

4.1 Models 124.128, 129.061, 201 (up to 05/92)

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Diagnosis - Diagnostic Trouble Code (DTC) Memory

Preparation for DTC Readout

The ASD control module (N30/2) features DTC memory which can store only **one** code in memory.

The first recognized fault is stored in memory. The memory **is not** erased when the vehicle battery or ASD control module are disconnected.

The DTC can be read via:

- the impulse counter scan tool, or
- the ASD MIL (A1e24) in the instrument cluster.

1. Connect impulse counter scan tool to data link connector (X11/4) according to connection diagram on following page.

Note:

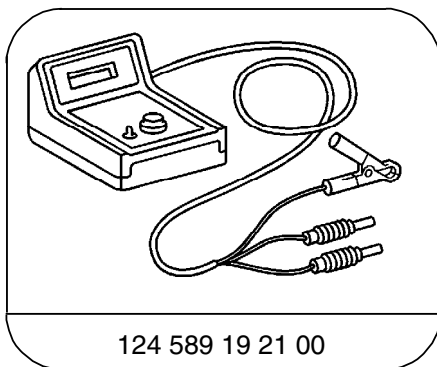
Connect yellow wire from impulse counter scan tool to:
ASD control module socket 5.

2. Engine: **at Idle**.
3. Read out DTC for ASD control module (N30/2), see section 0.



To erase the DTC, Engine: **at Idle**.

Special Tools



124 589 19 21 00
Pulse counter

Diagnosis - Diagnostic Trouble Code (DTC) Memory

Connection Diagram - Impulse Counter Scan Tool

Shown on model 129

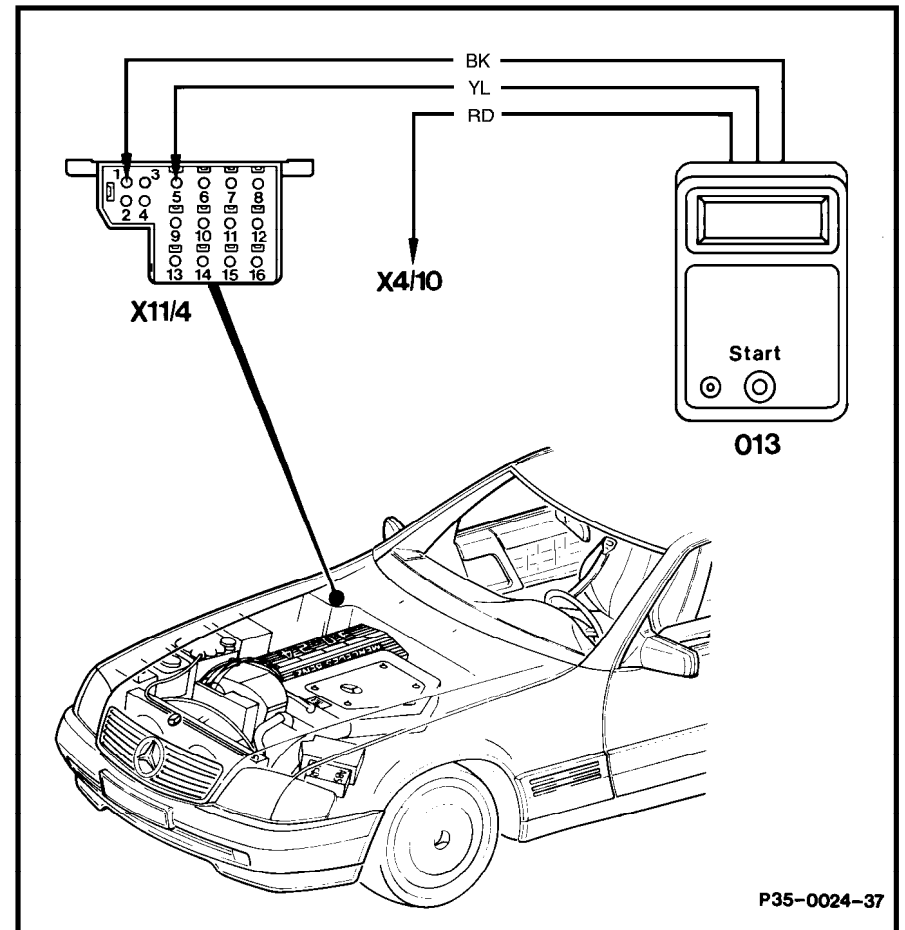


Figure 1

- 013 Impulse counter scan tool
- X4/10 Terminal block
- X11/4 Data link connector

P35-0024-37

Diagnosis - Diagnostic Trouble Code (DTC) Memory

DTC readout via the ASD MIL (A1e24)

Shown on model 129

Engine: **at Idle**

Bridge sockets 1 and 5 on the data link connector (X11/4) for approximately one second.

Count number of impulses on ASD MIL (A1e24), see Figure 3.

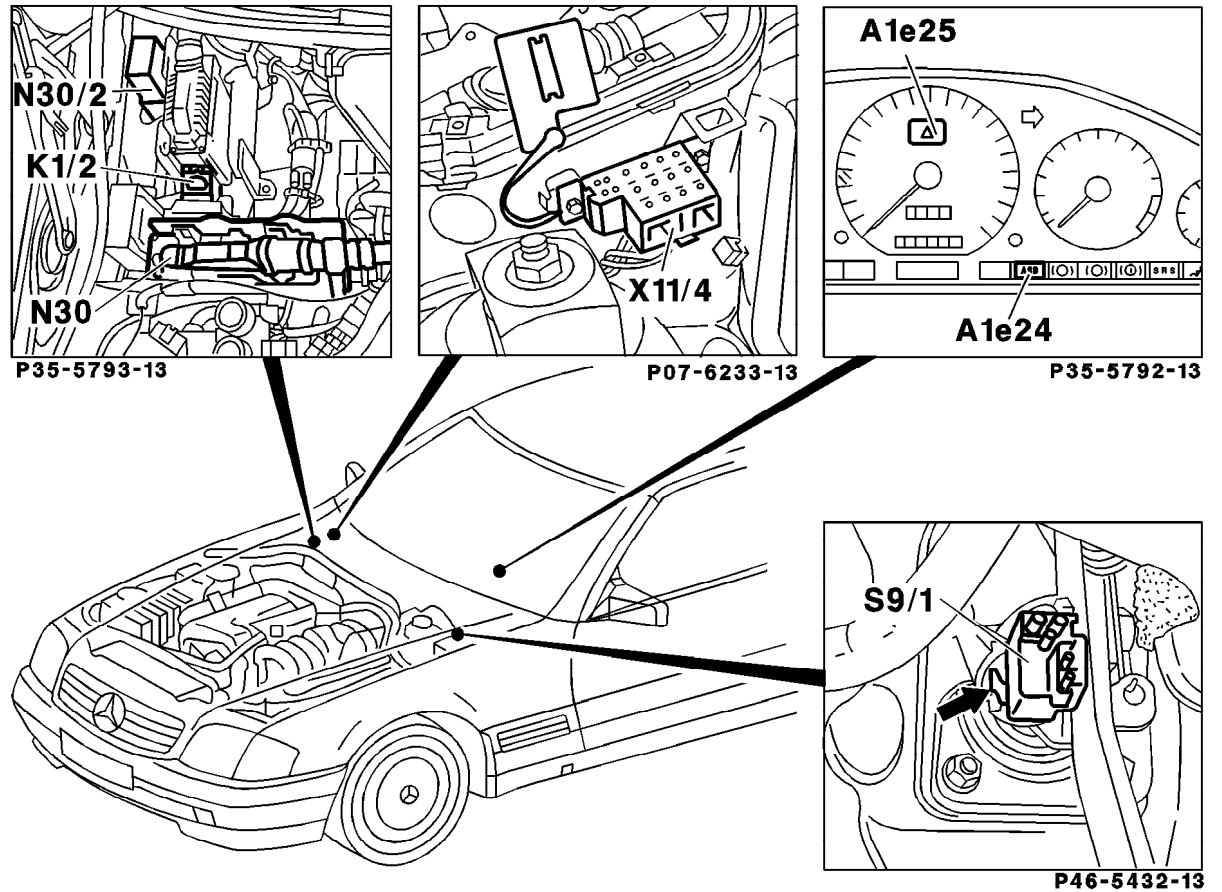


Figure 2

- A1e24 ASD MIL
- A1e25 ASD warning lamp
- X11/4 Data link connector

P35-5782-57

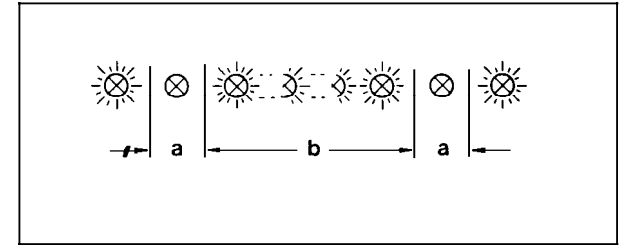
Diagnosis - Diagnostic Trouble Code (DTC) Memory

DTC readout via the ASD MIL (A1e24)

DTC indication

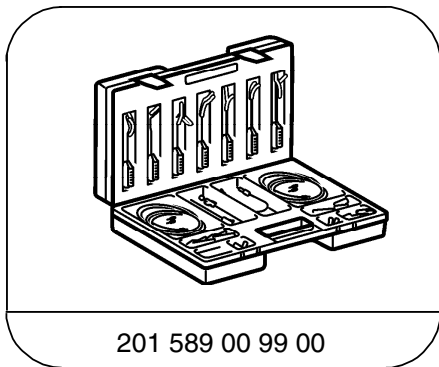
Figure 3

- a Pause for approximately two seconds
- b DTC (e.g. 4)



P35-0130-11

Special Tools



Electrical connecting set

Diagnosis - Diagnostic Trouble Code (DTC) Memory

Diagnostic trouble code (DTC)	Possible cause	Test step/Remedy ¹⁾
1	No fault in system.	In case of complaint: 23 and 33 (entire test)
2	ASD control module (N30/2).	Replace N30/2.
3	Stop lamp switch (S9/1).	23⇒ 6.0
4	Left front axle VSS sensor (L6/1) or VSS from ABS control module, N30.	23⇒ 9.0
5	Right front axle VSS sensor (L6/2) or VSS from ABS control module, N30.	23⇒ 10.0
6	Rear axle VSS sensor (L6) or VSS from ABS control module, N30.	23⇒ 11.0
7	No VSS from any sensor (L6, L6/1, L6/2).	23⇒ 9.0, 10.0, 11.0
8	ASD valve (Y38) or stop lamp switch (S9/1).	23⇒ 7.0 23⇒ 8.0

¹⁾ Observe Preparation for Test, see 22.

Diagnosis - Complaint Related Diagnostic Chart

Complaint/Problem	Possible cause	Remedy/Test step
ASD warning lamp (A1e25) does not come on, ASD MIL (A1e24) comes on with Ignition: ON .	Wiring between N30/2 and A1e25, Bulb, Electronic part of A1e25, N30/2.	23 ⇒ 4.0
ASD warning lamp (A1e25) does not change intensity when turning on exterior lamps with Ignition: ON .	Electronic part of A1e25.	Electronic part of A1e25.
ASD MIL (A1e24) does not come on, ASD warning lamp (A1e25) comes on with Ignition: ON .	Wiring between N30/2 and A1e25, Bulb, N30/2.	23 ⇒ 5.0
ASD warning lamp (A1e25) and ASD MIL (A1e24) stay on continuously with engine running.	Wiring between N30/2 and circuit 61e, No voltage on circuit 61e, N30/2.	23 ⇒ 2.0, If there is no voltage on circuit 61e, this will also be evident on the generator charge indicator lamp (A1e5). Check wiring, generator and voltage regulator, N30/2.
ASD warning lamp (A1e25) and ASD MIL (A1e24) do not come on with Ignition: ON .	Wiring, N30/2, Overvoltage protection relay module (K1/2), Circuit board in instrument cluster.	23 ⇒ 1.0

Electrical Test Program - Component Locations

Component Locations on Front Axle,
in Engine Compartment and in Instrument Cluster
Model 124

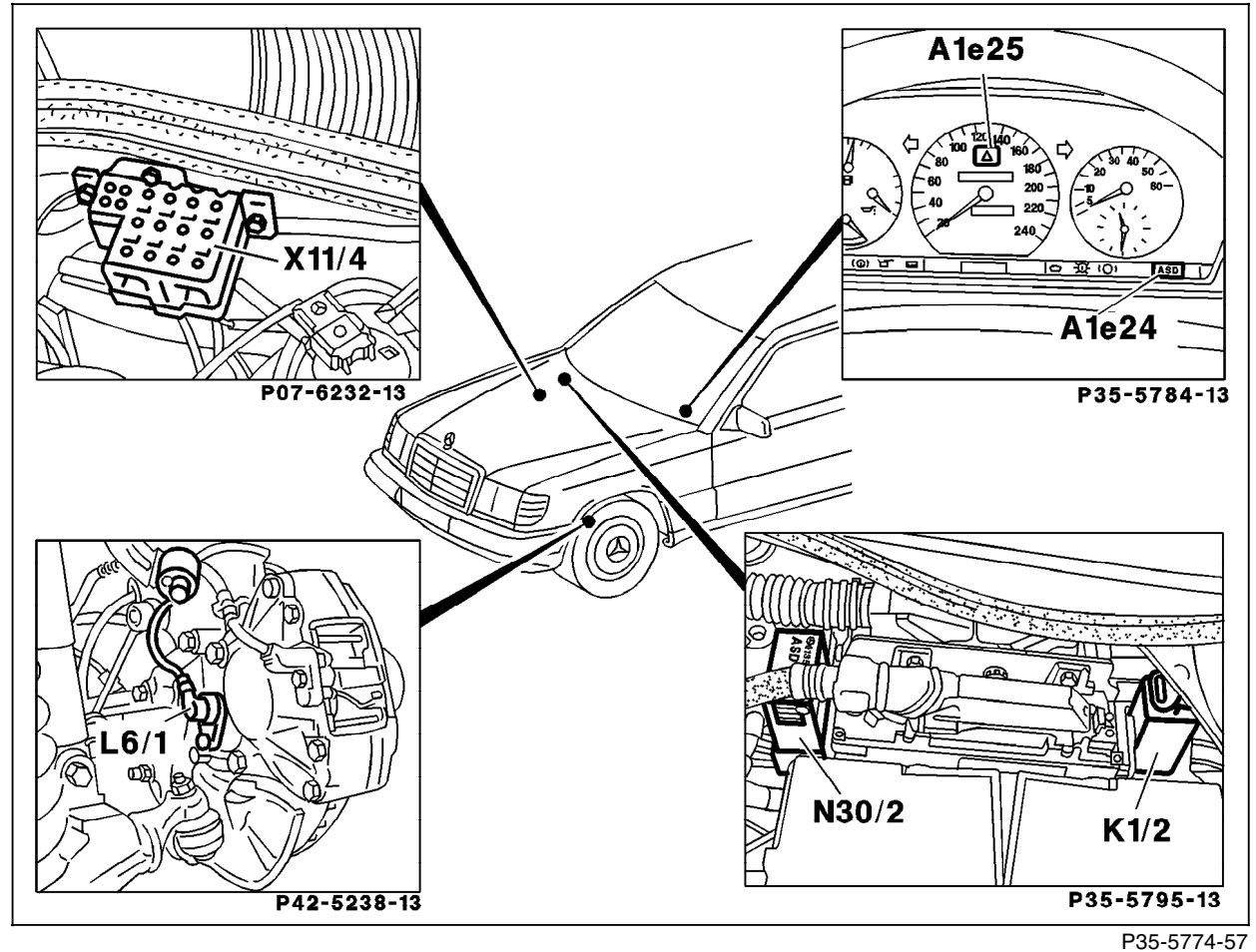


Figure 1

- A1e24 ASD MIL
- A1e25 ASD warning lamp
- L6/1 Left front axle VSS sensor
- L6/2 Right front axle VSS sensor
- K1/2 Overvoltage protection relay module
- N30/2 ASD control module
- X11/4 Data link connector (DTC readout)

Electrical Test Program - Component Locations

Electrical Components in Right Rear Chassis, on Rear Axle and in Passenger Compartment
Model 124

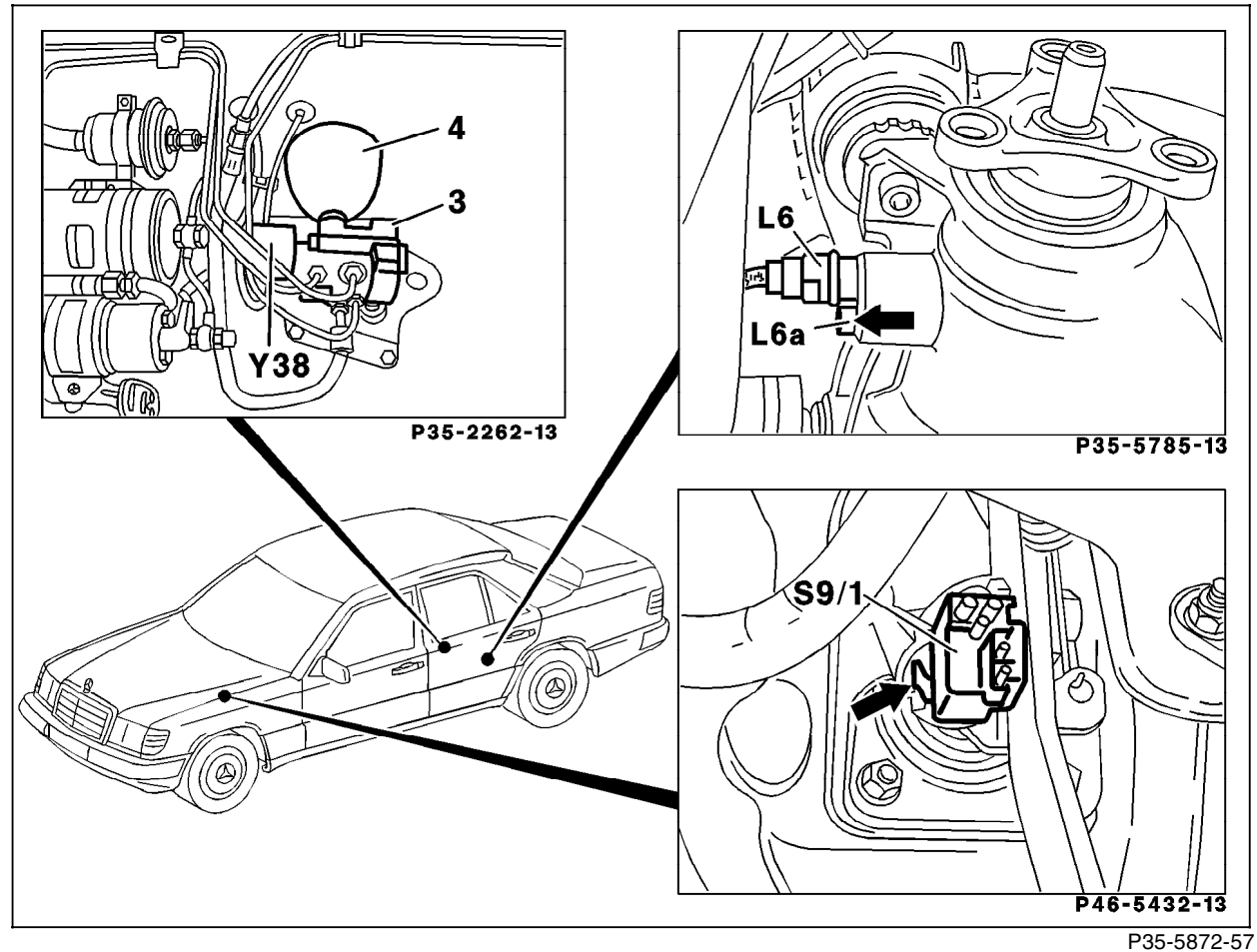


Figure 2

- L6 Rear axle VSS sensor
- S9/1 Stop lamp switch (4-pole)
- Y38 ASD valve

Electrical Test Program - Component Locations

Electrical Components in Engine Compartment,
and Passenger Compartment
Model 129

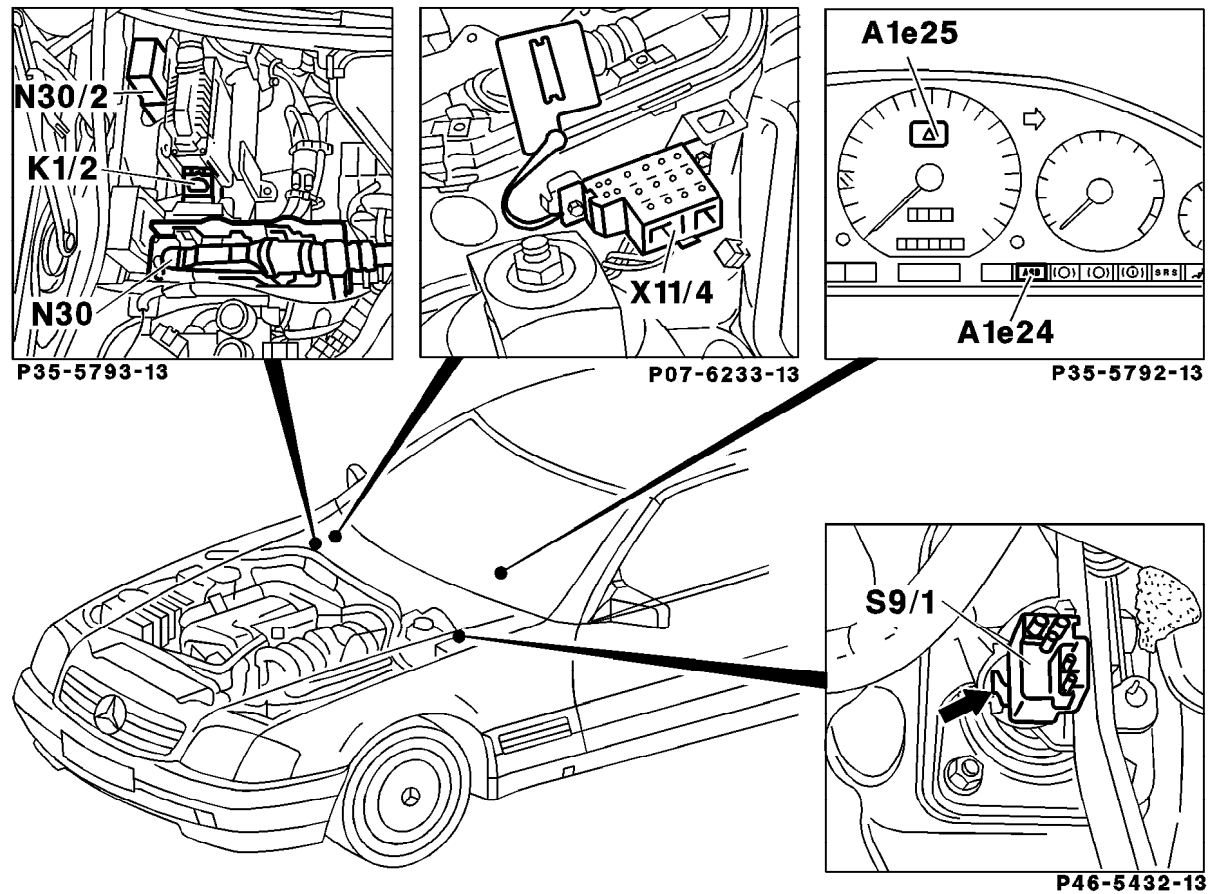


Figure 3

- A1e24 ASD MIL
- A1e25 ASD warning lamp
- K1/2 Overtoltage protection relay module
- N30 ABS control module
- N30/2 ASD control module
- S9/1 Stop lamp switch (4-pole)
- X11/4 Data link connector (DTC readout)

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Electrical Test Program - Component Locations

Electrical Components in Right Rear Chassis,
on Front and Rear Axles
Model 129

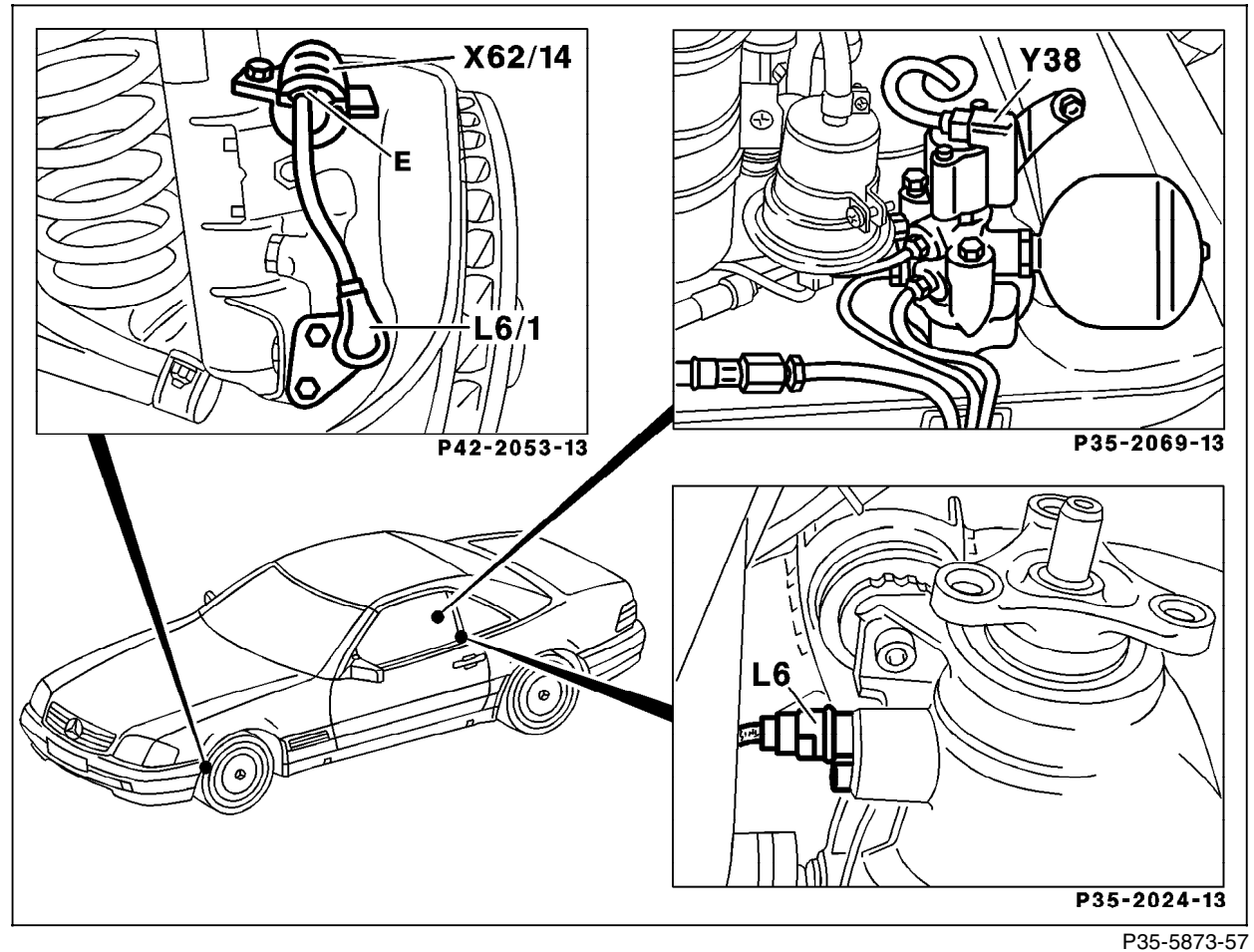


Figure 4

- L6 Rear axle VSS sensor
- L6/1 Left front axle VSS sensor
- L6/2 Right front axle VSS sensor (not shown)
- X62/14 Left front axle VSS sensor connector (axle spindle)
- Y38 ASD valve

Electrical Test Program - Component Locations

Electrical Components in Engine Compartment and Passenger Compartment
Model 201

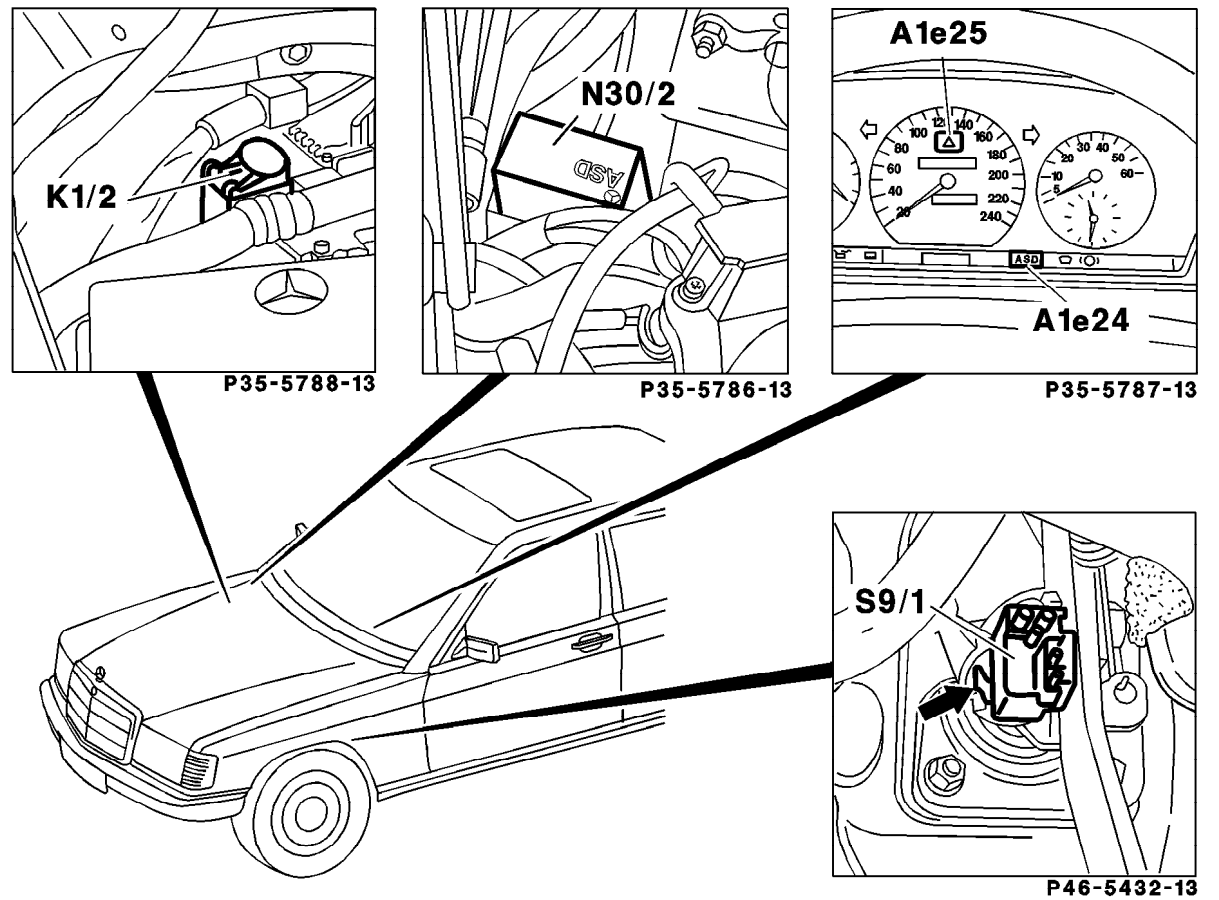


Figure 5

- A1e24 ASD MIL
- A1e25 ASD warning lamp
- K1/2 Overvoltage protection relay module
- N30/2 ASD control module
- S9/1 Stop lamp switch (4-pole)

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Electrical Test Program - Component Locations

Electrical Components in Engine Compartment,
on Front and Rear Axle and ASD Valve Location
Model 201

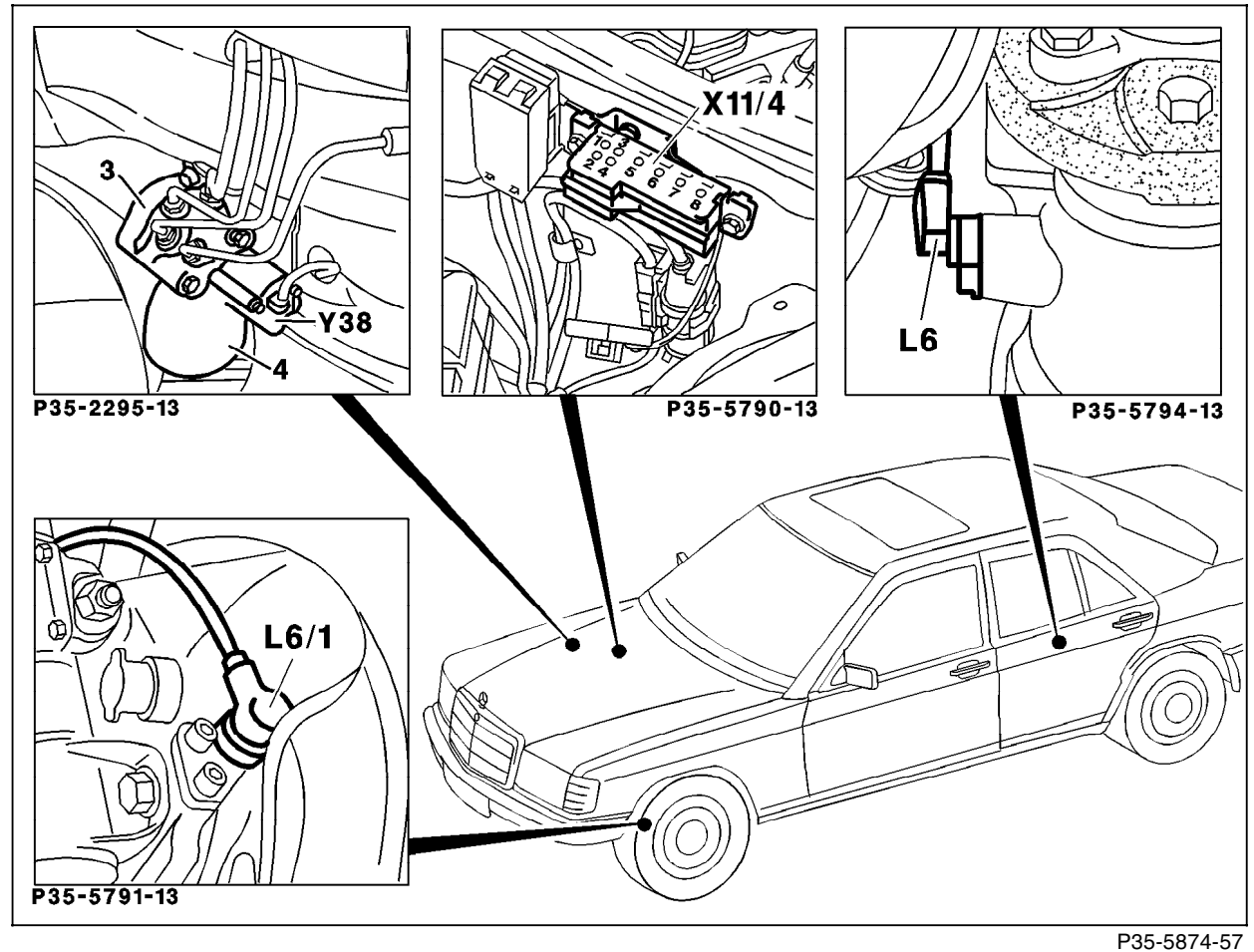


Figure 6

- L6 Rear axle VSS sensor
- L6/1 Left front axle VSS sensor
- L6/2 Right front wheel VSS sensor (not shown)
- X11/4 Data link connector (DTC readout)
- Y38 ASD valve

Electrical Test Program - Preparation for Test

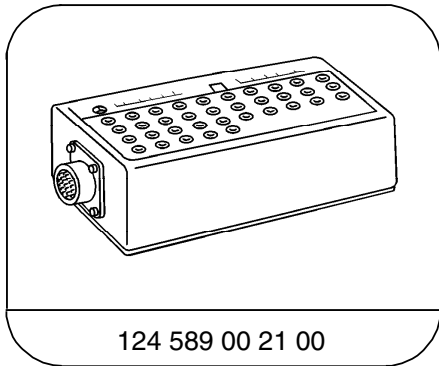
Preliminary work:
 Diagnosis - Diagnostic Trouble Code (DTC) Memory 11

1. Ignition: **OFF**
2. Remove plastic cover.
3. Disconnect ASD control module (N30/2).
3. Connect socket box (04) with test cable (02) according to connection diagram.

Electrical Wiring Diagrams:

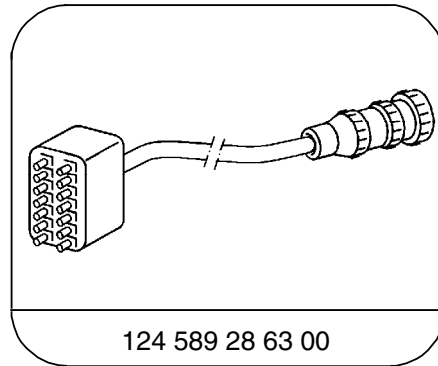
Electrical Troubleshooting Manual, Model 124
 Electrical Troubleshooting Manual, Model 129
 Electrical Troubleshooting Manual, Model 201

Special Tools



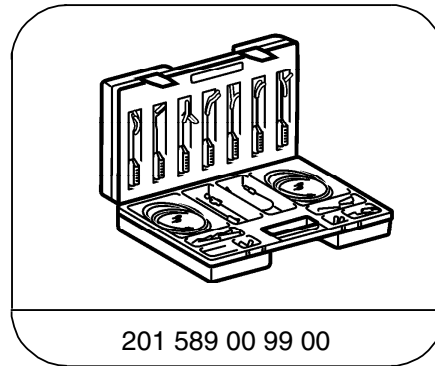
124 589 00 21 00

35-pin socket box



124 589 28 63 00

Test cable



201 589 00 99 00

Electrical connecting set

Equipment

Digital multimeter ¹⁾

Fluke models 23, 83, 85, 87

¹⁾ Available through the MBUSA Standard Equipment Program.

Electrical Test Program - Preparation for Test

Connection Diagram - Socket Box
Model 124

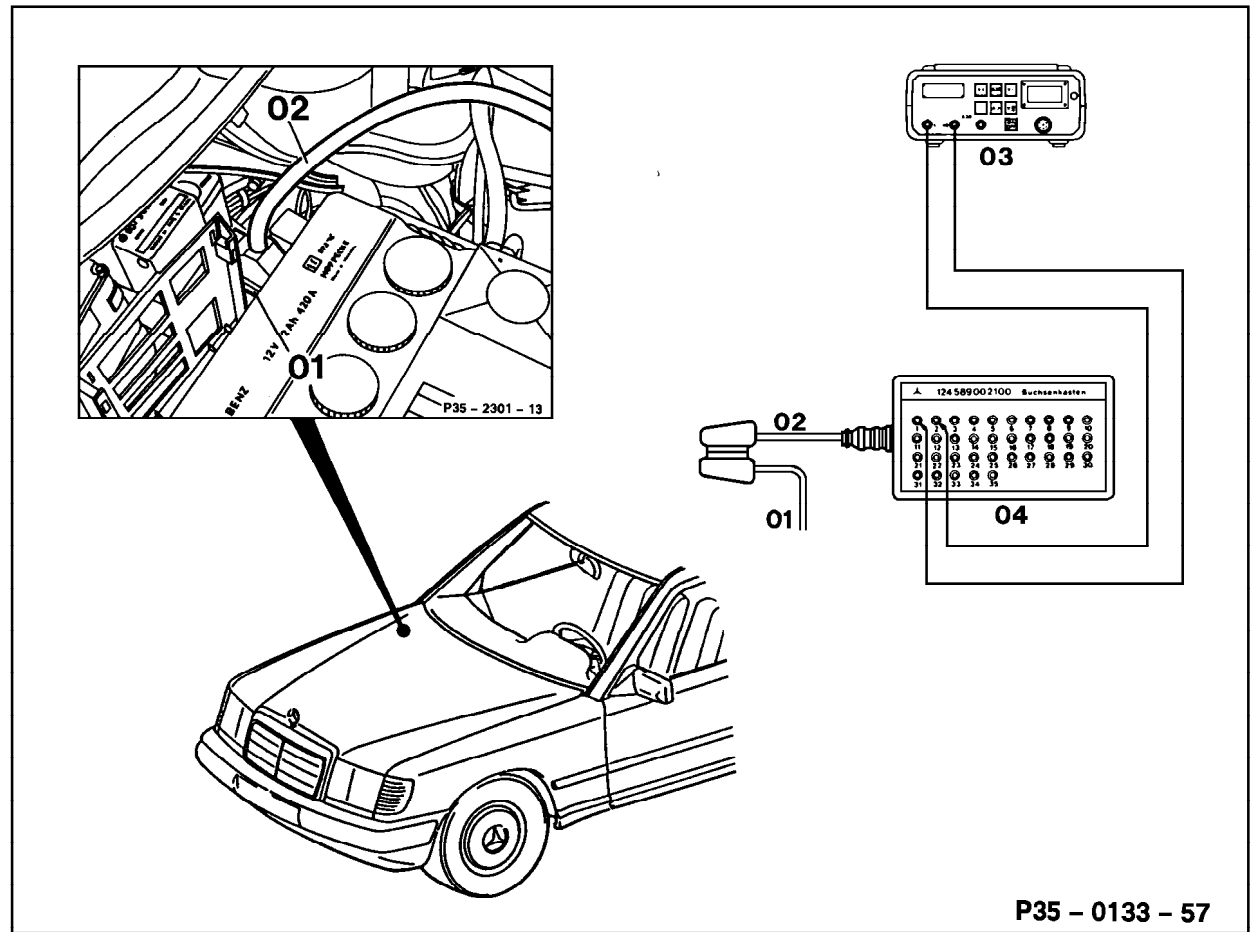


Figure 1

- 01 ASD control module connector
- 02 Test cable
- 03 Digital multimeter
- 04 Socket box (35-pole)

P35 - 0133 - 57

P35-0133-57

Electrical Test Program - Preparation for Test

Connection Diagram - Socket Box
Model 129

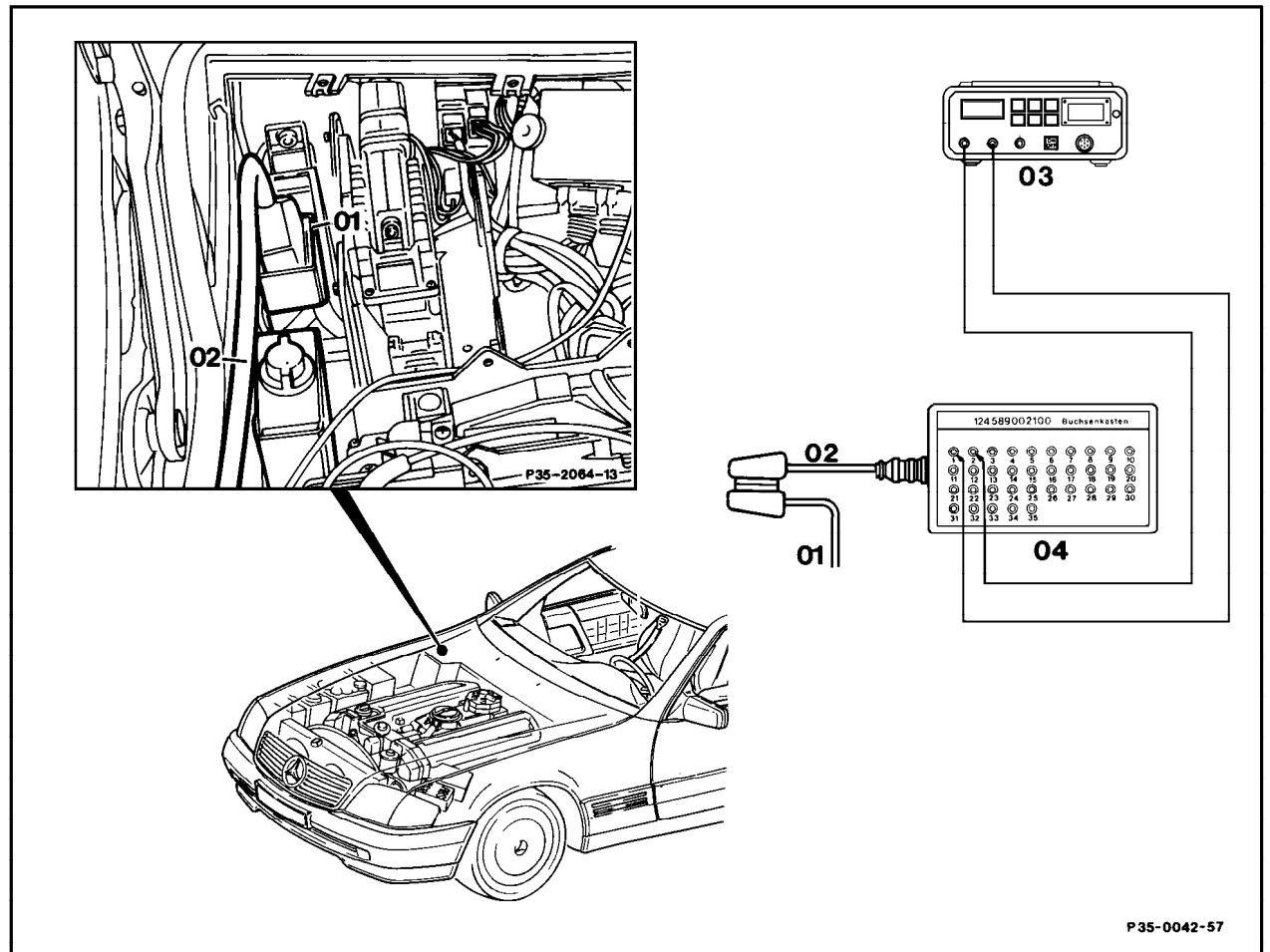


Figure 2

- 01 ASD control module connector
- 02 Test cable
- 03 Multimeter
- 04 Socket box (35-pole)

Electrical Test Program - Preparation for Test

Connection Diagram - Socket Box
Model 201

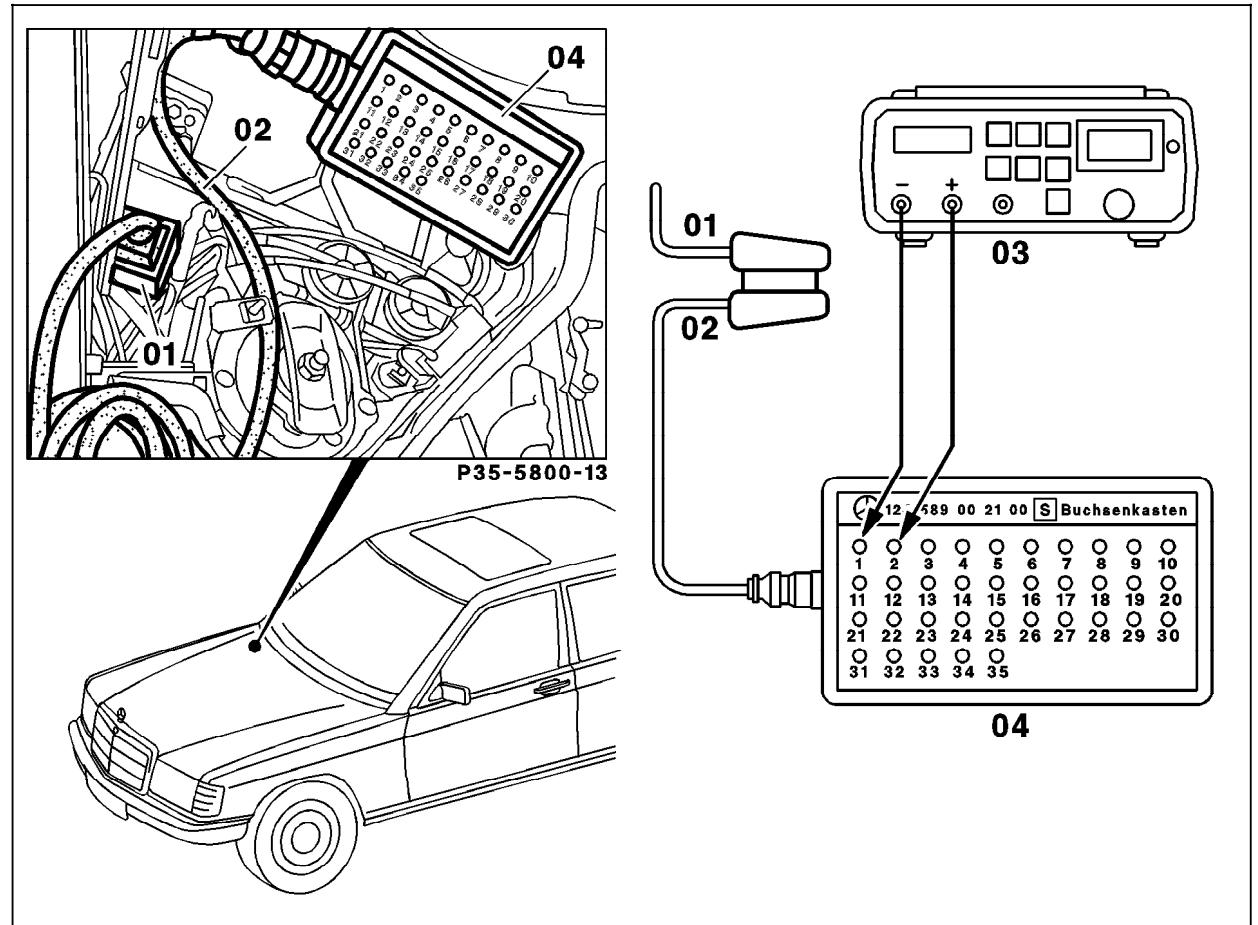


Figure 3

- 01 ASD control module connector
- 02 Test cable
- 03 Multimeter
- 04 Socket box (35-pole)

P35-5781-57

4.1 Automatic Locking Differential (ASD)

Models 124.128, 129.061, 201


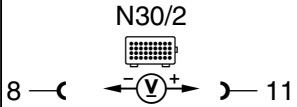

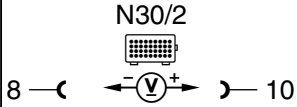

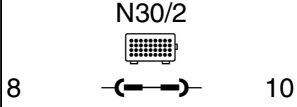
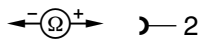
Electrical Test Program - Test

Test step DTC	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 1.0	ASD control module (N30/2) Voltage supply Circuit 87 E		Ignition: ON	11 – 14 V	⇒ 1.1
⇒ 1.1	Voltage supply from overvoltage protection relay module (K1/2)		Ignition: ON	11 – 14 V	Fuse in K1/2, Wiring, K1/2, ⇒ 1.2
⇒ 1.2	Ground wire		Ignition: OFF	< 1 Ω	Wiring, Model 124, 201 Ground (W10), Model 129 Ground (W16).


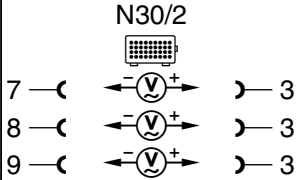
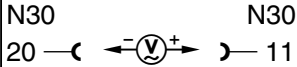
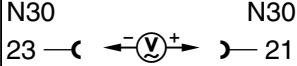
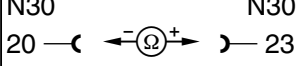
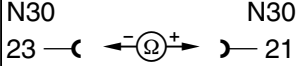
Electrical Test Program - Test

Test step DTC	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 2.0	Circuit 61 voltage	<p>N30/2 8 —(V)— 13</p>	Ignition: ON Engine: at Idle	< 2 V 11 – 14 V	Wiring, Generator (G2).
⇒ 3.0	Diagnosis output	<p>X11/4 N30/2 5 —(Ω)— 2</p>	Engine: OFF	< 1 Ω	Wiring, Data link connector (X11/4).
⇒ 4.0	ASD warning lamp (A1e25)	<p>N30/2 8 —(L)— 4</p>	Ignition: ON	A1e25: ON	Wiring, Fuse, A1e25, Bulb.
⇒ 5.0	ASD MIL (A1e24)	<p>N30/2 8 —(L)— 2</p>	Ignition: ON Bridge sockets 8 and 2. Engine: at Idle	A1e24: ON A1e24: OFF	Wiring, Fuse, A1e24. Wiring.

Electrical Test Program - Test

Test step DTC	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 6.0	 Stop lamp switch (S9/1) N.O. contact	N30/2 	Ignition: OFF Brake pedal not depressed. Depress brake pedal.	< 1 V 11 – 14 V	Fuse in F1, Wiring, S9/1.
⇒ 7.0	 Stop lamp switch (S9/1) N.C. contact	N30/2 	Ignition: ON Brake pedal not depressed. Depress brake pedal.	11 – 14 V < 1 V	Wiring, S9/1, ⇒ 8.0
⇒ 8.0	 ASD valve (Y38) Function	N30/2 	Ignition: ON Depress brake pedal.	ASD valve switches on. ASD valve switches off.	⇒ 8.1, Wiring.
⇒ 8.1	Coil resistance	Y38x1 1 —  — 2 Y38x1	Ignition: OFF Brake pedal not depressed.	5 – 7 Ω	Wiring, Y38.

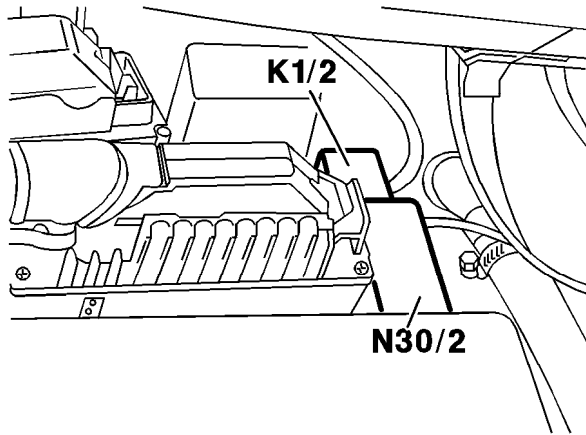
Electrical Test Program - Test

Test step DTC	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 10.0	 Right front VSS	<p>N30/2</p> 	<p>Raise front of vehicle. Ignition: ON Rotate right front wheel (approx. 1 rev./sec.).</p>	> 3 V~	Wiring, ⇒ 10.1.
⇒ 10.1	ABS control module (N30) right front VSS output	<p>N30</p> 	<p>Raise front of vehicle. Ignition: ON Rotate right front wheel (approx. 1 rev./sec.).</p>	> 3 V~	⇒ 10.2.
⇒ 10.2	Right front VSS sensor (L6/2)	<p>N30</p> 	<p>Raise front of vehicle. Ignition: ON Rotate right front wheel (approx. 1 rev./sec.).</p>	> 0.1 V~	⇒ 10.3.
⇒ 10.3	Internal resistance	<p>N30</p> 	<p>Ignition: OFF Disconnect ABS control module (N30).</p>	> 20 kΩ	Wiring, ⇒ 10.4.
⇒ 10.4	Internal resistance	<p>N30</p> 	<p>Ignition: OFF Disconnect ABS control module (N30).</p>	0.8 – 2.3 kΩ	Wiring, L6/2.

Electrical Test Program - Test

Test step DTC	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 11.0	Rear axle VSS		Raise front of vehicle. Ignition: ON Rotate either rear wheel (approx. 1 rev./sec.).	> 3 V~	Wiring, ⇒ 11.1.
⇒ 11.1	ABS control module (N30) rear axle VSS output		Raise front of vehicle. Ignition: ON Rotate either rear wheel (approx. 1 rev./sec.).	> 3 V~	⇒ 11.2.
⇒ 11.2	Rear axle VSS sensor (L6)		Raise front of vehicle. Ignition: ON Rotate either rear wheel (approx. 1 rev./sec.).	> 0.1 V~	⇒ 11.3.
⇒ 11.3	Internal resistance		Ignition: OFF Disconnect ABS control module (N30).	> 20 kΩ	Wiring, ⇒ 11.4.
⇒ 11.4	Internal resistance		Ignition: OFF Disconnect ABS control module (N30).	0.6 – 1.6 kΩ	Wiring, L6.

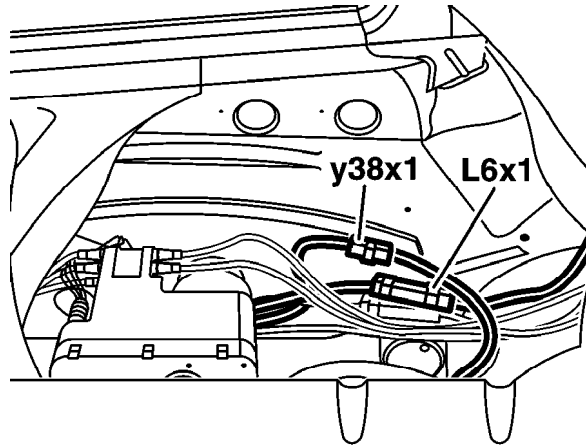
Electrical Test Program - Test



P35-2259-13

Figure 1
Model 124 Right component compartment

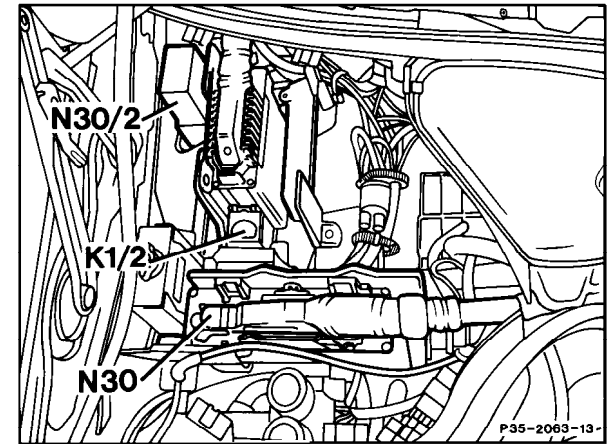
- K1/2 Overvoltage protection relay module (87E/87L/30a, 9-pole)
- N30/2 ASD control module



P35-5772-13

Figure 2
Model 124 Right rear passenger compartment

- L6x1 Rear axle VSS sensor connector
- Y38x1 ASD solenoid valve connector

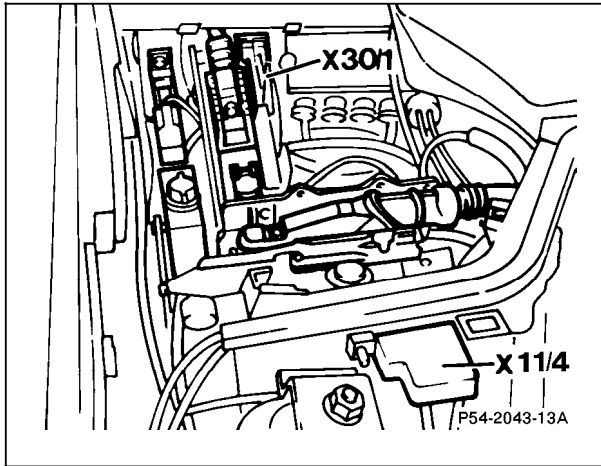


P35-2063-13

Figure 3
Model 129

- K1/2 Overvoltage protection relay module (87E/87L/30a, 9-pole)
- N30 ABS control module
- N30/2 ASD control module

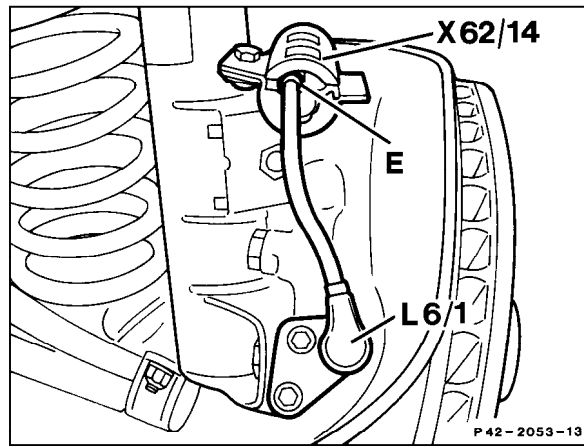
Electrical Test Program - Test



P54-2043-13A

Figure 4
Model 129

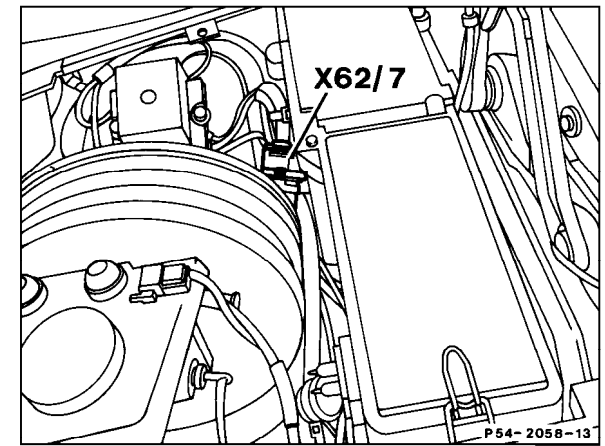
X30/1 Multi-function connector block
X11/4 Data link connector (DTC readout)



P42-2053-13

Figure 5
Model 129

L6/1 Left front axle VSS sensor
L6/2 Right front axle VSS sensor
X62/14 Left front axle VSS sensor connector (axle spindle)
X62/15 Right front axle VSS sensor connector (axle spindle)

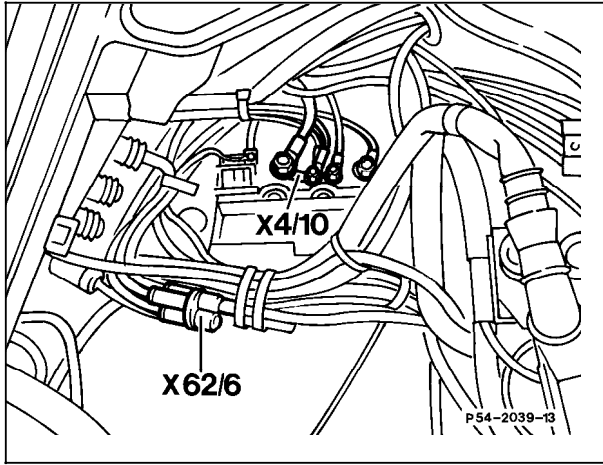


P54-2058-13

Figure 6
Model 129

X62/7 Left front axle VSS sensor connector (component compartment)

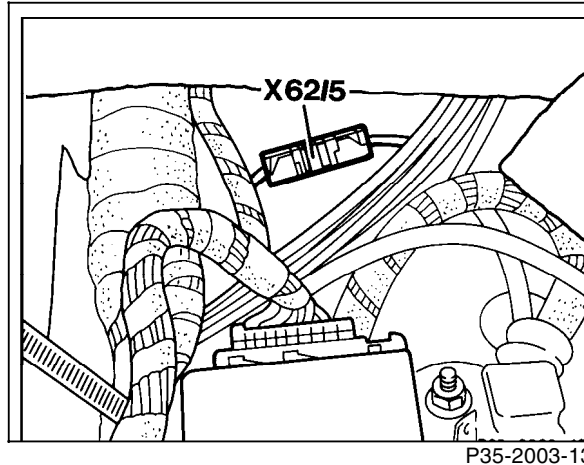
Electrical Test Program - Test



P54-2039-13

Figure 7
Model 129

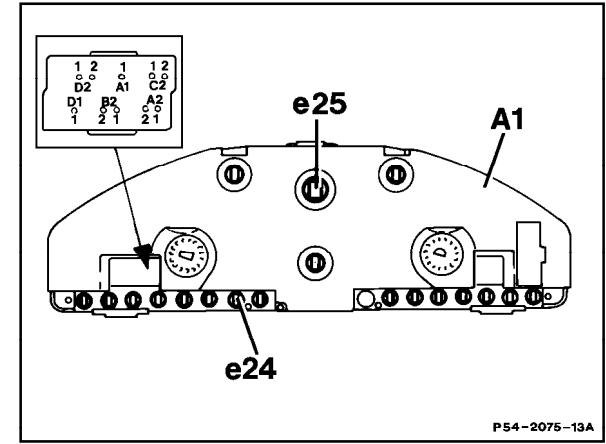
- X4/10 Terminal block (circuit 30/circuit 61 battery) (3-pole)
- X62/6 Right front axle VSS sensor connector (component compartment)



P35-2003-13

Figure 8
Model 129

- X62/5 Valve connector (ASD) (2-pole)

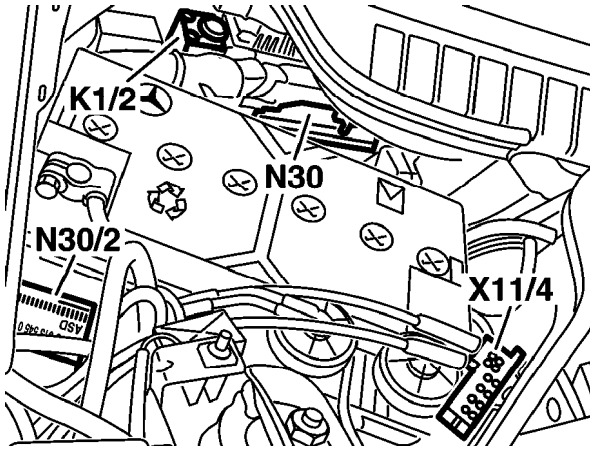


P54-2075-13A

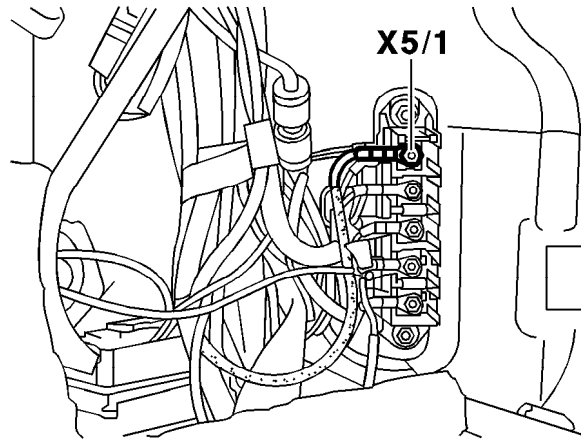
Figure 9
Model 129

- A1 Instrument cluster
- A1e24 ASD MIL
- A1e25 ASD warning lamp

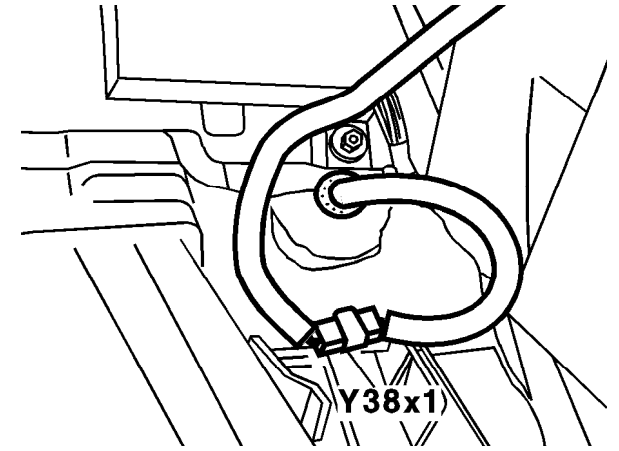
Electrical Test Program - Test



P35-5773-13



P35-5808-13



P35-5802-13

Figure 10
Model 201 Right component compartment

- K1/2 Overvoltage protection relay module (87E/87L/30a, 9-pole)
- N30 ABS control module
- N30/2 ASD control module
- X11/4 Data link connector (DTC readout)

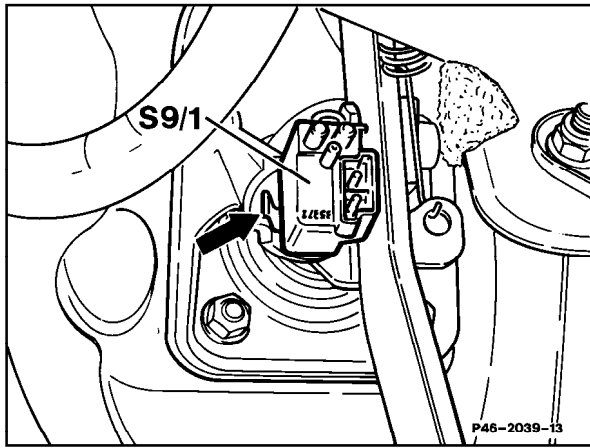
Figure 11
Model 201 Left footwell

- X5/1 Terminal block (interior)

Figure 12
Model 201 Right footwell

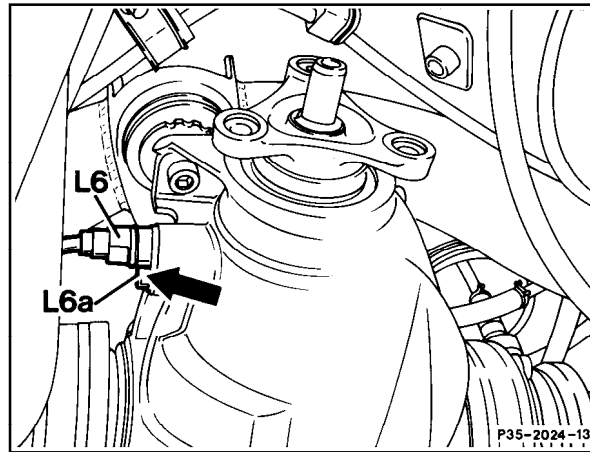
- Y38x1 ASD solenoid valve connector

Electrical Test Program - Test



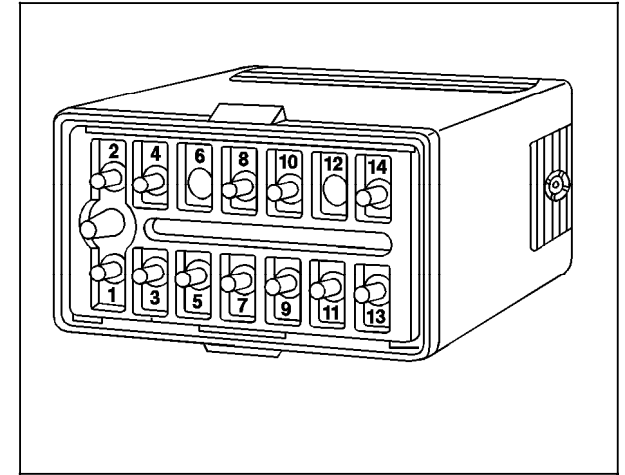
P46-2039-13

Figure 13
Pedal assembly, all models
S9/1 Stop lamp switch (4-pole)



P35-2024-13

Figure 14
Rear axle center piece, all models
L6 Rear axle VSS sensor
L6a Rear axle VSS sensor mounting screw



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Figure 15
ASD control module (N30/2) pin layout

1	Rear axle VSS sensor (L6) from N30
2	ASD warning lamp (A1e24) and Data link connector (X11/4)
3	Right front axle VSS sensor (L6/2) from N30
4	ASD MIL (A1e25)
5	Left front axle VSS sensor (L6/1) from N30
6	Not used
7 - 9	Ground
	Model 124: W10
	Model 129: W16
	Model 201: W10
10	ASD valve (Y38) (-) and Stop lamp switch (S9/1) N.C. contact
11	Stop lamp switch (S9/1) N.O. contact
12	Not used
13	Circuit 61 voltage
14	Circuit 87 voltage

Hydraulic Test Program - Component Locations

Hydraulic Components

Model 124.128

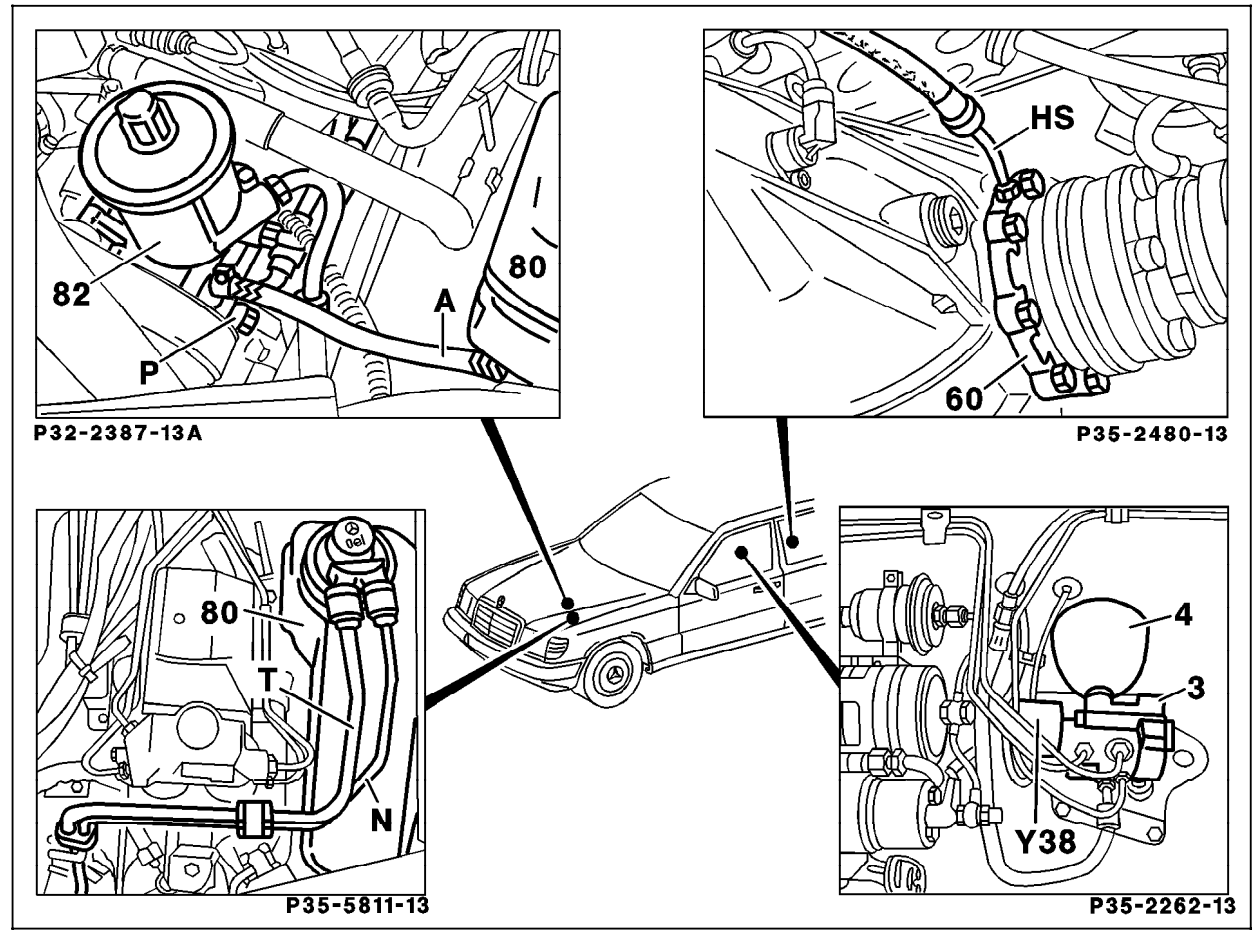


Figure 1

- 3/4 Hydraulic unit with pressure reservoir
- 60 Bearing cover plate with ring cylinder (M104)
- 80 Hydraulic oil reservoir
- 82 Hydraulic tandem pump
- A Suction line - oil reservoir to pressure pump
- HS Pressure line - hydraulic unit to ring cylinder
- T Return line - hydraulic unit to oil reservoir
- N Without leveling function:
Return line - hydraulic unit to oil reservoir
With leveling function:
Return line - leveling valve to oil reservoir
- P Pressure line - pressure pump to hydraulic unit
- Y38 ASD valve

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Hydraulic Test Program - Component Locations

Hydraulic Components
Model 129.061

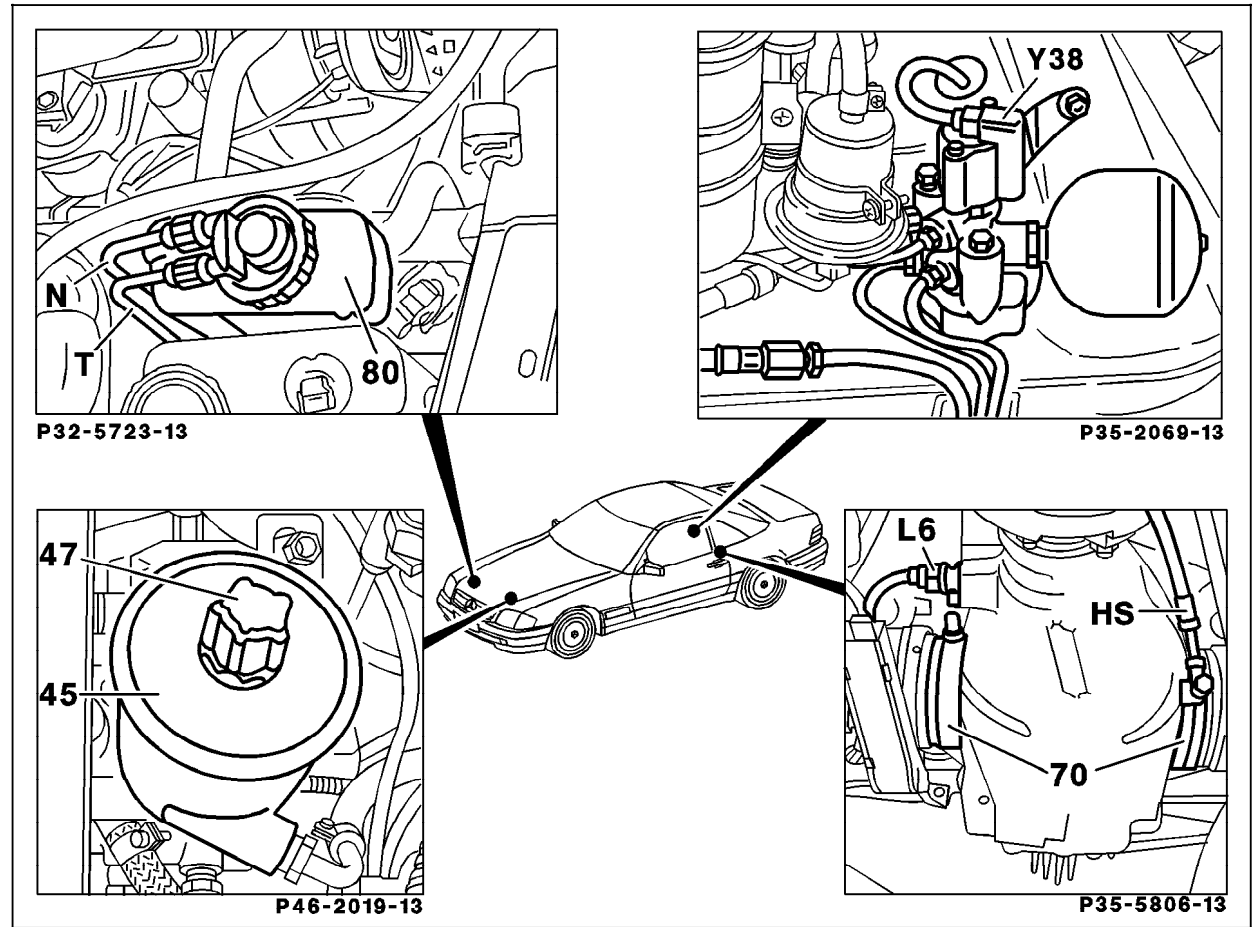


Figure 2

- 45 Tandem pump
- 70 Ring cylinder
- 80 Oil reservoir
- L6 Rear axle vehicle speed sensor
- Y38 ASD valve
- HS Pressure line - hydraulic unit to ring cylinder
- T Return line - hydraulic unit to oil reservoir
- N Without leveling function:
Return line - hydraulic unit to oil reservoir
With leveling function:
Return line - leveling valve to oil reservoir

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Hydraulic Test Program - Component Locations

Hydraulic Components
Model 201.028

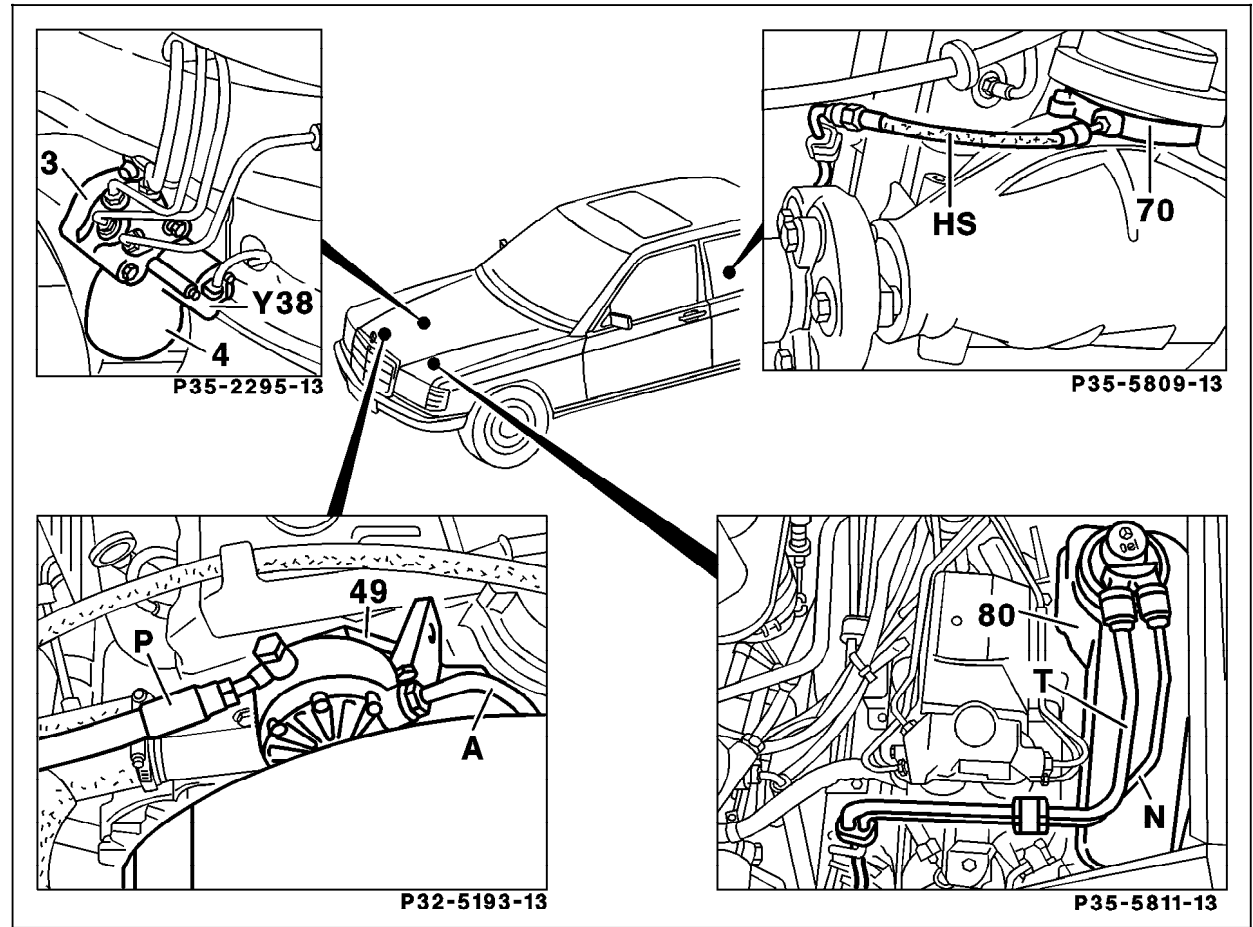


Figure 3

- 49 Hydraulic oil pump (camshaft driven)
- 3/4 Hydraulic unit with pressure reservoir
- 70 Ring cylinder
- 80 Oil reservoir
- A Suction line - oil reservoir to pressure pump
- HS Pressure line - hydraulic unit to ring cylinder
- T Return line - hydraulic unit to oil reservoir
- N Without leveling function:
Return line - hydraulic unit to oil reservoir
- With leveling function:
Return line - leveling valve to oil reservoir
- P Pressure line - pressure pump to hydraulic unit
- Y38 ASD valve

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Hydraulic Test Program - Component Locations

Hydraulic Components
Model 201.029

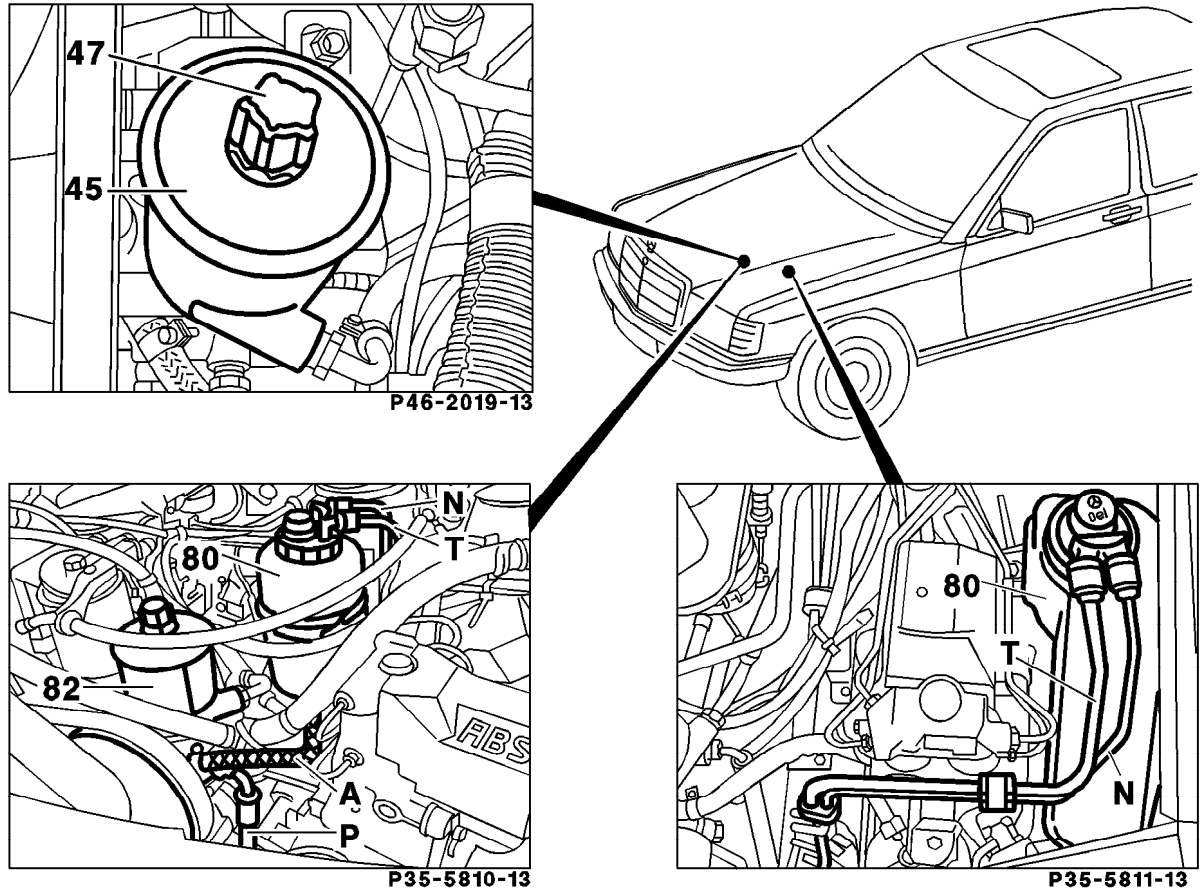


Figure 4

- 45 Tandem pump
- 80 Oil reservoir
- A Suction line - oil reservoir to pressure pump
- T Return line - hydraulic unit to oil reservoir
- N Without leveling function:
Return line - hydraulic unit to oil reservoir
- With leveling function:
Return line - leveling valve to oil reservoir
- P Pressure line - pressure pump to hydraulic unit

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Hydraulic Test Program - Preparation for Test

Preparation for Test

1. Ignition: **OFF**
2. Check oil level in oil reservoir, correct if necessary.
3. Release system pressure.
4. Connect the pressure gauge to pressure release screw on hydraulic unit according to connection diagram.

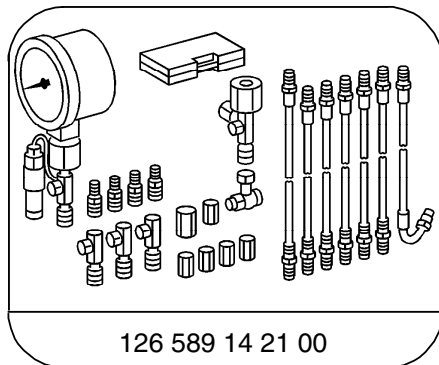
Note:

Checking hydraulic pump:

Model 129: 3.1 32 (ADS)

Model 124, 201: See SMS, Job No.
32-0530

Special Tools



Tester

Hydraulic Test Program - Preparation for Test

Connection Diagram - Pressure Gauge

Shown on model 129

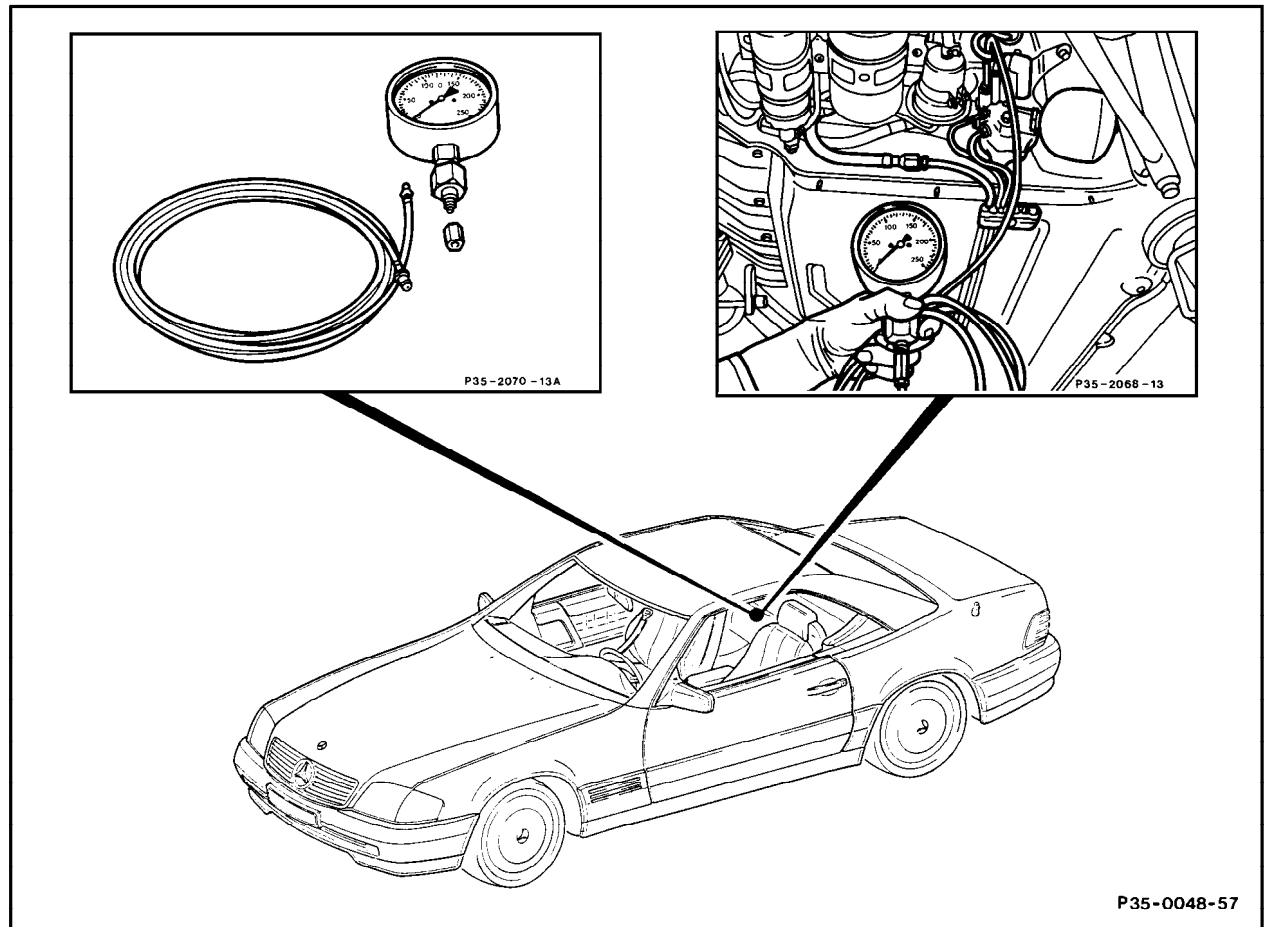


Figure 1

P35-0048-57

Hydraulic Test Program - Preparation for Test

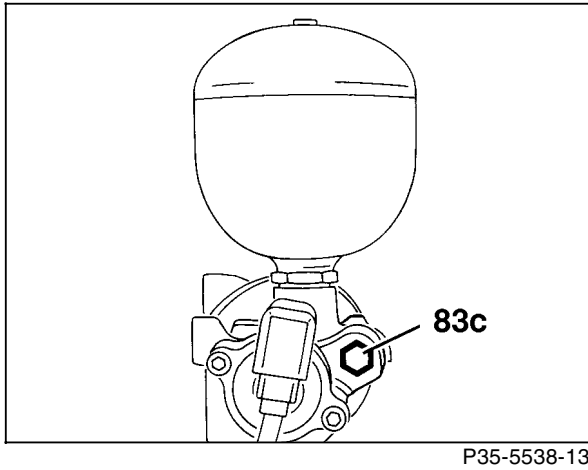


Figure 2

83c Closing screw

Hydraulic Test Program - Test

Test step	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 1.0	Gas pressure in pressure reservoir	⊗ 250 bar at pressure release screw on hydraulic unit	Engine: at Idle System depressurized.	Rapid pressure buildup up to 22 bar followed by slow buildup up to 33 bar.	If rapid pressure buildup stops at 10 bar, replace pressure reservoir.
⇒ 2.0	Pressure test	⊗ 250 bar	Engine: at Idle	27 – 33 bar	<p>Pressure < 27 bar: Model 124, 201 See SMS Job No. 32-0530 Model 129 3.1 32</p> <p>Pressure > 38 bar: Replace hydraulic unit.</p>

Mechanical Test Program - Component Locations

Mechanical Components

Shown on Model 129

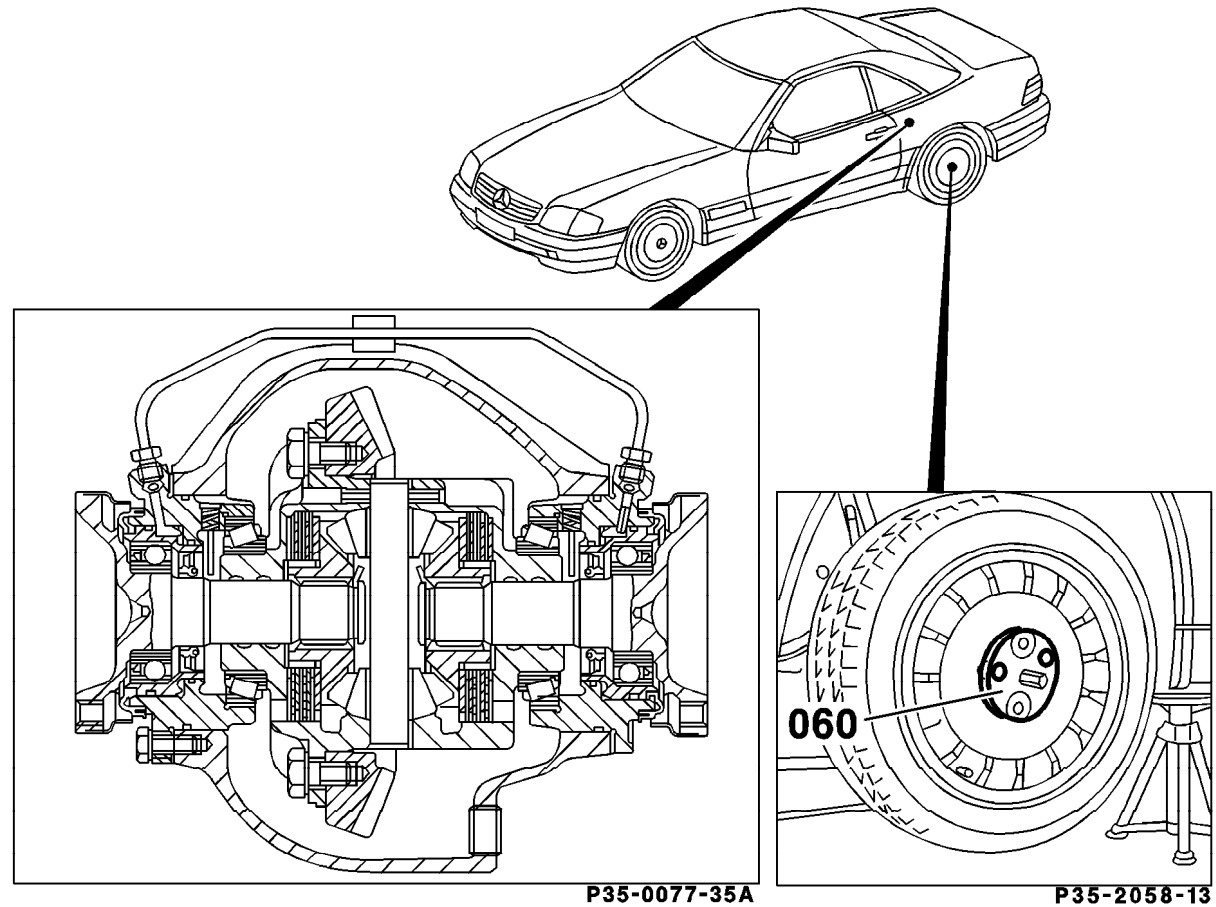


Figure 1

060 Frictional torque measurement adaptor plate

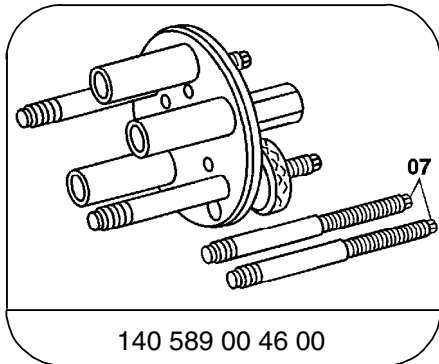
P35-5824-57

Mechanical Test Program - Preparation for Test

Preparation for Test

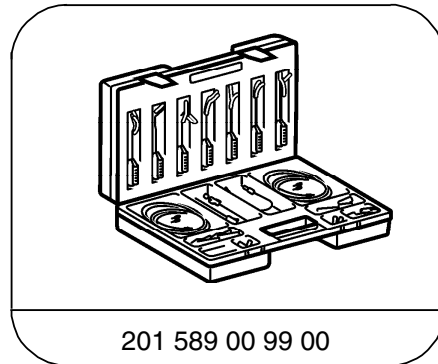
1. Ignition: **OFF**
2. Check oil level in oil reservoir, correct if necessary.
3. Lift vehicle at rear on one side.
4. Attach frictional torque measurement adaptor plate (Figure 1) using two opposing wheel bolts on raised wheel. Screw studs with shorter threads into the rear axle shaft flange until they bottom out. Slide frictional torque measurement adaptor plate over studs and tighten knurled nuts by hand.
5. Disconnect ASD control module (N30/2).
6. Bridge sockets 8 and 10 of the ASD control module connector.

Special Tools



140 589 00 46 00

Drive flange



201 589 00 99 00

Electrical connecting set

Equipment

Torque Wrench
Range: 16 – 65 Nm
80 – 260 Nm

Local Purchase

Mechanical Test Program - Test

Frictional Torque Measurement
Shown on Model 201

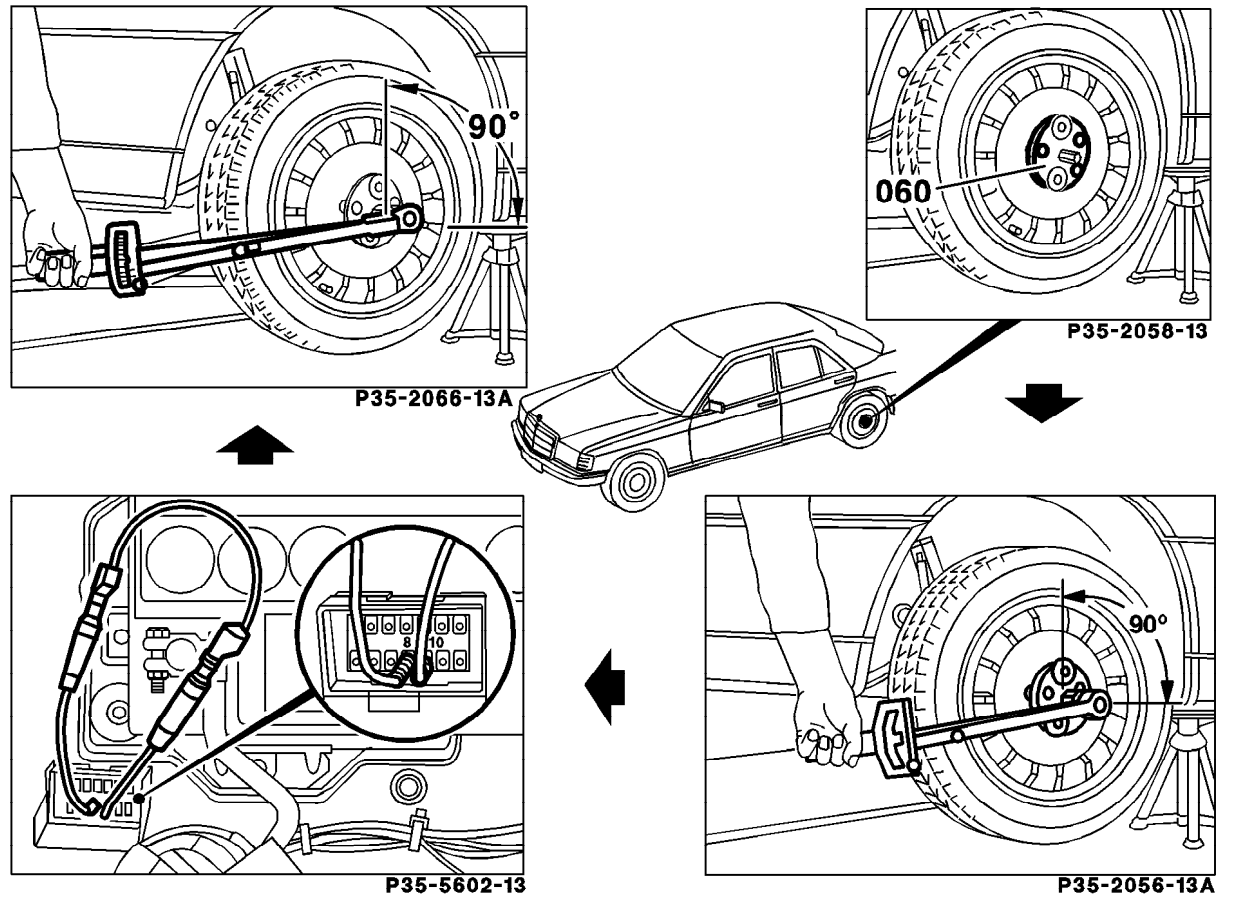



Figure 1
060 Frictional torque measurement adaptor plate

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Mechanical Test Program - Test

Test step	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 1.0	Frictional torque without ASD engaged	Torque wrench (15 – 65 Nm)	Turn torque wrench through 90° (see 42, Figure 1). Observe and record the value.	See ⇒ 2.0	⇒ 2.0
⇒ 2.0	Frictional torque with ASD engaged	<p style="text-align: center;">N30/2  8 ← → 10</p> <p>Torque wrench (80 – 260 Nm)</p>	<p>Disconnect ASD control module (N30/2).</p> <p>Return wheel to its starting position in ⇒ 1.0 (see 42, Figure 1).</p> <p>Engine: at Idle Pressure within hydraulic system: 27 – 33 bar. (see 33 ⇒ 2.0)</p> <p>Turn torque wrench through 90° (see 42, Figure 1). Observe and record the value.</p>	<p>Measured frictional torque in ⇒ 2.0 minus measured frictional torque in ⇒ 1.0: > 100 Nm.</p>	<p>If frictional torque difference is < 100 Nm, replace rear axle center piece.</p>