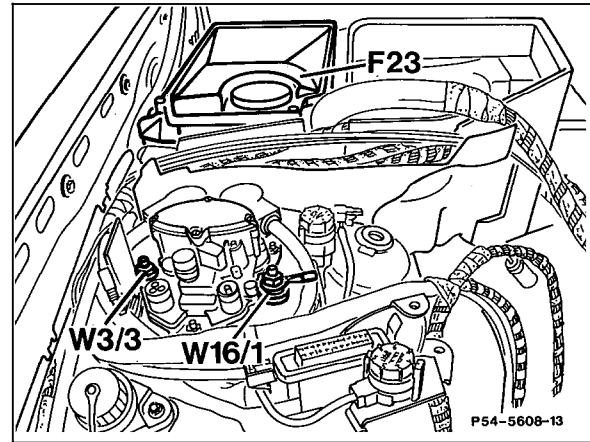
#### Electrical Test Program – Test



P42-5141-13

Figure 4  
Model 129

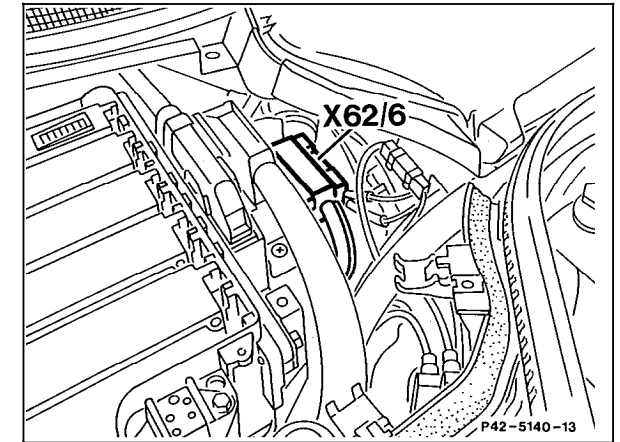
- F23 Module box
- W27 Ground (module box bracket)



P54-5608-13

Figure 5  
Model 140

- W16/1 Ground (right front spring tower)

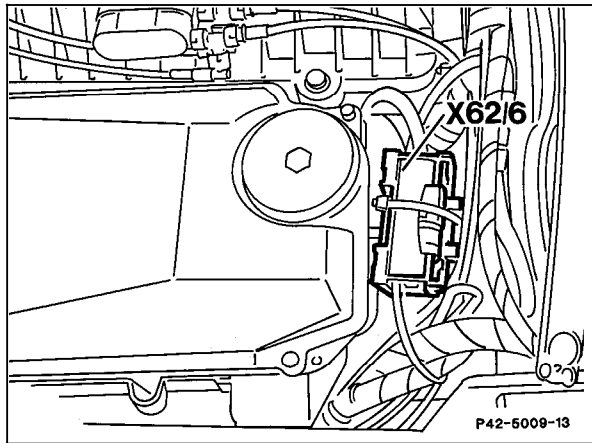


P42-5140-13

Figure 6  
Model 129

- X62/2 Right front axle VSS sensor connector (component compartment)

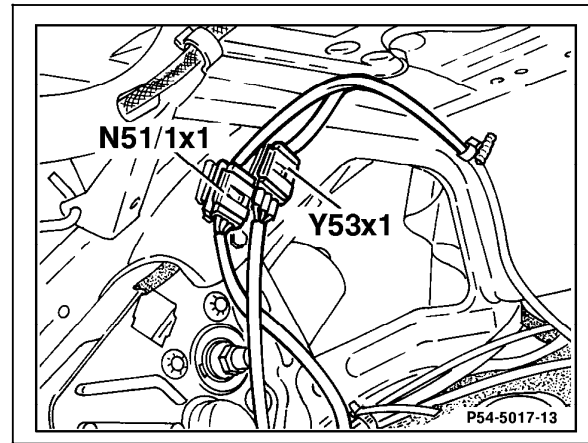
Electrical Test Program – Test



P42-5009-13

Figure 7  
Model 140

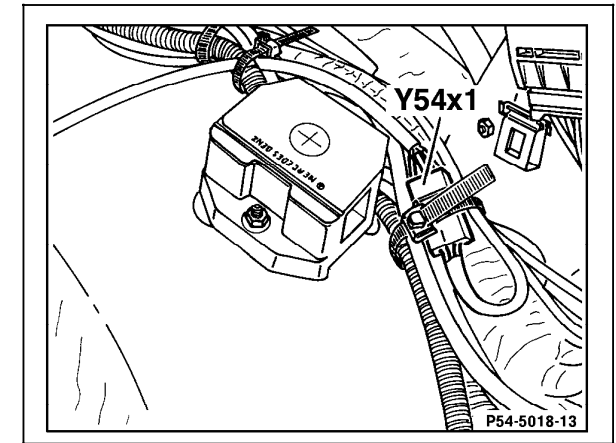
X62/6 Right front axle VSS sensor connector (component compartment)



P54-5017-13

Figure 8  
Model 140

Y53x1 Left rear axle damper valve assembly connector  
N51/1x1 Vehicle load sensor connector

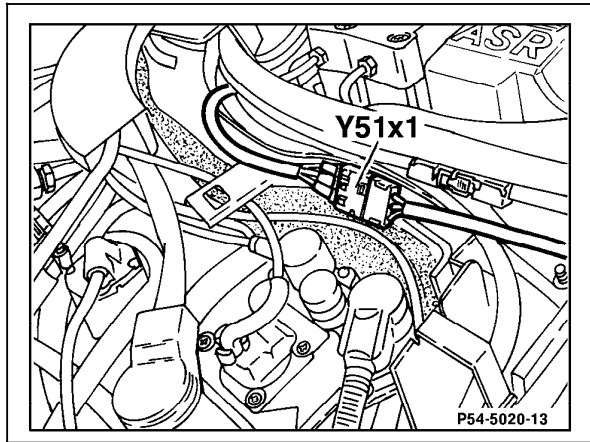


P54-5018-13

Figure 9  
Model 140

Y54x1 Right rear axle damper valve assembly connector

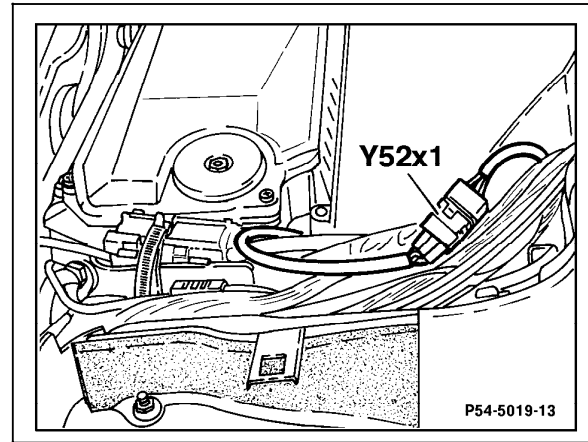
Electrical Test Program – Test



P54-5020-13

Figure 10  
Model 140

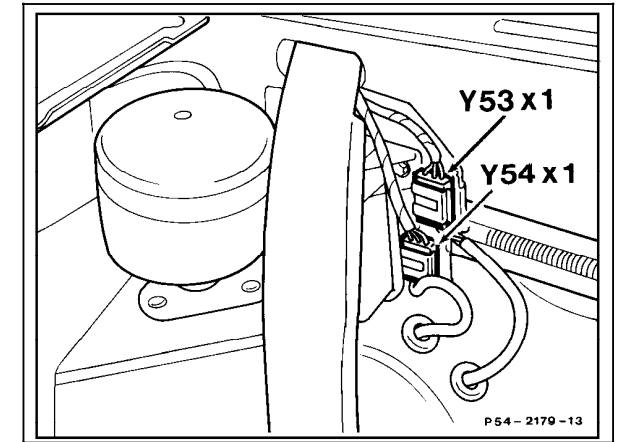
Y51x1 Left front axle damper valve assembly connector



P54-5019-13

Figure 11  
Model 140

Y52x1 Right front axle damper valve assembly connector

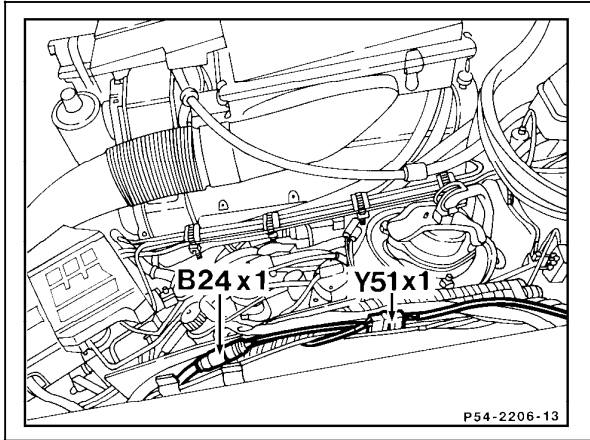


P54-2179-13

Figure 12  
Model 129

Y53x1 Left rear axle damper valve assembly connector  
Y54x1 Right rear axle damper valve assembly connector

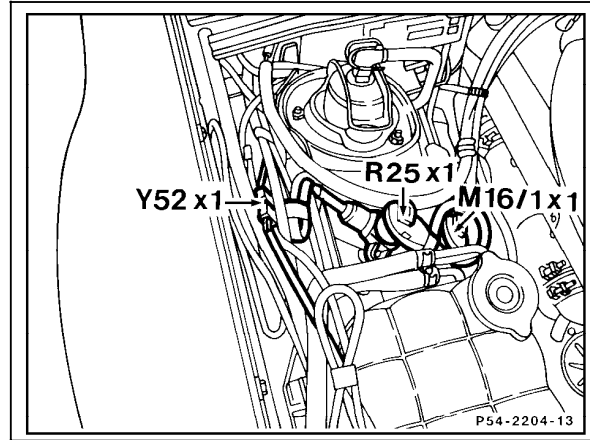
Electrical Test Program – Test



P54-2206-13

Figure 13  
Model 129

Y51x1 Left front axle damper valve assembly connector



P54-2204-13

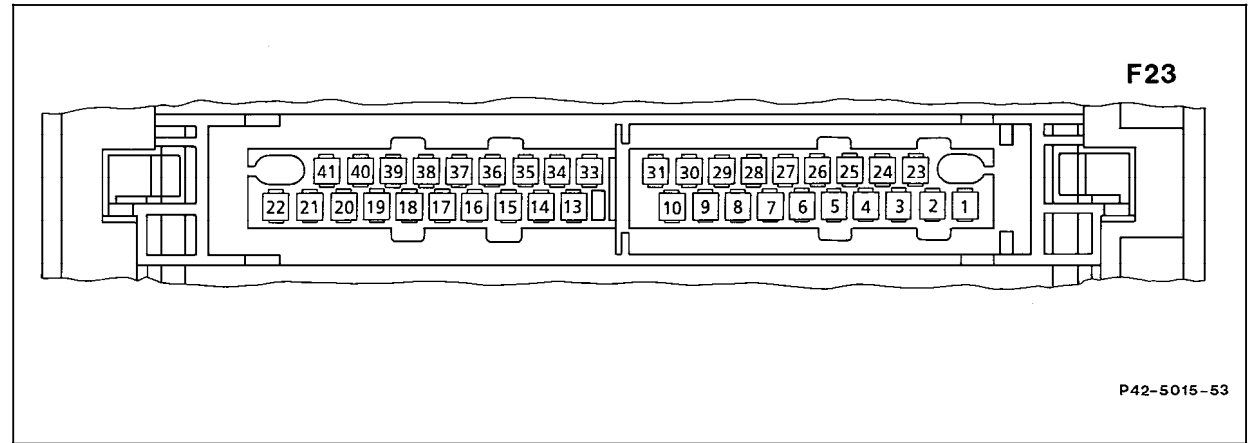
Figure 14  
Model 129

Y52x1 Right front axle damper valve assembly connector



#### Electrical Test Program – Test

#### Connector Layout - ADS Control Module (N51)



P42-5015-53

F23	Modulbox	21	Front axle solenoid valve 1 (Y51y1) (+)	35	Wheel acceleration sensor (B24/1) (-)
1	Steering angle sensor (N49)	22	Front axle solenoid valve 1 (Y52y1) (+)	36	Wheel acceleration sensor (B24/1)
2	Diagnosis (output)	23	<b>Model 129</b>	37	Not used
3	ADS MIL (A1e27)		Processed VSS from ABS or ABS/ASR control module (N30 or N30/1)	38	Body acceleration sensor (B24)
4	Circuit 61		<b>Model 140</b>	36-37	-
5	-		Processed VSS from ABS or ABS/ASR control module (N30 or N30/1)	38	Body acceleration sensor (B24)
6	Vehicle load sensor (N51/1) (+)		Not used	39	Body acceleration sensor (B24) (-)
7	Vehicle load sensor (N51/1) (signal)	24	Not used	40	Front axle solenoid valve 2 (Y52y2) (+)
8	Vehicle load sensor (N51/1) (-)	25	Comfort/sport switch (S45/1), Sport setting	41	Front axle solenoid valve (Y52y1, Y52y2) (-)
9	Rear axle solenoid valve 1 (Y53y1, Y54y1) (+)	26	Comfort/sport switch (S45/1), Comfort setting		
10	Rear axle solenoid valve 2 (Y53y2, Y54y2) (+)	27	Not used		
11-13	-	28-29	Voltage supply, circuit 87		
14	<b>Model 129</b>	30	Rear axle solenoid valve (Y53y1, Y53y2, Y54y1, Y54y2) (-)		
	Oil level switch (S44)	31	Ground (W15)		
15	Wheel acceleration sensor (B24/1) (+)	32-34	Not used		
16	Body acceleration sensor (B24) (+)				
17-18	-				
19	Front axle solenoid valve 2 (Y51y2) (+)				
20	Front axle solenoid valve (Y51y1, Y51y2) (-)				

#### Hydraulic Test Program – Component Locations

#### Hydraulic Components on Front Axle and in Engine Compartment Model 129

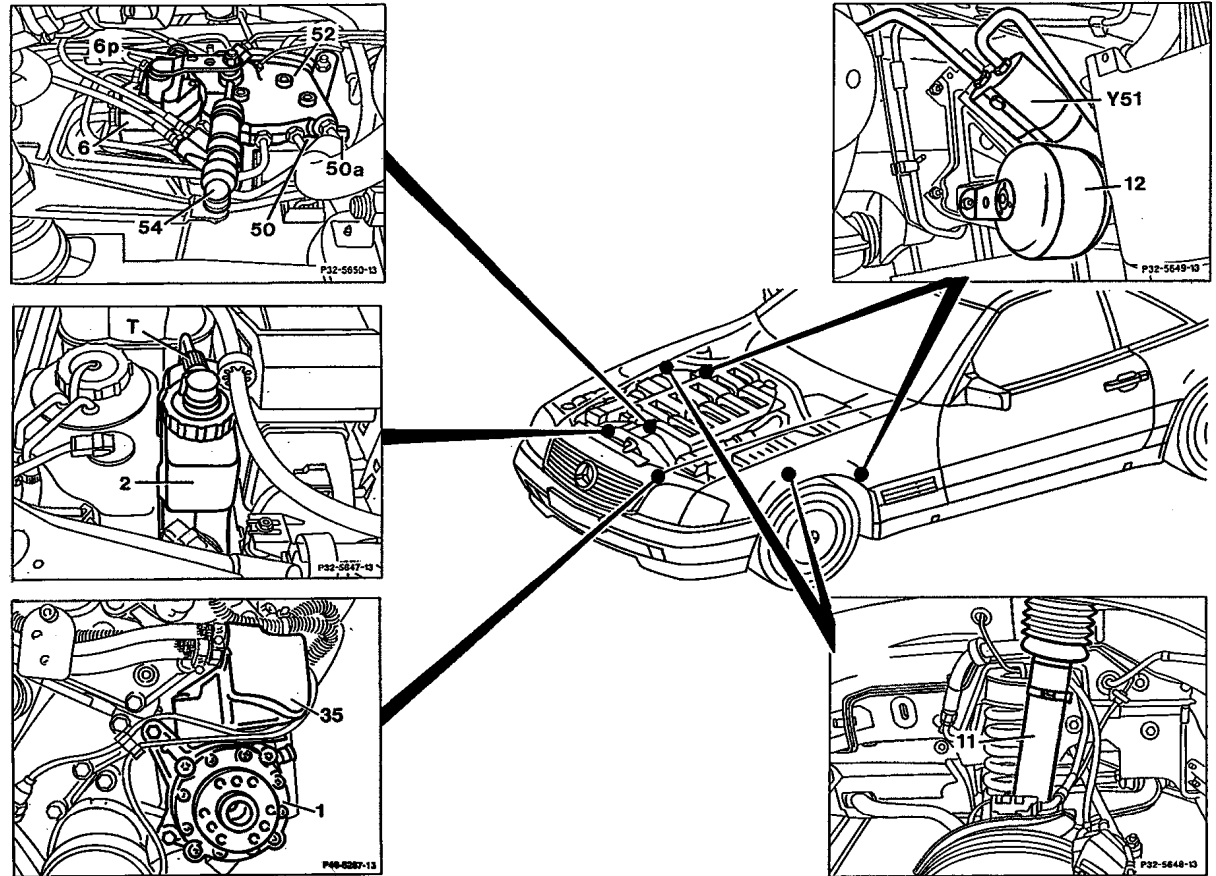


Figure 1

- 1 Hydraulic oil pump
- 2 Hydraulic oil reservoir
- 6 Front axle leveling valve
- 11 Front suspension strut
- 12 Front pressure reservoir
- 52 Distributor
- 54 Front axle connecting rod

P32-5632-57

### Hydraulic Test Program – Component Locations

#### Hydraulic Component on Rear Axle and in Rear of Vehicle Model 129

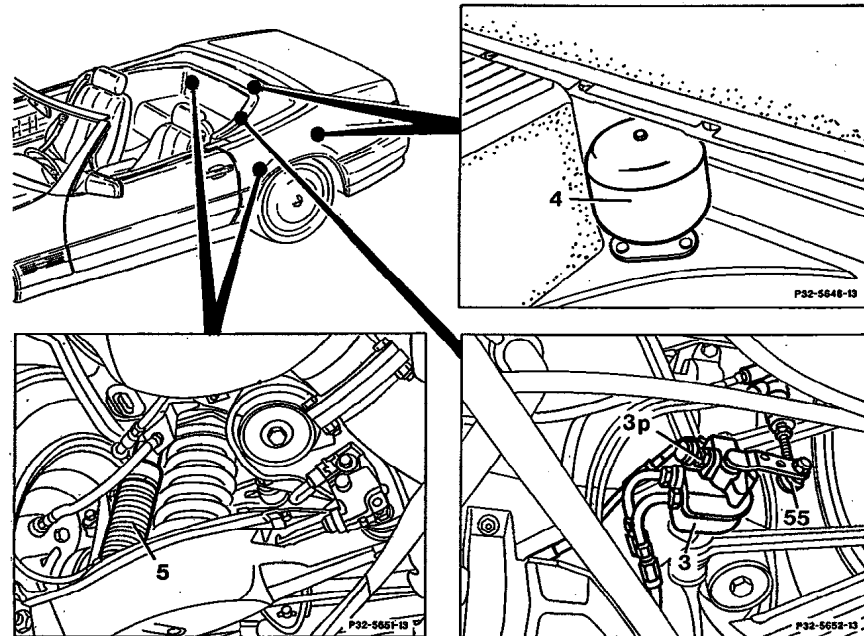


Figure 2

- 3 Rear axle leveling valve
- 4 Rear pressure reservoir
- 5 Rear suspension strut
- 55 Rear axle connecting rod

P32-5633-57

#### Hydraulic Test Program – Component Locations

##### Hydraulic Components Model 140

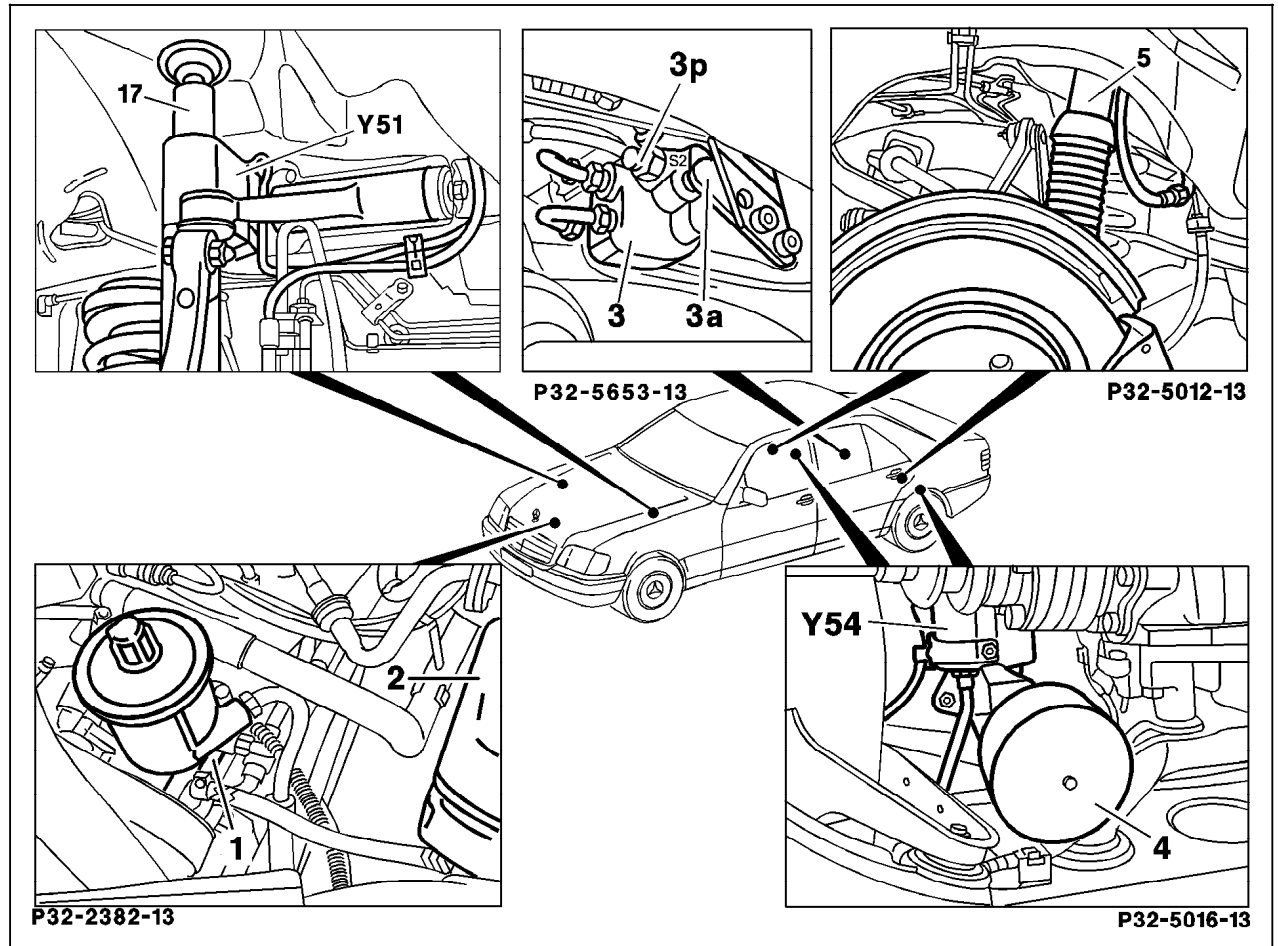


Figure 3

- 1 Hydraulic oil pump
- 2 Hydraulic oil reservoir
- 3 Rear axle leveling valve
- 4 Rear pressure reservoir
- 5 Rear suspension strut
- 11 Front suspension strut

P32-5634-57

### Hydraulic Test Program – Hydraulic Oil Pump Test

#### Preparation for Test

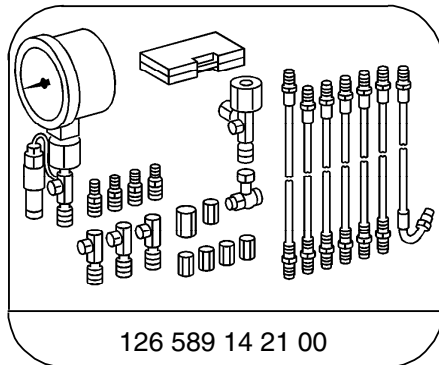
1. Check oil level in oil reservoir, correct if necessary.
2. **Model 129**  
Unscrew connecting rods (54, 55) at front and rear leveling valve levers (set levers to neutral position).  
**Model 140**  
Unscrew connecting rod at leveling valve lever (3a).
3. Depressurize rear axle hydraulic system by slowly opening bleeder screw (3p). Connect drain hose and place into container.
4. Connect test gauge (038a) to rear axle leveling valve bleeder screw (S2).

5. **Model 129**  
Set both leveling valve levers to position “F” (fill).
6. **Model 129**  
Open pressure supply screw (50a) by maximum of 1 turn.
7. Disconnect return line (T) at oil reservoir (2) and using a suitable hose, hold it in a measuring glass.

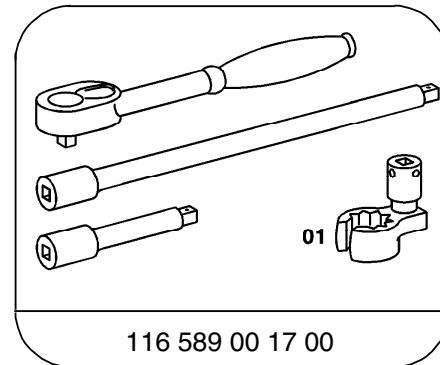


To perform this test, the oil fill quantity must be increased by 0.5 liters. If the oil reservoir was empty, the hydraulic oil pump must first be bled by disconnecting the high pressure flexible hose at the steel line. Run the engine and hold the hose into a container until the oil exits free of bubbles.

#### Special Tools



Tester



Box wrench

#### Hydraulic Test Program – Hydraulic Oil Pump Test

Model 129

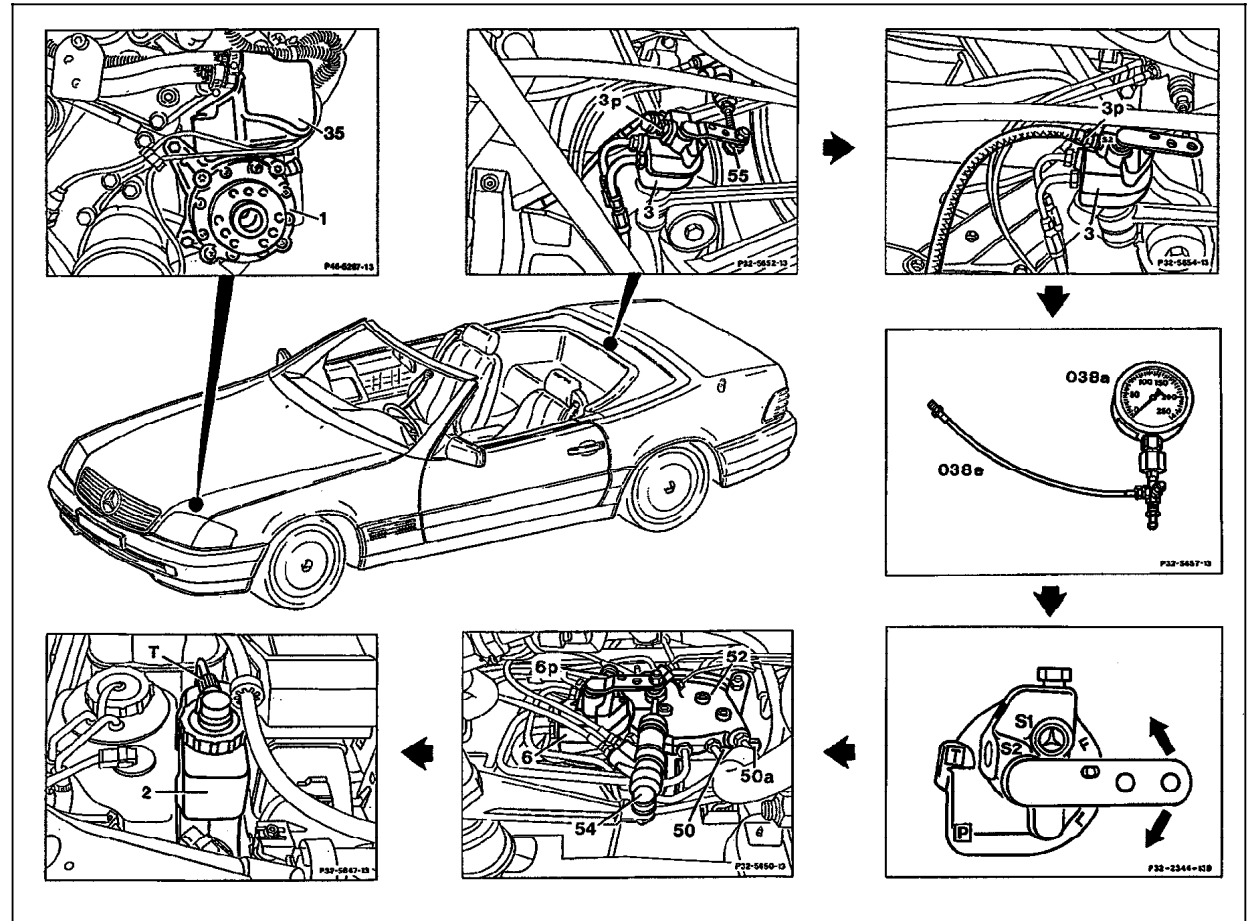


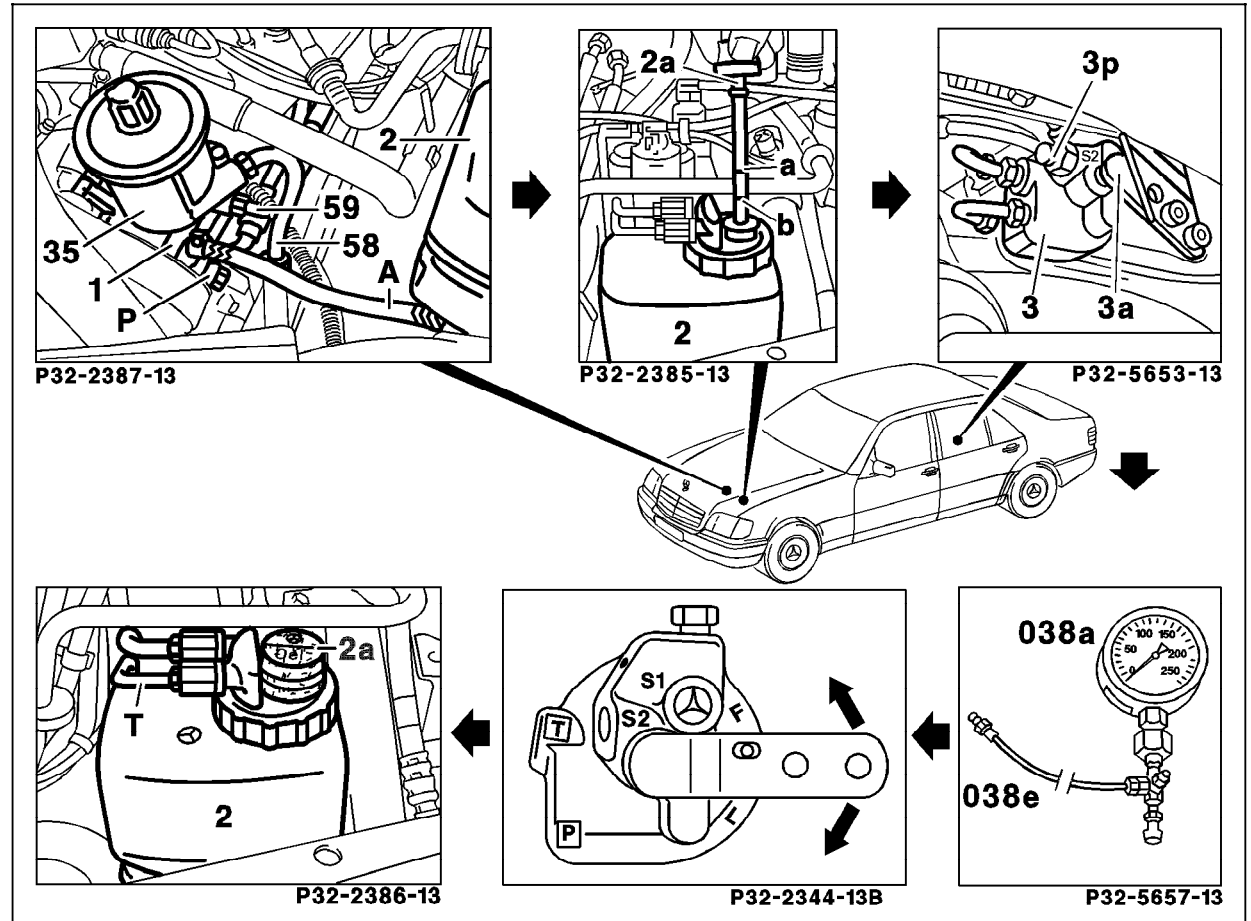
Figure 1

- 1 Hydraulic oil pump
- 2 Hydraulic oil reservoir
- 3 Rear axle leveling valve
- 3p Bleeder screw
- 6 Front axle leveling valve
- 6p Bleeder screw
- 50a Pressure supply screw
- 54 Front axle connecting rod
- 55 Rear axle connecting rod
- T Return line - oil reservoir distributor/valve unit

P32-5635-57

#### Hydraulic Test Program – Hydraulic Oil Pump Test

Model 140





P32-5636-57

Figure 2

- 1 Hydraulic oil pump
- 2 Hydraulic oil reservoir
- 3 Rear axle leveling valve
- 3a Connecting lever
- 3p Bleeder screw
- 7 Rear axle connecting rod

#### Hydraulic Test Program – Hydraulic Oil Pump Test

Test step	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy <sup>1)</sup>
⇒ 1.0	<b>Delivery pressure</b>  <b>WARNING!</b> High pressure	 250 bar Connect test gauge to rear axle leveling valve connection S2	Engine: <b>at Idle</b> Set leveling valve lever(s) to position “F” (fill). Observe test gauge needle until pressure no longer increases.	> 133 bar  Delivery capacity at idle > 0.2 l/min.	Delivery pressure < 133 bar, Delivery capacity < 0.2 l/min: Replace hydraulic oil pressure pump (SMS, Job No. 32-640)  Delivery pressure < 133 bar, Delivery capacity > 0.2 l/min: see 34

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



#### Hydraulic Test Program – Leveling Valve Function Test

##### Preparation for Test

##### Model 129

1. Check oil level in oil reservoir, correct if necessary.
2. Unscrew connecting rods (54, 55) at leveling valve levers (set lever to neutral position).

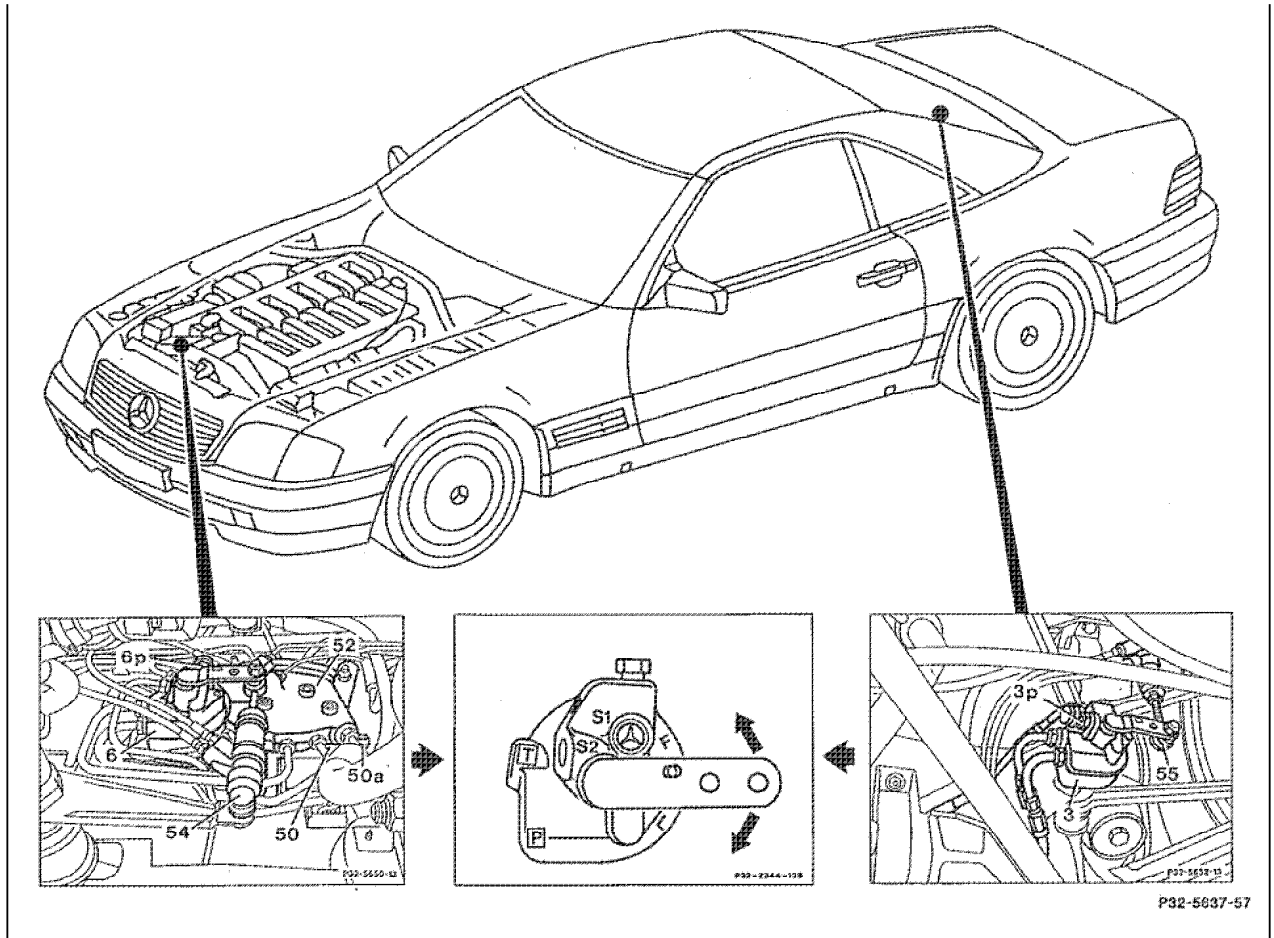


Figure 1

- 3 Rear axle leveling valve
- 6 Front axle leveling valve
- 54 Front axle connecting rod
- 55 Rear axle connecting rod

P32-5637-57

#### Hydraulic Test Program – Leveling Valve Function Test

##### Preparation for Test

##### Model 140

1. Check oil level in oil reservoir, correct if necessary.
2. Unscrew connecting rod at leveling valve lever (3a) (set lever to neutral position).

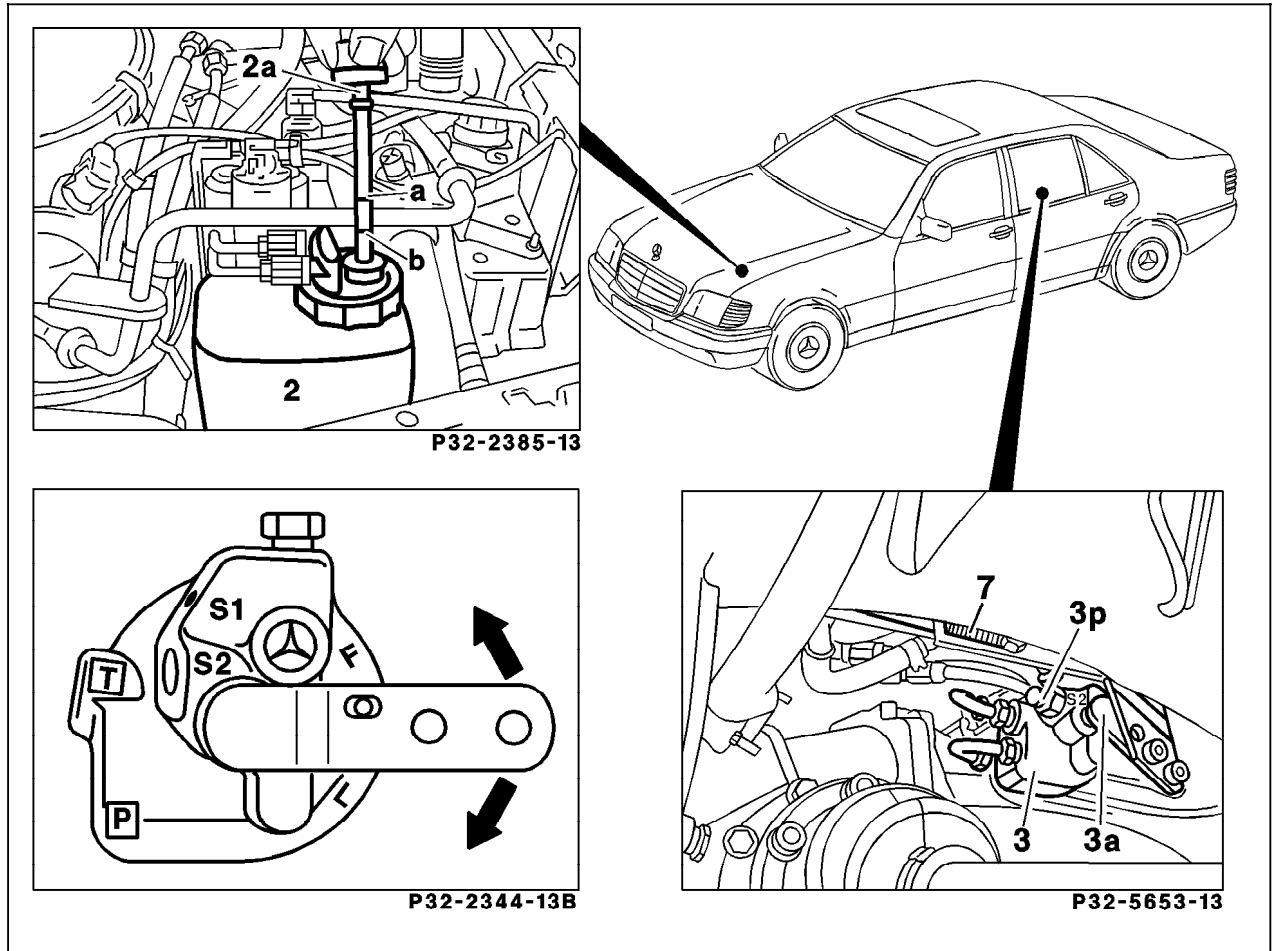


Figure 2

- 3 Rear axle leveling valve
- 3a Leveling valve lever
- 7 Connecting rod

P32-5638-57

#### Hydraulic Test Program – Leveling Valve Function Test

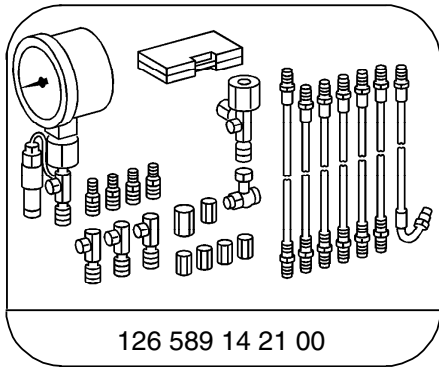
Test step	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 1.0	<b>Control function</b> Leveling valve	—	Engine: <b>at Idle</b> Set leveling valve lever to position “F” (fill).	Vehicle must raise at respective axle.	34, <b>Model 129</b> 35

### Hydraulic Test Program – Leveling Valve Pressure Test

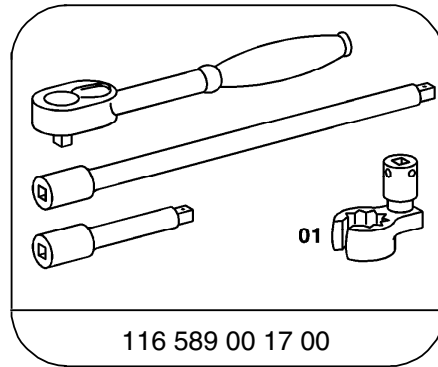
#### Preparation for Test

1. Check oil level in oil reservoir, correct if necessary.
2. **Model 129**  
Disconnect connecting rod at front and rear leveling valve levers (set levers to neutral position) (Figure 1).
- Model 140**  
Disconnect connecting rod at rear leveling valve levers (set lever to neutral position) (Figure 2).
3. Depressurize hydraulic system by slowly opening bleeder screw (3p or 6p). Connect drain hose and place into container.
4. Connect test gauge to leveling valve bleeder screw.  
**Model 129**  
Front axle: Connection “6p”  
**Model 140**  
Rear axle: Connection “3p” or leveling valve connection S2.

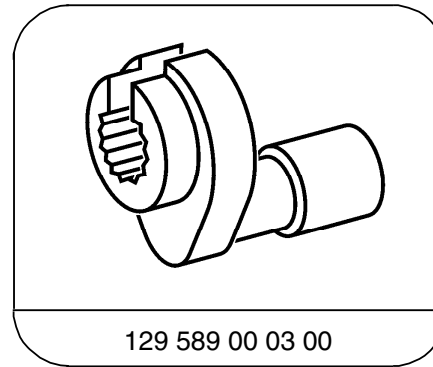
#### Special Tools



Tester



Box wrench



Box wrench

#### Hydraulic Test Program – Leveling Valve Pressure Test

Model 129

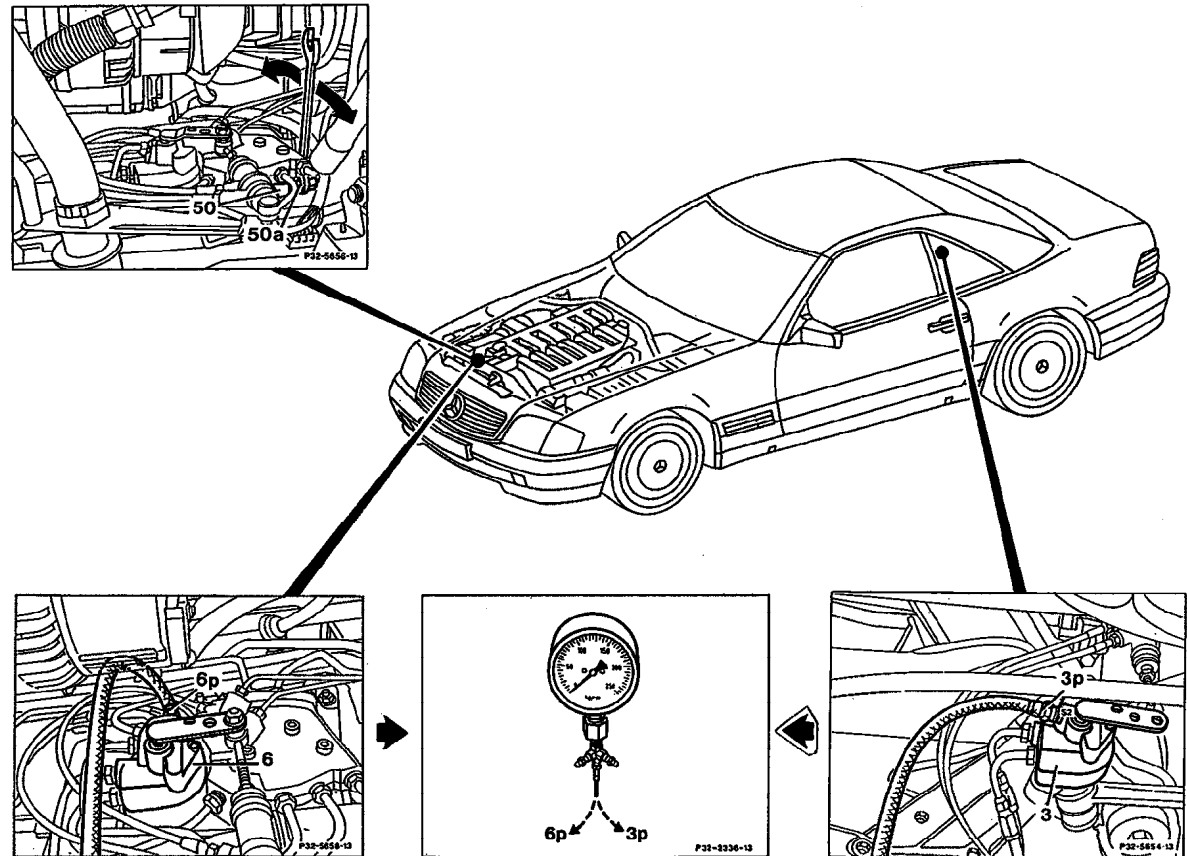




Figure 1


- 3 Rear axle leveling valve
- 3p Bleeder screw
- 6 Front axle leveling valve
- 6p Bleeder screw
- 50a Pressure supply screw

P32-5639-57

Hydraulic Test Program – Leveling Valve Pressure Test

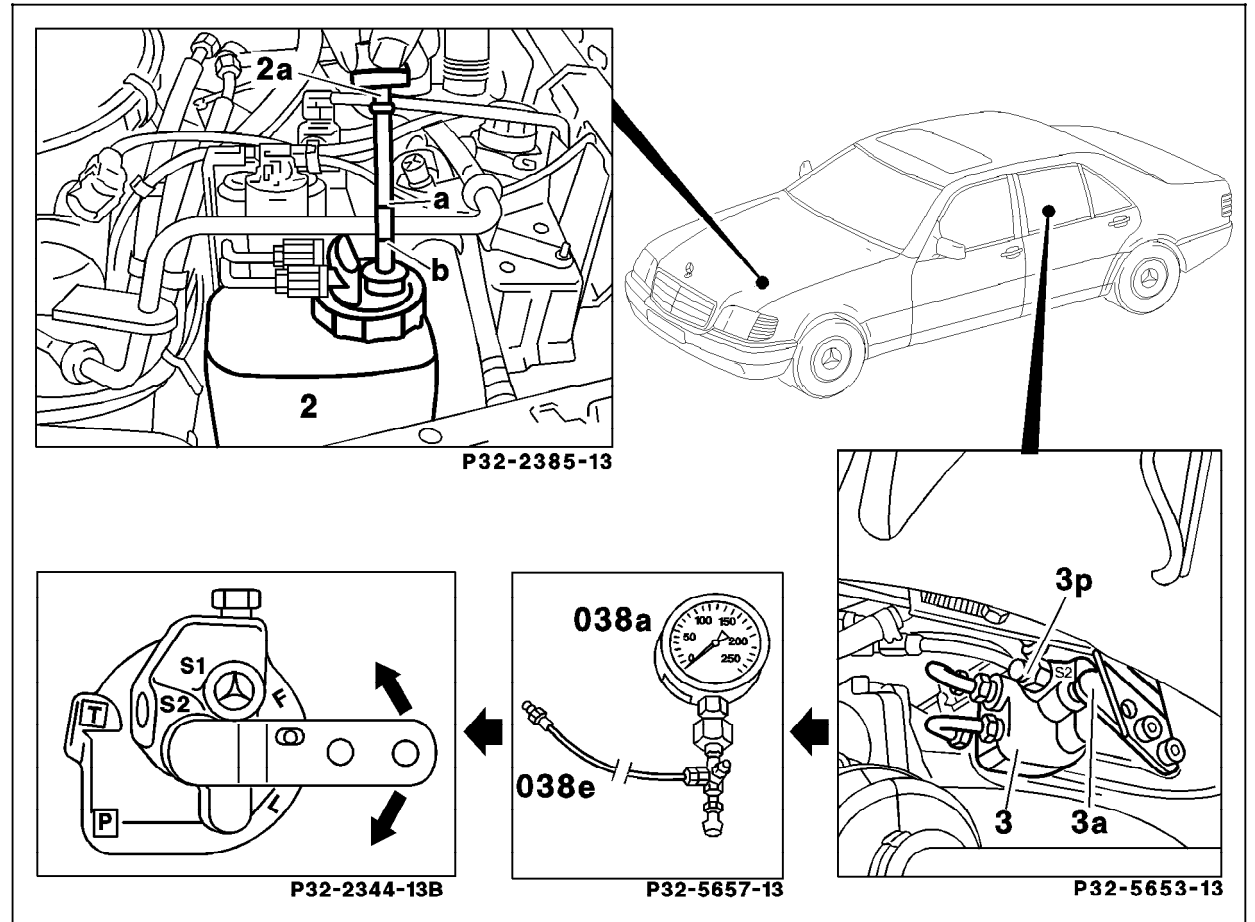
Test step	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 1.0	<p><b>Opening pressure of relief valve</b></p> <p> <b>WARNING!</b> High Pressure</p>	<p> 250</p> <p>Connect test gauge to front or rear axle leveling valve</p>	<p>Engine: <b>at Idle</b></p> <p>Set leveling valve lever to “F” (fill).</p>	133 – 153 bar	<p>&gt; 153 bar Replace leveling valve.</p> <p>&lt; 133 bar Set leveling valve on other axle to “F” (fill) and read pressure again.</p> <p>If new pressure reading is:</p> <p>&gt; 133 bar Check pressure supply screw (50a) for proper seating, Replace valve assembly.</p> <p>&lt; 133 bar 33 ⇒ 1.0</p> <p><b>Note:</b> If delivery capacity &gt; 0.2l/min., replace leveling valve.</p>

#### Hydraulic Test Program – Leveling Valve Pressure Test

Test step	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 2.0	<b>Overflow valve function</b>	 250 Connect test gauge to front or rear axle leveling valve	Engine: <b>at Idle</b> Set leveling valve lever to "F" (fill) until gauge indicates approximately 80 bar.  Set leveling valve lever to "L" (empty)	30 – 36 bar	Rear axle: Replace leveling valve.  Front axle: > 36 bar, replace leveling valve. < 30 bar, check front axle struts for fluid leaks 36 ⇒ 1.0.  <b>Note:</b> If front axle struts are not leaking, replace leveling valve.

#### Hydraulic Test Program – Leveling Valve Pressure Test

Model 140






P32-5640-57

Figure 2

- 2 Hydraulic oil reservoir
- 3 Rear axle leveling valve
- 3a Connecting lever
- 3p Bleeder screw
- 7 Connecting rod



#### Hydraulic Test Program – Leveling Valve Pressure Test

Test step	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 1.0	<b>Opening pressure of relief valve</b>   <b>WARNING!</b> High Pressure	 250 Connect test gauge to rear axle leveling valve	Engine: <b>at Idle</b> Set leveling valve lever to "F" (fill).	133 – 153 bar	> 153 bar Replace leveling valve.  < 133 bar Check hydraulic oil pump 32
⇒ 2.0	<b>Overflow valve function</b>	 250 Connect test gauge to rear axle leveling valve	Engine: <b>at Idle</b> Set leveling valve lever to "F" (fill) until gauge indicates approximately 80 bar.  Set leveling valve lever to "L" (empty)	30 – 36 bar	Rear axle: Replace leveling valve.

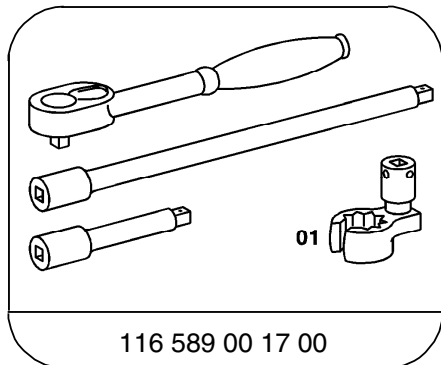
### Hydraulic Test Program – Valve Assembly Internal Leakage Test (Model 129)

Preliminary work:	
Leveling valve pressure test .....	34

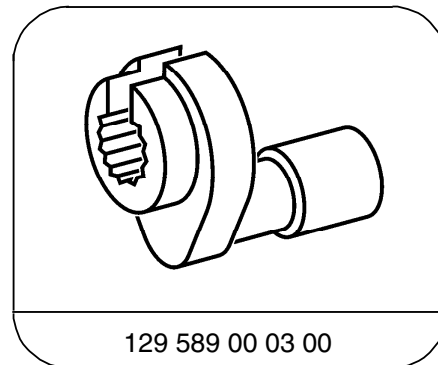
#### Preparation for Test

1. Check oil level in oil reservoir, correct if necessary.
2. Disconnect connecting rods (54, 55) at front and rear leveling valve levers (set levers to neutral position).
3. Disconnect leak oil line of suspension struts at front axle and close steel line.
4. Disconnect return line (T) at oil reservoir.

#### Special Tools



Box wrench



Box wrench

#### Hydraulic Test Program – Valve Assembly Internal Leakage Test (Model 129)

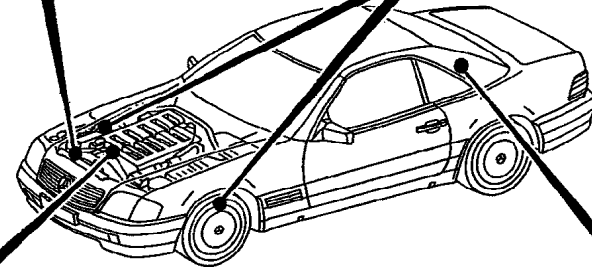
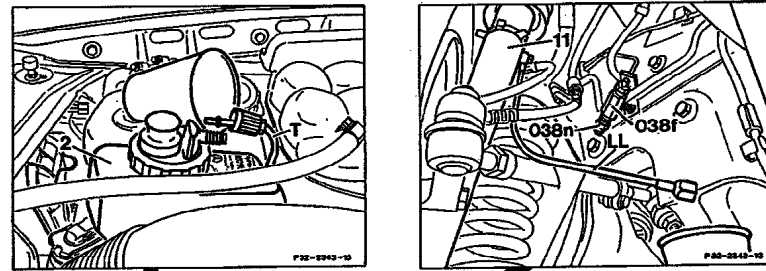
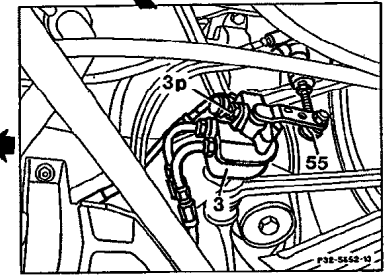
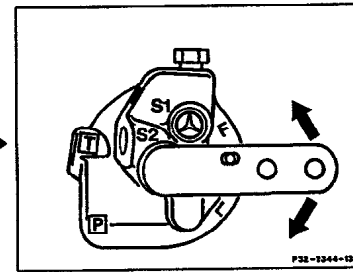
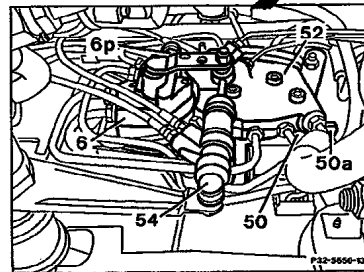


Figure 1

- 2 Hydraulic oil reservoir
- 3 Rear axle leveling valve
- 6 Front axle leveling valve
- 54 Front axle connecting rod
- 55 Rear axle connecting rod
- LL Leak oil return line - left suspension strut, front axle distributor/valve unit
- T Return line - oil reservoir distributor/valve unit
- 038f Coupling (from hydraulic kit)
- 038n Vent screw (from hydraulic kit)
- 50 Distributor valve
- 52 Distributor



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#### Hydraulic Test Program – Valve Assembly Internal Leakage Test (Model 129)

Test step	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 1.0	<b>Valve assembly internal leakage</b>	—	Engine: <b>at Idle</b> Set front axle leveling valve lever to “F” (fill). Then move leveling valve lever to center position.	Vehicle must raise at front axle.	Replace distributor valve or valve assembly.
			Set rear axle leveling valve lever to “F” (fill). Then move leveling valve lever to center position.	Vehicle must raise at rear axle.	Replace distributor valve or valve assembly.
			Engine: <b>OFF</b> Wait at least two minutes (allows valves to close).		
	Leak oil discharge	—	Move both leveling valve levers to “L” (empty).	Vehicle must not lower.	Replace distributor valve or valve assembly.
			Disconnect return line (T) at reservoir. Attach drain hose and place into measuring container.	Maximum of 2 cc oil discharge in four hours.	Replace distributor valve or valve assembly.

### Hydraulic Test Program – Front Axle Strut Suspension Leak Test (Model 129)

#### Preparation for Test

- Weight of vehicle must rest on wheels.
- Vehicle must be in normal load/curb weight condition.

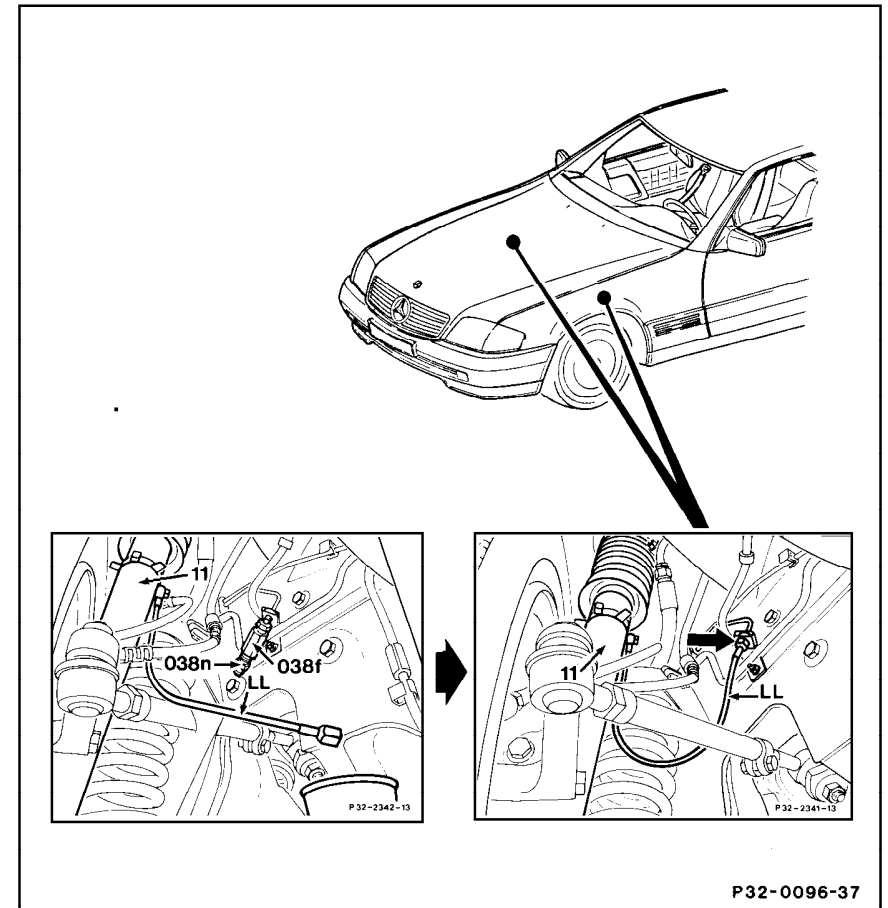


Figure 1

- 11 Front suspension strut
- LL Leak oil return line for left suspension strut, front axle distributor/valve unit
- LR Leak oil return line for right suspension strut, front axle distributor/valve unit (not shown)

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#### Hydraulic Test Program – Front Axle Strut Suspension Leak Test (Model 129)

Test step	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 1.0	<b>Leak oil quantity</b>	Measuring container	Disconnect leak oil line from leak oil hoses (LL and LR) and place leak oil line in measuring container.	Maximum amount of leak oil : 2 cc in four hours.	Internal leak in strut, replace suspension strut.