

1.6 Model 202 up to 08/95

	Page
Diagnosis	
Function Test	11/1
Complaint Related Diagnostic Chart	12/1
Electrical Test Program	
Component Locations	21/1
Preparation for Test	22/1
Test	23/1

Diagnosis – Function Test

General Information

Malfunction indicator/warning lamps

The instrument cluster is fully equipped with all lamps regardless of actual vehicle equipment.

Bulb test

- Turn the ignition key to position “2”. All malfunction indicator/warning lamps must illuminate.

After 4 seconds, the SRS MIL will extinguish.

After 30 seconds all other indicator/warning lamps will extinguish, with the exception of the following: ABS, ASD or ASR, and generator charging lamps.

Start engine. At > 480 engine RPM, all indicator/warning lamps are to extinguish, indicating that all systems monitored are O.K.

The indicator instruments must reflect the actual operating conditions.

CAUTION!

Should the malfunction indicator/warning lamps remain illuminated and/or come on while driving, it will be necessary to check the corresponding system with the Diagnostic Manual and/or the monitored fluid level as necessary.

Diagnosis – Complaint Related Diagnostic Chart

Complaint/Problem	Possible cause	Test step/Remedy ¹⁾
Entire instrument cluster (A1) not functioning.	Power supply, Instrument cluster (A1).	23 ⇒ 1.0
Indicator lamps for ABS, ASR, brake pad wear, brake fluid, parking brake, ASD/ASR and generator charge are not functioning.	Power supply, Instrument cluster (A1).	23 ⇒ 1.0
Illumination for odometer, clock and outside temperature display LCD not operating.	Bulbs, Exterior lamp switch (S1), Instrument cluster (A1).	23 ⇒ 1.0, 2.0
Instrument cluster illumination not operating.	Bulbs, Exterior lamp switch (S1), Instrument cluster (A1).	23 ⇒ 2.0
Fuel level gauge (A1p2) inaccurate or not operating.	Instrument cluster (A1), Fuel level sensor(s) (B4/1 or B4/2).	23 ⇒ 3.0
Tachometer (A1p5) inaccurate or not operating.	Instrument cluster (A1), TN-signal.	23 ⇒ 4.0
Low engine oil level indicator lamp (A1e12) illuminated with proper engine oil level status.	Instrument cluster (A1), Oil level switch (S43).	23 ⇒ 5.0
Electronic speedometer (A1p8) false reading.	Instrument cluster (A1), Vehicle speed signal (VSS).	23 ⇒ 6.0
Outside temperature display (A1p4) false reading or not operating.	Outside temperature indicator temperature sensor (B14), Instrument cluster (A1).	23 ⇒ 7.0

¹⁾ Observe Preparation for Test, see 22.

Diagnosis – Complaint Related Diagnostic Chart

Complaint/Problem	Possible cause	Test step/Remedy ¹⁾
ECT gauge (A1p1) inaccurate or not operating.	ECT gauge sensor (B13), Instrument cluster (A1).	23 ⇒ 8.0
Low ECL indicator lamp (A1e11) illuminated or not functioning.	ECL switch (S41), Instrument cluster (A1).	23 ⇒ 9.0
Low windshield washer fluid level indicator lamp (A1e13) illuminated or not functioning.	Windshield washer fluid level switch (S42), Instrument cluster (A1).	23 ⇒ 10.0
Brake pad wear indicator lamp (A1e6) illuminated or not functioning.	Brake pads, Left/right front brake pad wear sensor (S10/1 or S10/2), Instrument cluster (A1).	23 ⇒ 11.0
Low brake fluid level/parking brake indicator lamp (A1e7) illuminated or not functioning.	Brake fluid level switch (S11), Parking brake switch (S12), Instrument cluster (A1).	23 ⇒ 12.0
Generator charge indicator lamp (A1e5) illuminated or not functioning.	Generator (G2), Instrument cluster (A1).	23 ⇒ 13.0
SRS MIL (A1e15) not functioning.	SRS control module (N2/2), Instrument cluster (A1).	23 ⇒ 14.0
ABS MIL (A1e17) not functioning.	ABS control module (N30), Instrument cluster (A1).	23 ⇒ 15.0
ASD MIL (A1e24) not functioning.	ASD control module (N30/2), Instrument cluster (A1).	23 ⇒ 16.0
ASR MIL (A1e22) not functioning.	ASR control module (N30/1), Instrument cluster (A1).	23 ⇒ 17.0

¹⁾ Observe Preparation for Test, see 22.

Diagnosis – Complaint Related Diagnostic Chart

Complaint/Problem	Possible cause	Test step/Remedy ¹⁾
ASD warning lamp (A1e25) not functioning.	ASD control module (N30/2), Instrument cluster (A1).	23 ⇒ 18.0
ASR warning lamp (A1e21) not functioning.	ASR control module (N30/1), Instrument cluster (A1).	23 ⇒ 19.0
“CHECK ENGINE” MIL (A1e26) illuminated or not functioning.	Diagnostic module (OBD II) (N59/1), Instrument cluster (A1).	23 ⇒ 20.0

¹⁾ Observe Preparation for Test, see 22.

Electrical Test Program – Component Locations

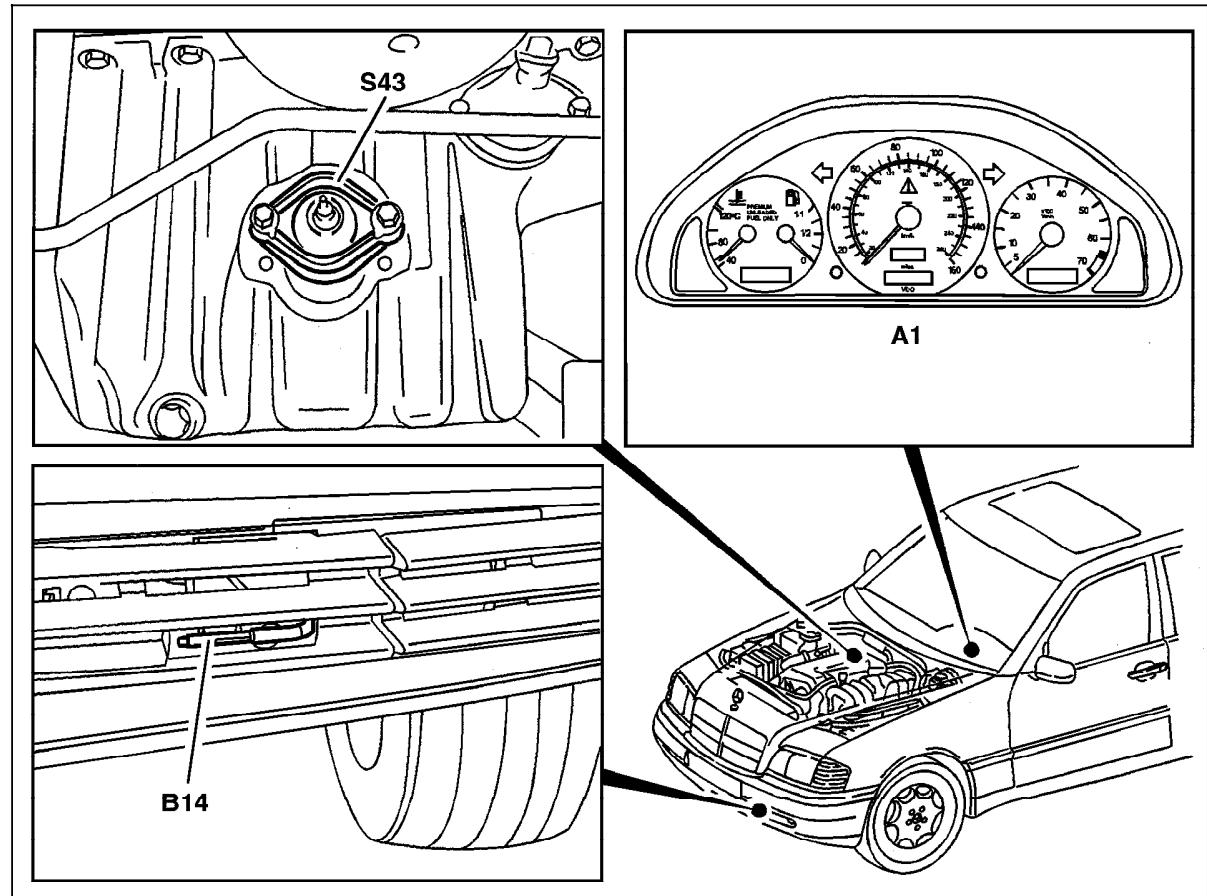


Figure 1

- A1 Instrument cluster
- B14 Outside temperature indicator temperature sensor
- S43 Oil level sensor

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Electrical Test Program – Component Locations

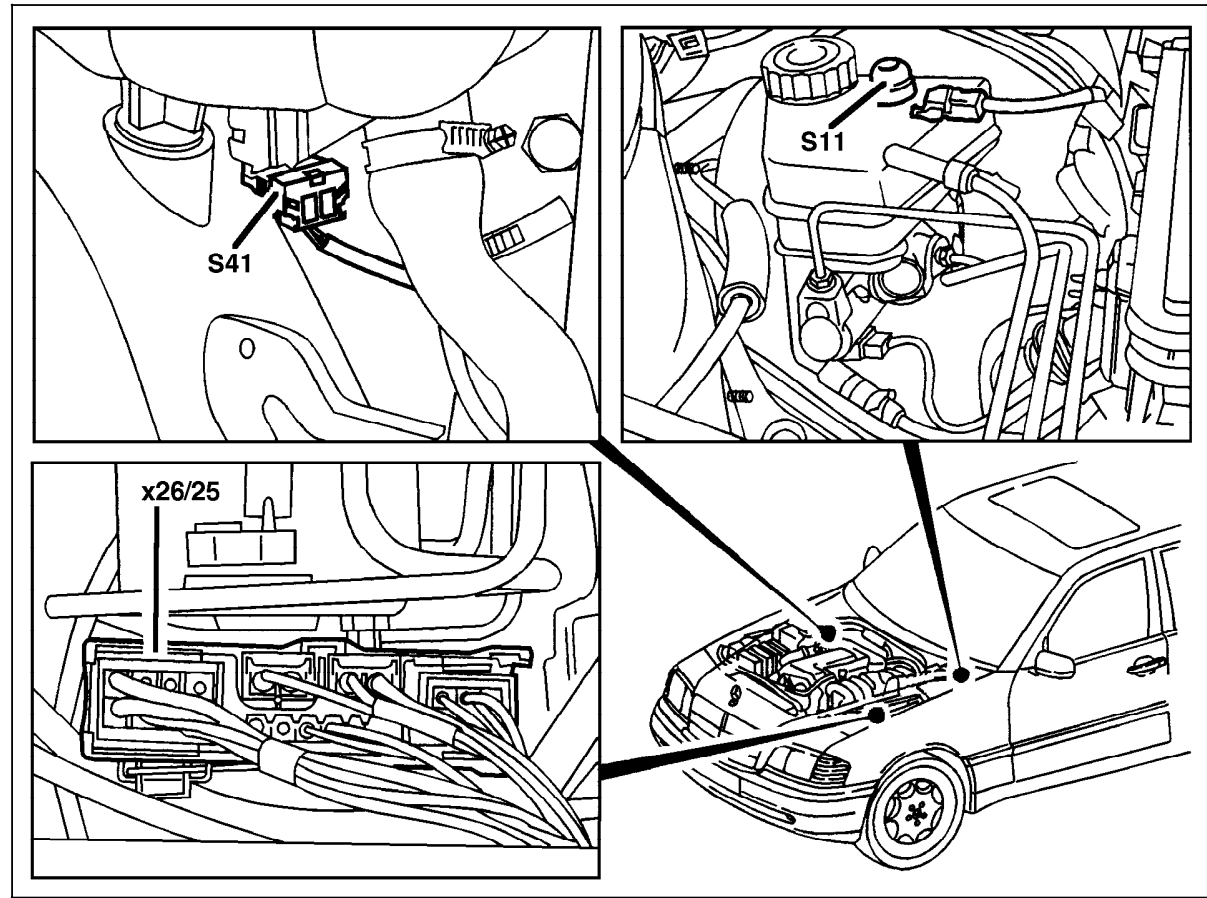


Figure 2

- S11 Brake fluid level switch
- S41 ECL switch
- X26/25 Engine/chassis connector (24-pole)

P54-6095-57

Electrical Test Program – Component Locations

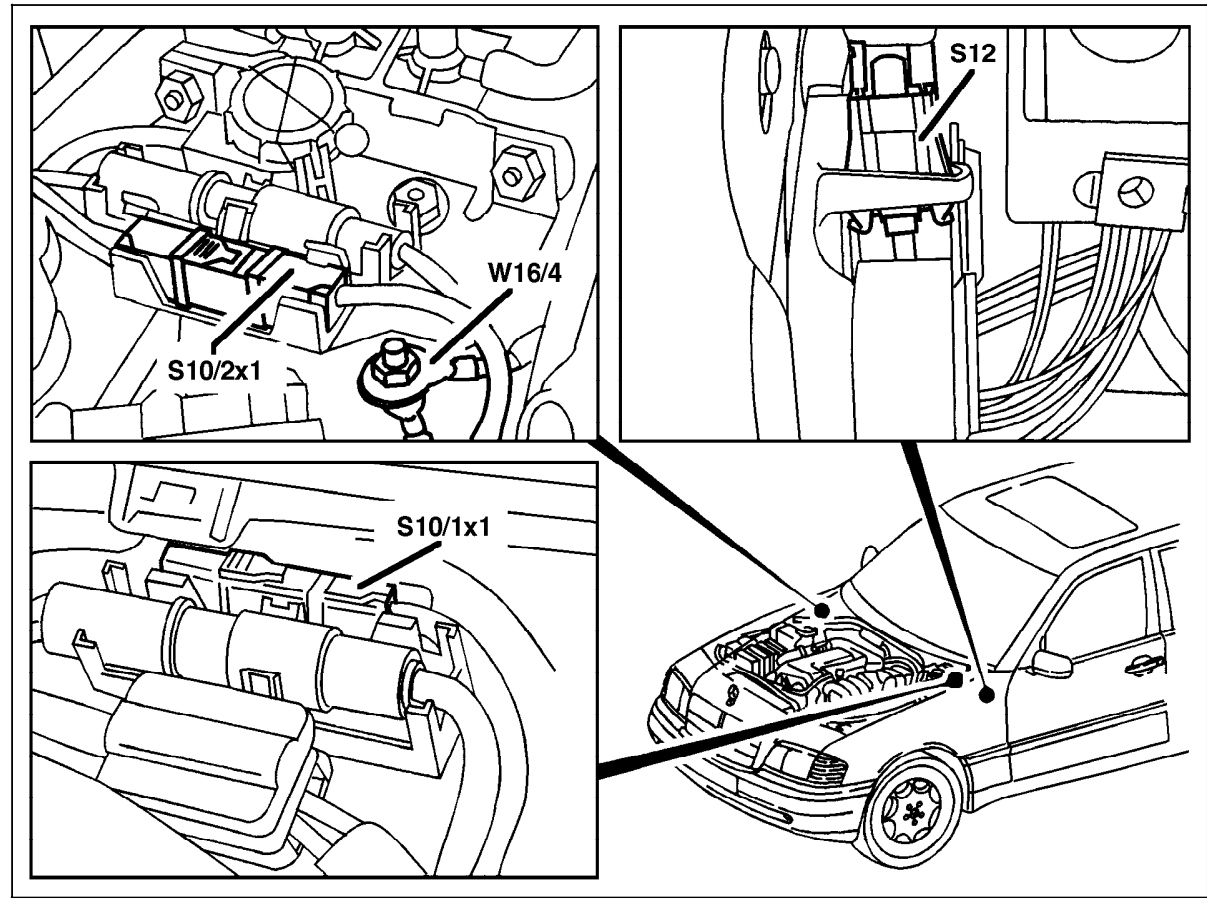


Figure 3

- S10/1x1 Left front brake pad wear sensor connector
- S10/2x1 Right front brake pad wear sensor connector
- S12 Parking brake switch

P54-6096-57

Electrical Test Program – Component Locations

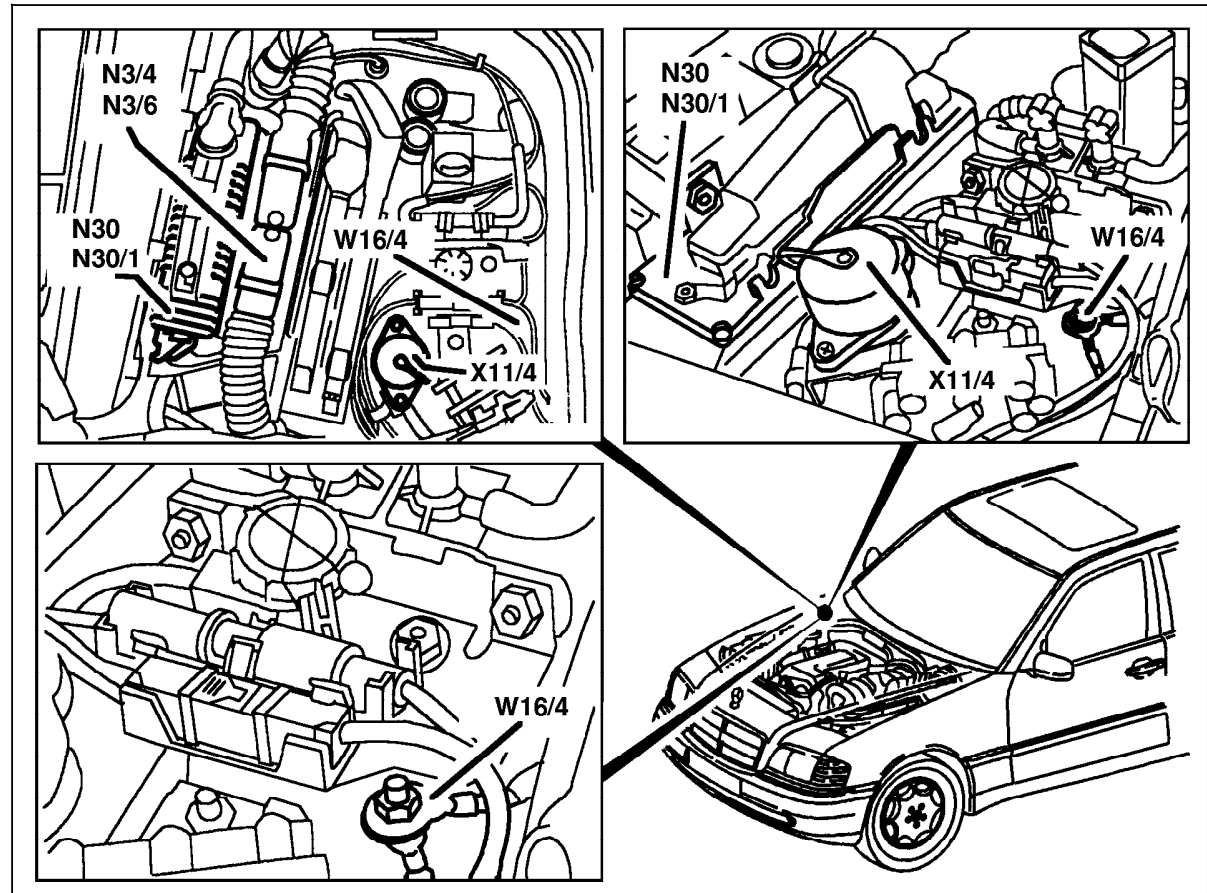


Figure 4

- N3/4 Engine control module (HFM-SFI)
- N30 ABS control module
- N30/1 ABS/ASR control module
- W16/6 Ground (component compartment - right)
- X11/4 Data link connector (DTC readout)

P54-6097-57

Electrical Test Program – Component Locations

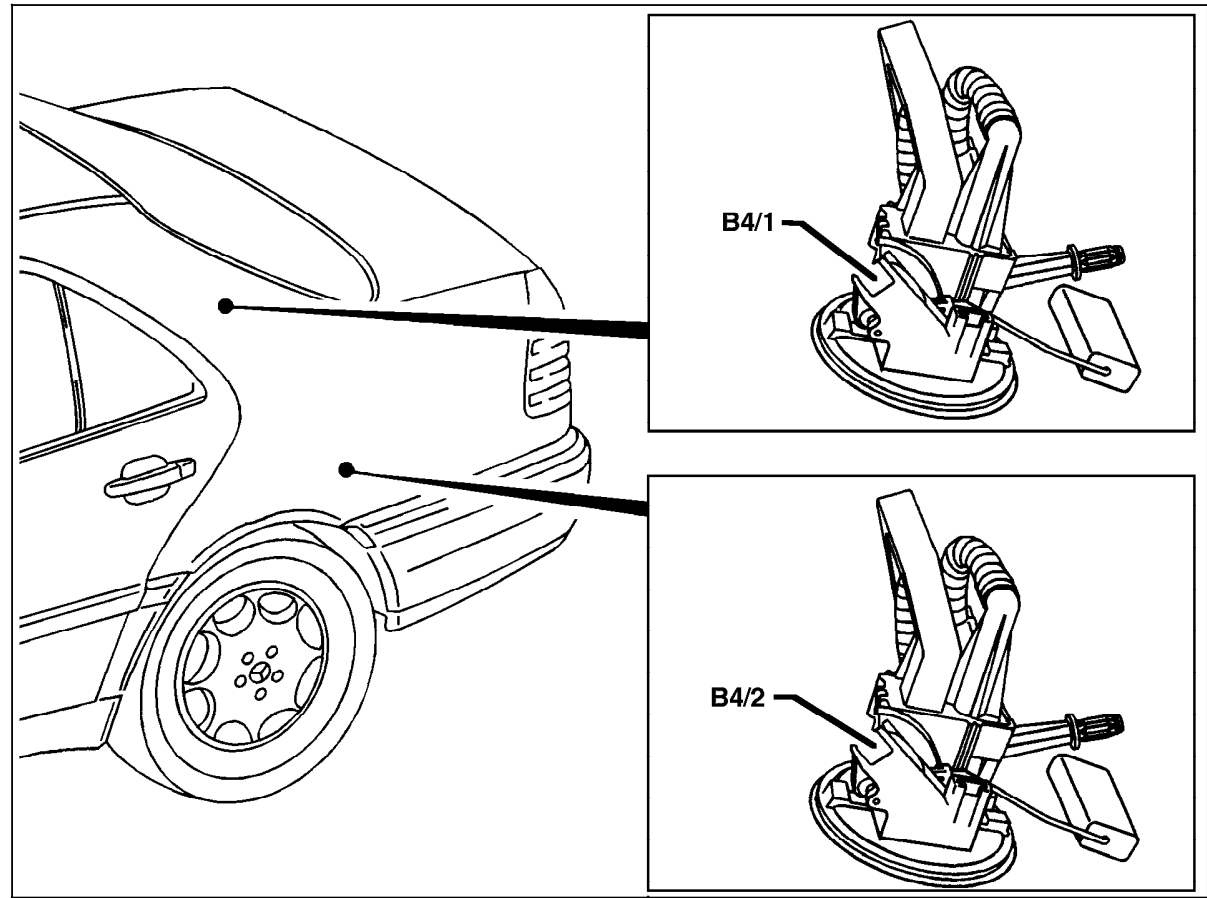


Figure 5

- B4/1 Left fuel level sensor
- B4/2 Right fuel level sensor

P54-6125-57

Electrical Test Program – Component Locations

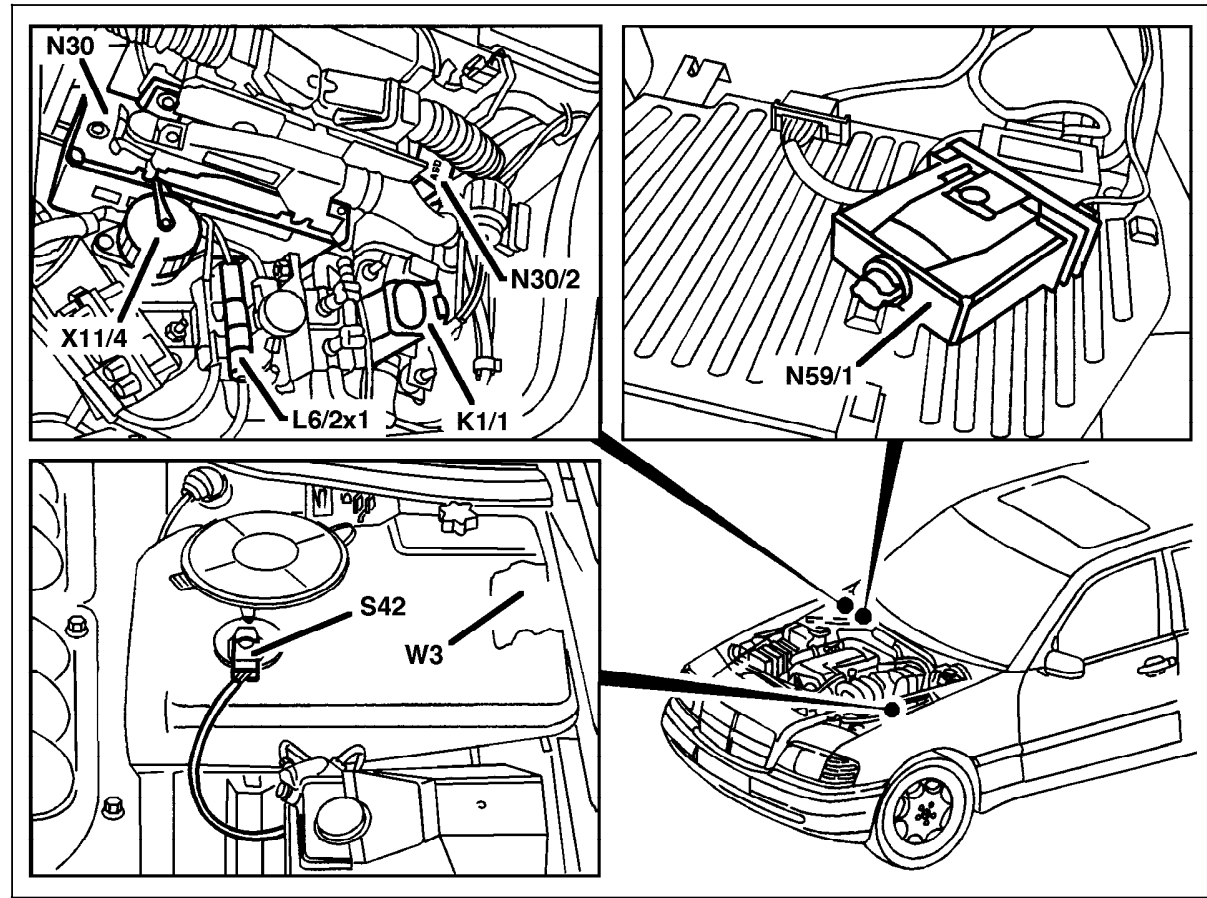


Figure 6

- N30/2 ASD control module
- N59/1 Diagnostic module (OBD II)
- S42 Windshield washer fluid level switch
- W3 Ground (left front wheelhousing)

P54-6554-57

Electrical Test Program – Preparation for Test

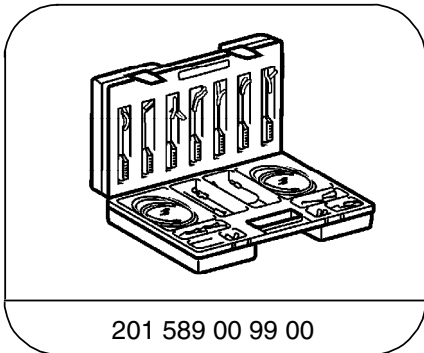
Preparation for Test:

1. Battery voltage 11 – 14 V.
2. Check fuses.
3. Systems and fluid levels are o.k.

Note:

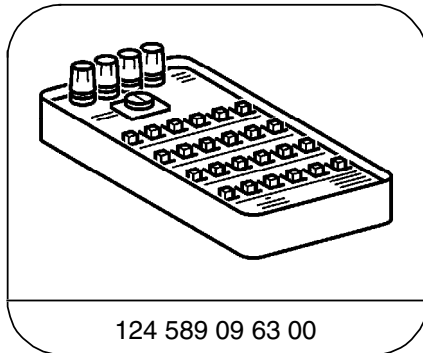
In order to avoid damage to the control modules listed in 23, please ensure that the ignition is **OFF**, prior to connecting or disconnecting any electrical leads.

Special Tools



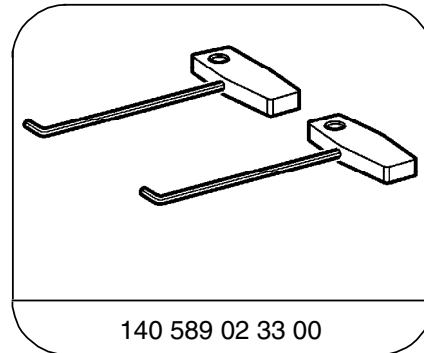
201 589 00 99 00

Electrical connecting set



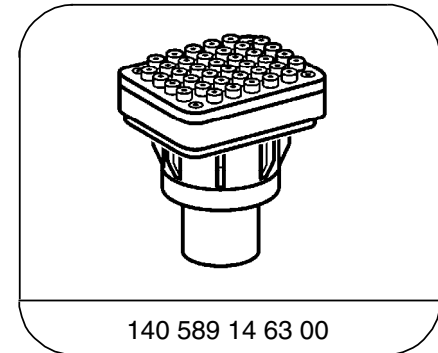
124 589 09 63 00

Ohm decade



140 589 02 33 00

Extraction hook



140 589 14 63 00

Adapter

Electrical Wiring Diagrams:

See Electrical Troubleshooting Manual, Model 202, Vol. 1, group 54

Conventional tools, test equipment

Description	Brand, model, etc.
Multimeter ¹⁾	Fluke models 23, 83, 85, 87
Signal generator ¹⁾	SUN DTR-8416

¹⁾ Available through the MBUSA Standard Equipment Program.

Electrical Test Program – Test

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0	Instrument cluster (A1) Voltage supply Circuit 30		Remove A1. Disconnect connector 1, (Figure 1 and 4).	11 – 14 V	Wiring, ⇒ 1.1
1.1	Voltage supply Circuit 15, unfused		Remove A1. Disconnect connector 1. Ignition: ON	11 – 14 V	Wiring, ⇒ 1.2
1.2	Voltage supply Circuit 15		Remove A1. Disconnect connector 1. Ignition: ON	11 – 14 V	Wiring, A1
2.0	Instrument cluster (A1) Illumination LCD display illumination		Remove A1. Disconnect connector 1 (Figure 1 and 4). Ignition: ON Turn on parking lights.	11 – 14 V	Wiring. Values OK: Bulbs, Bulbs for LCD display, Exterior lamp switch (S1), A1

Electrical Test Program – Test



⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
3.0	Fuel level gauge (A1p2) Wiring and contacts	<p>B4/1 2 — (←→) — 3</p> <p>B4/2 2 — (←) — (→) — 3</p>	<p>Ignition: OFF</p> <p>Disconnect connector of left fuel level sensor (B4/1) (21, Figure 5).</p> <p>Jumper connect sockets, then remove connector for right fuel level sensor (B4/2) (21, Figure 5).</p> <p>Connect resistance substitution unit.</p> <p>Ignition: ON</p> <p>Resistance substitution unit setting:</p> <p style="text-align: right;">8 +6 Ω</p> <p style="text-align: right;">27 ± 5.3 Ω</p> <p style="text-align: right;">46.5 ± 10.5 Ω</p> <p style="text-align: right;">96 ± 11.7 Ω</p> <p style="text-align: right;">145.5 ± 13.2 Ω</p> <p style="text-align: right;">189 – 7.8 Ω</p>	<p>Display in A1p2:</p> <p style="text-align: right;">≈ 0¹⁾</p> <p style="text-align: right;">≈ Res.¹⁾</p> <p style="text-align: right;">≈ 1/4</p> <p style="text-align: right;">≈ 1/2</p> <p style="text-align: right;">≈ 3/4</p> <p style="text-align: right;">≈ 1/1</p>	<p>Wiring, Instrument cluster (A1), ⇒ 3.1</p>
[3.0]	Vehicles (as of 03/94) with recalibrated resistance values.		<p>Resistance substitution unit setting:</p> <p style="text-align: right;">6 +6.6 Ω</p> <p style="text-align: right;">24 ± 5.3 Ω</p> <p style="text-align: right;">51 ± 10.5 Ω</p> <p style="text-align: right;">100.5 ± 11.7 Ω</p> <p style="text-align: right;">145.5 ± 13.2 Ω</p> <p style="text-align: right;">189 – 7.8 Ω</p>	<p>Display in A1p2:</p> <p style="text-align: right;">≈ 0¹⁾</p> <p style="text-align: right;">≈ Res.¹⁾</p> <p style="text-align: right;">≈ 1/4</p> <p style="text-align: right;">≈ 1/2</p> <p style="text-align: right;">≈ 3/4</p> <p style="text-align: right;">≈ 1/1</p>	

¹⁾ Fuel reserve warning lamp illuminates.




Electrical Test Program – Test

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
3.1	Left fuel level sensor (B4/1).	<p>B4/1 2 — — 3</p>	Disconnect connector at B4/1.	3 (± 1) Ω Empty 97.5 (± 3) Ω Full	B4/1
	Right fuel level sensor (B4/2).	<p>B4/2 2 — — 3</p>	Disconnect connector at B4/2.	3 (± 1) Ω Empty 97.5 (± 3) Ω Full	B4/2
4.0	Tachometer (A1p5) Wiring and contacts	<p>W16/6 X11/4 17 — 17</p>	Ignition: OFF Disconnect all connectors from N3/4 (21, Figure 4). Connect signal generator and set to a voltage amplitude of approx. 10 V (Figure 6). Ignition: ON	Engine 111 30 Hz ≈ 1000/rpm 130 Hz ≈ 4000/rpm 200 Hz ≈ 6200/rpm Engine 104 50 Hz ≈ 1000/rpm 195 Hz ≈ 4000/rpm 315 Hz ≈ 6400/rpm	Wiring, Instrument cluster (A1). Values OK: N3/4, Engine 104: D.M., Engines, Vol. 2 – 1.1, Engine 111: D.M., Engines, Vol. 2 – 1.2).

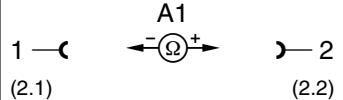

Electrical Test Program – Test

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
5.0	Low engine oil level indicator lamp (A1e12, Figure 2) Wiring and contacts	W3  S43 1	Oil level is OK. Disconnect connector from oil level switch (S43). Engine: at Idle	A1e12 does not illuminate.	Wiring, S43, Instrument cluster (A1), ⇒ 5.1
5.1	Wiring and contacts		Engine: at Idle Disconnect connector from S43 (21, Figure 1).	A1e12 illuminates after 60± 10 seconds.	A1e12, Wiring, A1, ⇒ 5.2
5.2		W3  S43 1	Connector unplugged at S43.	0 Ω	S43.


Electrical Test Program – Test

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
6.0	<p>Electronic speedometer (A1p8) Wiring and contacts</p> <p>Vehicles with ASR or ETS as of 06/94: Left front axle VSS sensor (L6/1) connected to ASR/SPS or ETS/SPS control module (N47-1 or N47-2). See D.M., Chassis and Drivetrain, Vol. 3, 9.2 23</p>	<p>ABS W16/6  N30 ↳ 5 (1.5)</p> <p>ABS/ ASR W16/6  N30/1 ↳ 18 (1.18)</p> <p>ASR/ SPS or ETS/ SPS W16/6  N47-1 N47-2</p>	<p>Ignition: OFF Disconnect connector from ABS control module (N30) or ASR control module (N30/1), ASR/SPS or ETS/SPS control module (N47-1, N47-2) (21, Figure 4).</p> <p>Connect signal generator and set to a voltage amplitude of approx. 10 V (Figure 6). Ignition: ON</p>	<p>With increasing frequency input the vehicle speed indicated must also increase.</p>	<p>Wiring, Instrument cluster (A1).</p> <p>Values OK: N30 or N30/1, D.M., Chassis and Drivetrain, Vol. 2, 5.3 or 6.3 23</p> <p>N47-1 or N47-2 D.M., Chassis and Drivetrain, Vol. 3 – 9.2 23</p>


Electrical Test Program – Test

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy								
7.0	<p>Outside temperature indicator temperature sensor (B14) (21, Figure 1) Wiring and contacts</p>		<p>Remove A1. Disconnect connector 2 (Figure 4). Measure ambient air temperature at B14, (21, Figure 1).</p>	<p>° F at B14</p> <table border="0"> <tr> <td>- 4 ° F</td> <td>≈ 29 k Ω</td> </tr> <tr> <td>+ 32 ° F</td> <td>≈ 9.8 k Ω</td> </tr> <tr> <td>+ 68 ° F</td> <td>≈ 3.7 k Ω</td> </tr> <tr> <td>+ 104 ° F</td> <td>≈ 1.6 k Ω</td> </tr> </table>	- 4 ° F	≈ 29 k Ω	+ 32 ° F	≈ 9.8 k Ω	+ 68 ° F	≈ 3.7 k Ω	+ 104 ° F	≈ 1.6 k Ω	<p>Wiring, B14</p> <p>Values OK: A1</p>
- 4 ° F	≈ 29 k Ω												
+ 32 ° F	≈ 9.8 k Ω												
+ 68 ° F	≈ 3.7 k Ω												
+ 104 ° F	≈ 1.6 k Ω												
8.0	<p>ECT gauge (A1p1) Wiring and contacts</p>		<p>Separate engine/chassis connector (X26/25) (21, Figure 2) and connect in the resistance substitution unit. Ignition: ON</p>	<p>Display (° C) in A1p1:</p> <table border="0"> <tr> <td>130 Ω</td> <td>≈ 60 °C</td> </tr> <tr> <td>70 Ω</td> <td>≈ 80 °C</td> </tr> <tr> <td>38 Ω</td> <td>≈ 100 °C</td> </tr> <tr> <td>22 Ω</td> <td>≈ 120 °C</td> </tr> </table>	130 Ω	≈ 60 °C	70 Ω	≈ 80 °C	38 Ω	≈ 100 °C	22 Ω	≈ 120 °C	<p>Wiring, A1</p> <p>Values OK: ECT gauge sensor (B13).</p>
130 Ω	≈ 60 °C												
70 Ω	≈ 80 °C												
38 Ω	≈ 100 °C												
22 Ω	≈ 120 °C												

Electrical Test Program – Test

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
9.0	Low ECL indicator lamp (A1e11, Figure 2) Wiring and contacts		Disconnect connector at ECL switch (S41) (21, Figure 2). Engine: at Idle	A1e11 does not illuminate.	Wiring, A1 Values OK: ECL switch (S41), ⇒ 9.1
9.1	Wiring and contacts	<p style="text-align: center;">S41</p> <p style="text-align: center;">1  2</p>	Disconnect connector at S41 Engine: at Idle	A1e11 illuminates after approx. 5 – 60 sec.	A11e1, Wiring, A1 Values OK: S41
10.0	Low windshield washer fluid level indicator lamp (A1e13, Figure 2) Wiring and contacts		Disconnect connector at windshield washer fluid level switch (S42) (21, Figure 6). Engine: at Idle	A1e13 does not illuminate.	Wiring, A1 Values OK: S42, ⇒ 10.1


Electrical Test Program – Test

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
10.1	Wiring and contacts	<p style="text-align: center;">S42</p> <p>1  2</p>	<p>Disconnect connector at S42.</p> <p>Engine: at Idle</p>	A1e13 illuminates.	<p>A1e13, Wiring, A1</p> <p>Values OK: S42</p>
11.0	<p>Brake pad wear indicator lamp (A1e6, Figure 2)</p> <p>Wiring and contacts</p>		<p>Disconnect connector at left front brake pad wear sensor connector (S10/1x1) (21, Figure 3).</p> <p>Disconnect connector at right front brake pad wear sensor connector (S10/2x1) (21, Figure 3).</p> <p>Engine: at Idle</p>	A1e6 does not illuminate.	<p>Wiring, A1</p> <p>Values OK: S10/1 or S10/2, ⇒ 11.1</p>




Electrical Test Program – Test

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
11.1	Wiring and contacts	<p>1 S10/1x1 —(—→)—</p> <p>2</p> <p>1 S10/2x1 —(—→)—</p> <p>2</p>	<p>Disconnect connector at S10/1x1. Engine: at Idle</p> <p>Disconnect connector at S10/2x1. Engine: at Idle</p>	<p>A1e6 illuminates.</p> <p>A1e6 illuminates.</p>	<p>Brake pad wear indicator lamp (A1e6), Wiring, A1</p> <p>Values OK: S10/1 or S10/2, Left or right front brake pads.</p>
12.0	<p>Low brake fluid level/ parking brake indicator lamp (A1e7, Figure 2) Wiring and contacts</p>		<p>Disconnect connector at brake fluid level switch (S11, 21, Figure 2) as well as flat pin connector at parking brake switch (S12, 21, Figure 3).</p> <p>Engine: at Idle</p>	<p>A1e7 does not illuminate.</p>	<p>Wiring, ⇒ 12.1</p>




Electrical Test Program – Test

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
12.1	Wiring and contacts	<p style="text-align: center;">S11</p> <p style="text-align: center;">1  2</p>	<p>Disconnect connector at S11. Engine: at Idle Set parking brake.</p> <p>Connect flat pin connector at S12 (21, Figure 3) Engine: at Idle</p>	<p>A1e7 does not illuminate.</p> <p>A1e7 illuminates.</p>	<p>A1e7, Wiring, A1 Values OK: S11, S12</p>
13.0	<p>Generator charge indicator lamp (A1e5, Figure 3)</p> <p>Wiring and contacts</p>		<p>Disconnect D+ connector at generator (G2). Ignition: ON</p>	<p>A1e5 does not illuminate.</p>	<p>Wiring, A1, ⇒ 13.1</p>
13.1	Wiring and contacts		<p>Disconnect D+ connector at generator (G2), and touch to ground. Ignition: ON</p>	<p>A1e5 illuminates.</p>	<p>A1e5, Wiring, A1 Values OK: Generator (G2).</p>

Electrical Test Program – Test

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
14.0	SRS MIL (A1e15, Figure 3) Wiring and contacts	W16/6  X11/4 30	Connect socket 30 of 38-pole data link connector (X11/4, Figure 6) to ground in right of component compartment (W16/6, 21, Figure 4). Engine: at Idle	A1e15 illuminates.	A1e15, Wiring, A1 Values OK: D.M., Body and Accessories, Vol. 3 – 16.3
15.0	ABS MIL (A1e17, Figure 3) Wiring and contacts	W16/6  N30 29 (1.29)	Ignition: OFF Disconnect connector at ABS control module (N30, 21, Figure 4). Engine: at Idle	A1e17 illuminates.	A1e17, Wiring, A1. Values OK: D.M., Chassis and Drivetrain, Vol. 2 – 6.3
16.0	ASD MIL (A1e24, Figure 3) Wiring and contacts	W16/6  N30/2 2 (1.2)	Ignition: OFF Disconnect ASD control module (N30/2) from connector (21, Figure 6). Engine: at Idle	A1e24 illuminates.	A1e24, Wiring, A1 Values OK: D.M., Chassis and Drivetrain, Vol. 2 – 4.3

Electrical Test Program – Test

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
17.0	ASR MIL (A1e22, Figure 3) Wiring and contacts	W16/6  N30/1 10 (1.10)	Ignition: OFF Disconnect connector from ASR control module (N30/1) (21 Figure 4). Engine: at Idle	A1e22 illuminates.	A1e22, Wiring, A1 Values OK: D.M., Chassis and Drivetrain, Vol. 2 – 5.3
18.0	ASD warning lamp (A1e25) Wiring and contacts	W16/6  N30/2 4 (1.4)	Ignition: OFF Disconnect ASD control module (N30/2) from connector (21, Figure 6). Engine: at Idle	A1e25 illuminates.	A1e25, Wiring, A1 Values OK: D.M., Chassis and Drivetrain, Vol. 2 – 4.3
19.0	ASR warning lamp (A1e21) Wiring and contacts	W16/6  N30/1 12 (1.12)	Ignition: OFF Disconnect connector from ASR control module (N30/1) (21, Figure 4). Engine: at Idle	A1e21 illuminates.	A1e21, Wiring, A1 Values OK: D.M., Chassis and Drivetrain, Vol. 2 – 5.3

Electrical Test Program – Test

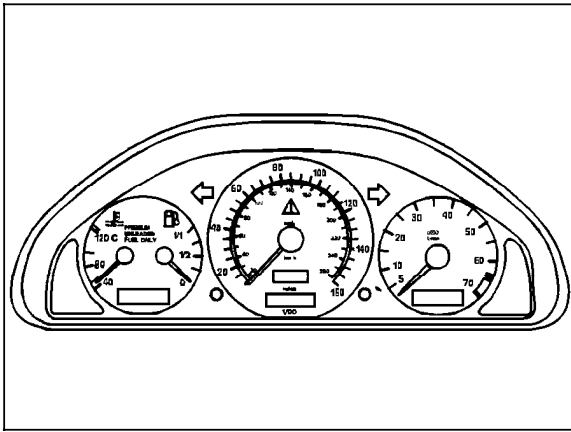


Figure 1

A1 Instrument cluster

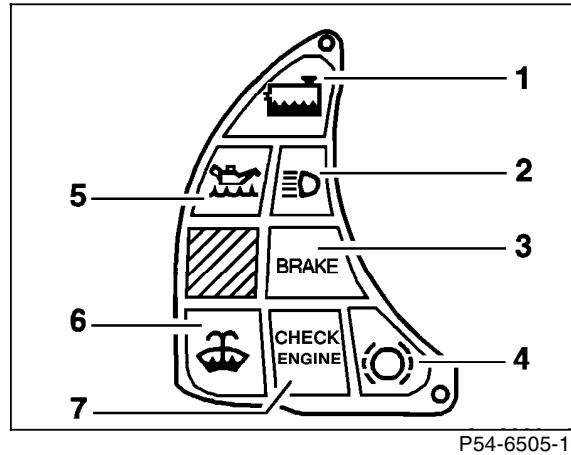


Figure 2

Indicator/warning lamps (left)

- 1 Low ECL indicator lamp
- 2 High beam indicator lamp
- 3 Low brake fluid level and parking brake indicator lamp
- 4 Brake pad wear indicator lamp
- 5 Low engine oil level indicator lamp
- 6 Low windshield washer fluid level indicator lamp
- 7 "CHECK ENGINE " MIL

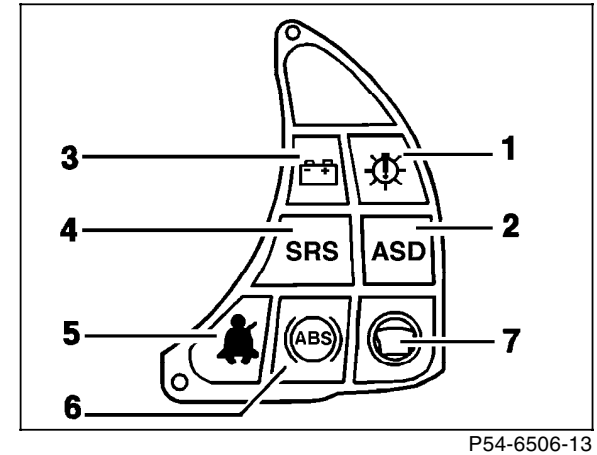
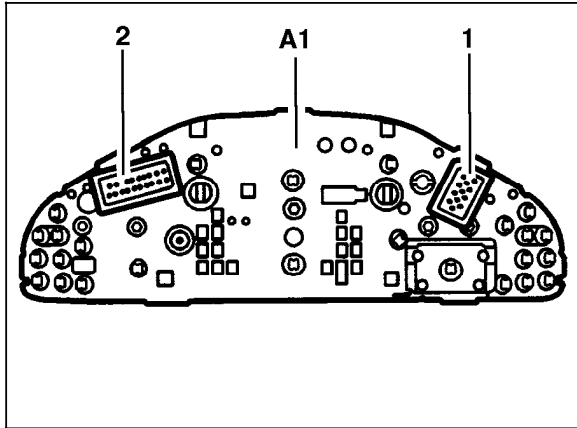


Figure 3

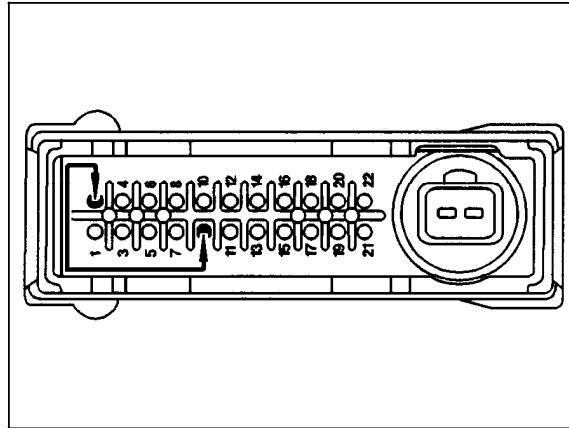
Indicator/warning lamps (right)

- 1 Exterior lamp failure indicator lamp
- 2 ASD or ASR MIL
- 3 Generator charge indicator lamp
- 4 SRS MIL
- 5 Safety belt reminder lamp
- 6 ABS MIL

Electrical Test Program – Test



P54-6089-13



P54-6553-13

Figure 4

Figure 5

- A1 Instrument cluster
- 1 Connector (24-pole)
- 2 Connector (21-pole)

N59/1 Diagnostic module (OBD II)

Electrical Test Program – Test

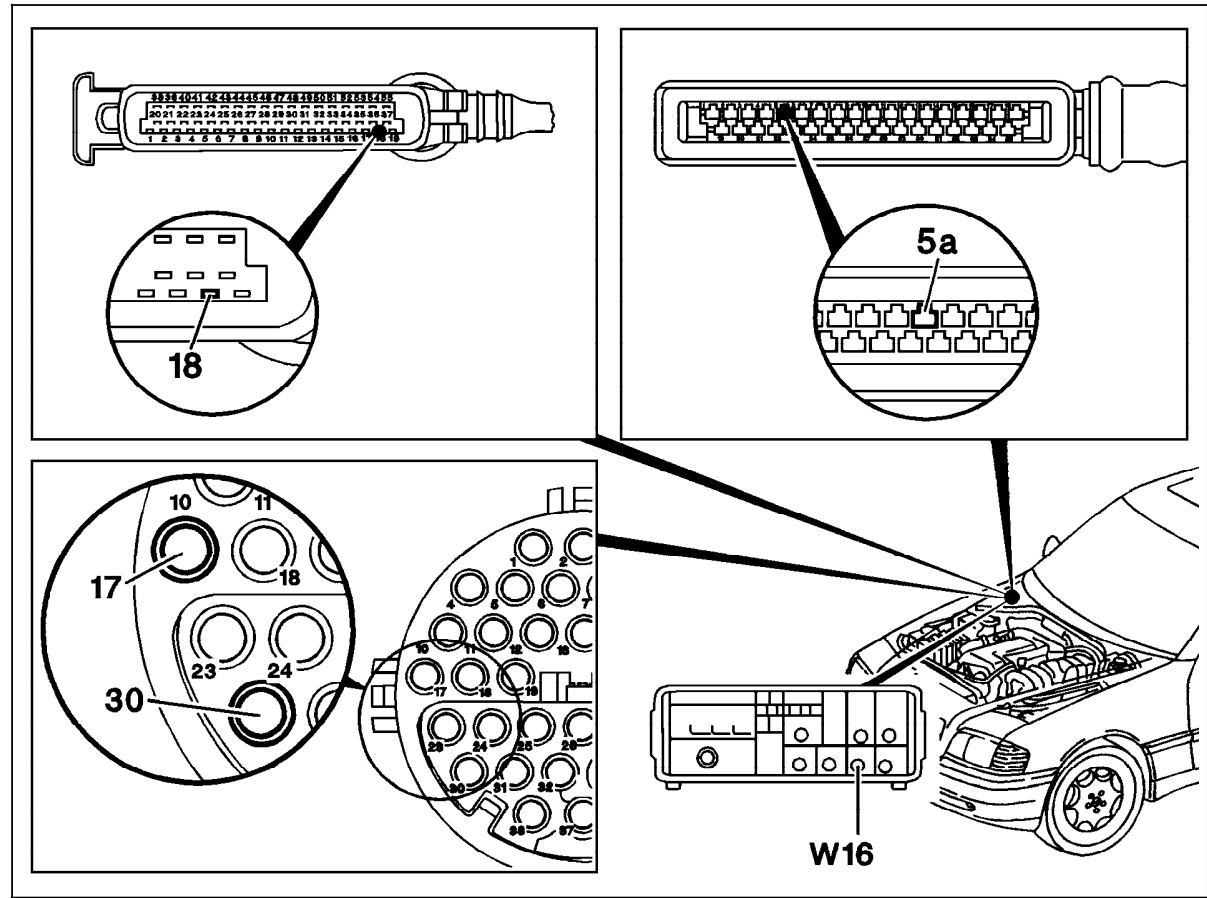


Figure 6

- 5a ABS control module connector, socket 5
- 17 Data link connector, 38-pole (X11/4), socket 17
- 18 ASR control module connector, socket 18
- 30 Data link connector, 38-pole (X11/4), socket 30

P54-6692-57