

1.13 All Models as of M.Y. 1997

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Diagnosis – Function Test

Bulb test

- Turn the ignition key to position “2”. All malfunction indicator/warning lamps must illuminate.
- Start engine. At > 480 engine RPM, all indicator/warning lamps are to extinguish, indicating that all systems monitored are O.K.
- Independent of engine operation the following lamps go out:
After 4 seconds, the SRS MIL will extinguish.
After 6 seconds, the safety belt warning lamp will extinguish.

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.

Warning buzzer

- Exterior illumination and service brake warning
- Ignition key in ignition lock warning
- Safety belt warning for 6 seconds
(the warning tone will cease if safety belt buckle is latched).

Indicator instruments

The indicator instruments must reflect the actual operating conditions.

Photo transistor (models 202 and 210)

Point a flash light at the Photo transistor (25 or 26, Figure 1), at the same time the illumination for the LCD display (outside temperature display, trip odometer, odometer and electronic clock) must brighten noticeably.

CAUTION!

Instrument cluster with multi-function display (model 210)

Functional problems (example: worn brake pads, engine coolant level insufficient, burnt out exterior lamp etc.) or a system failure (ABS system fault, SRS system fault) will be indicated in place of the outside temperature, trip odometer, odometer and electronic clock by use of a warning display. The warning display will be red or orange in color, based on the problem, additionally, a warning tone will be heard.

Maintenance display (model 170)

Turn ignition switch to position 2, press left button twice within one second: the tool symbol and the actual remaining mileage until the next scheduled service will be displayed for ten seconds.
Diagnosis and version coding is done using the HHT.

Diagnosis – Diagnostic Trouble Code (DTC) Memory

Note regarding HHT:

The Instrument Cluster (IC) is tested via the HHT, the following functions are available:

1. Control module version
2. Diagnostic Trouble Code (DTC) Memory
3. Actual values
4. Activation
5. Version Coding

By pressing the continue key on the HHT, additional information can be recalled for each test step.

Note regarding version coding:

The following is available in the HHT during version coding:

1. Read out of version code and transfer to a new spare part instrument cluster.
2. Read out/change of version code:
 1. Motor Version
 2. Country Version
(miles/kilometer)
 3. Fuel tank version
 4. Optional equipment

Note

Prior to the replacement of a defective instrument cluster, readout and store the version code in the HHT. After installing the instrument cluster input the previously stored values back into the instrument cluster. If the readout of stored version codes not possible, the input must be performed manually (by using the menu in the HHT).

Diagnosis – Complaint Related Diagnostic Chart

Complaint/Problem	Possible cause	Test step/Remedy ¹⁾
Entire instrument cluster (A1) not functioning.	Power supply, Instrument cluster (A1)	Model 129: 23 ⇒ 1.0 Model 140: 24 ⇒ 1.0 Model 202: 25 ⇒ 1.0 Model 210: 26 ⇒ 1.0 Model 170: 27 ⇒ 1.0
Warning lamps/Indicator lamps are not functioning.	Power supply, Instrument cluster (A1)	Model 129: 23 ⇒ 1.0 Model 140: 24 ⇒ 1.0 Model 202: 25 ⇒ 1.0 Model 210: 26 ⇒ 1.0 Model 170: 27 ⇒ 1.0
Communication between HHT and instrument cluster not possible.	Wiring, Instrument cluster (A1)	Model 129: 23 ⇒ 2.0 Model 140: 24 ⇒ 2.0 Model 202: 25 ⇒ 2.0 Model 210: 26 ⇒ 2.0 Model 170: 27 ⇒ 2.0
Low engine coolant level (ECL) indicator lamp (A1e11), low windshield washer fluid level indicator lamp (A1e13) illuminated or does not function.	ECL switch (S41) Windshield washer fluid level switch (S42) Wiring Instrument cluster (A1)	Model 129: 23 ⇒ 3.0 Model 140: 24 ⇒ 3.0 Model 202: 25 ⇒ 3.0 Model 210: 26 ⇒ 3.0 Model 170: 27 ⇒ 3.0

¹⁾ Observe Preparation for Test, see 22.

1.13 Instrument Cluster (IC)

All Models as of M.Y. 1997

Electrical Test Program – Component Locations

Model 129

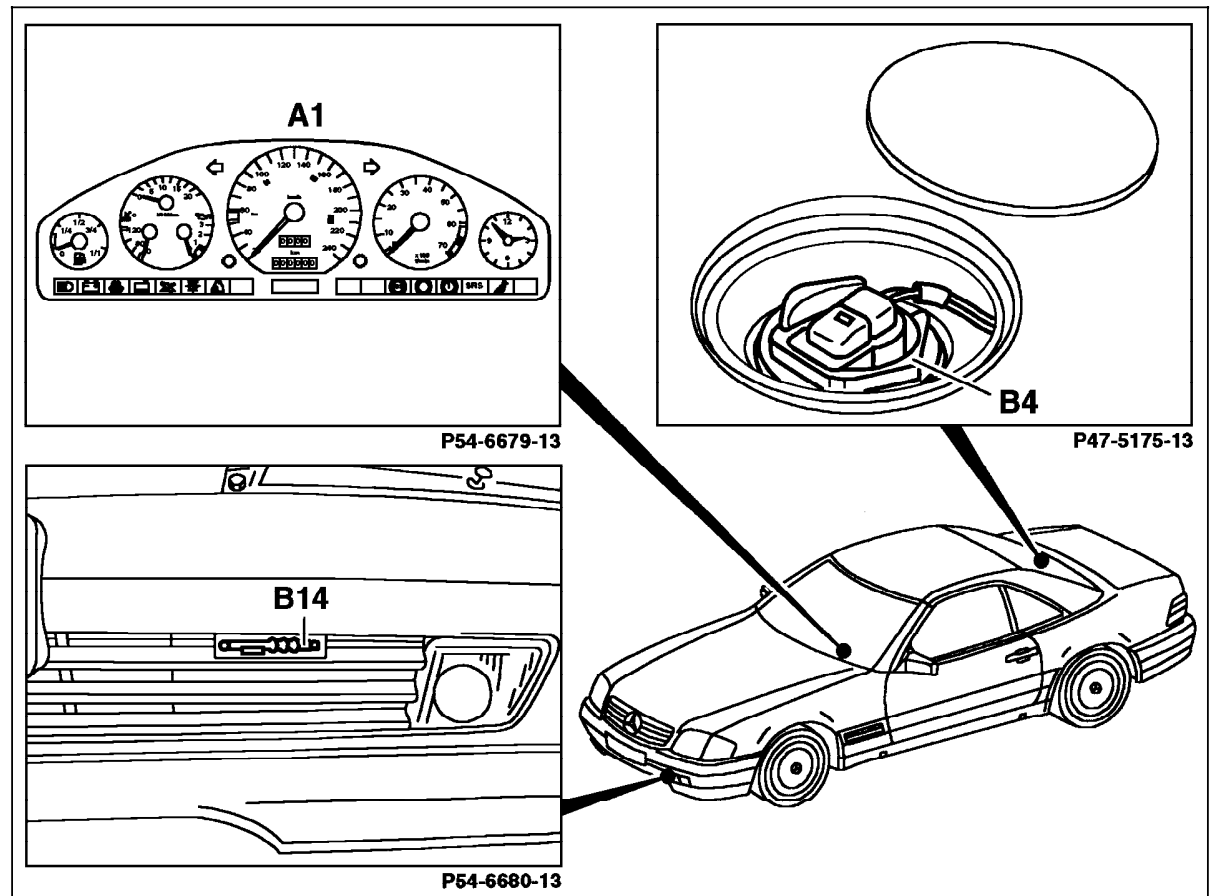


Figure 1

- A1 Instrument cluster
- B4 Fuel level sensor
- B14 Outside temperature indicator temperature sensor

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Electrical Test Program – Component Locations

Model 129

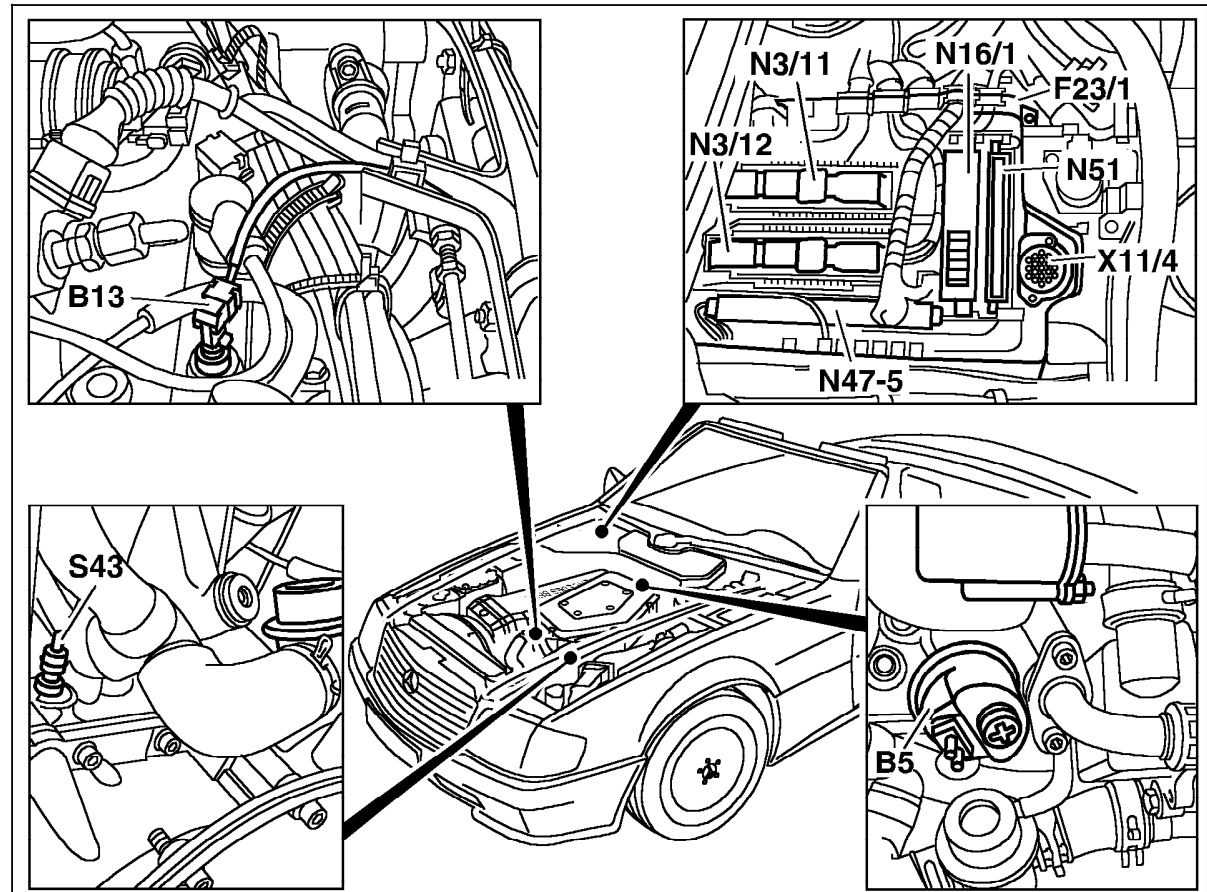


Figure 2

- B5 Oil pressure sensor
(Engine 119: right front;
engine 104, 120: left rear)
- B13 ECT sensor
- F23/1 Control module box
- N3/11 Left engine control module (ME-SFI)
- N3/12 Right engine control module (ME-SFI)
- N16/1 Base module
- N47-5 ESP - SPS control module
- N51 ADS control module
- S43 Oil level switch
(Engine 119: right side of oil pan;
engine 104, 120: left side of oil pan)
- X11/4 Data link connector

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1.13 Instrument Cluster (IC)

All Models as of M.Y. 1997

Electrical Test Program – Component Locations

Model 140

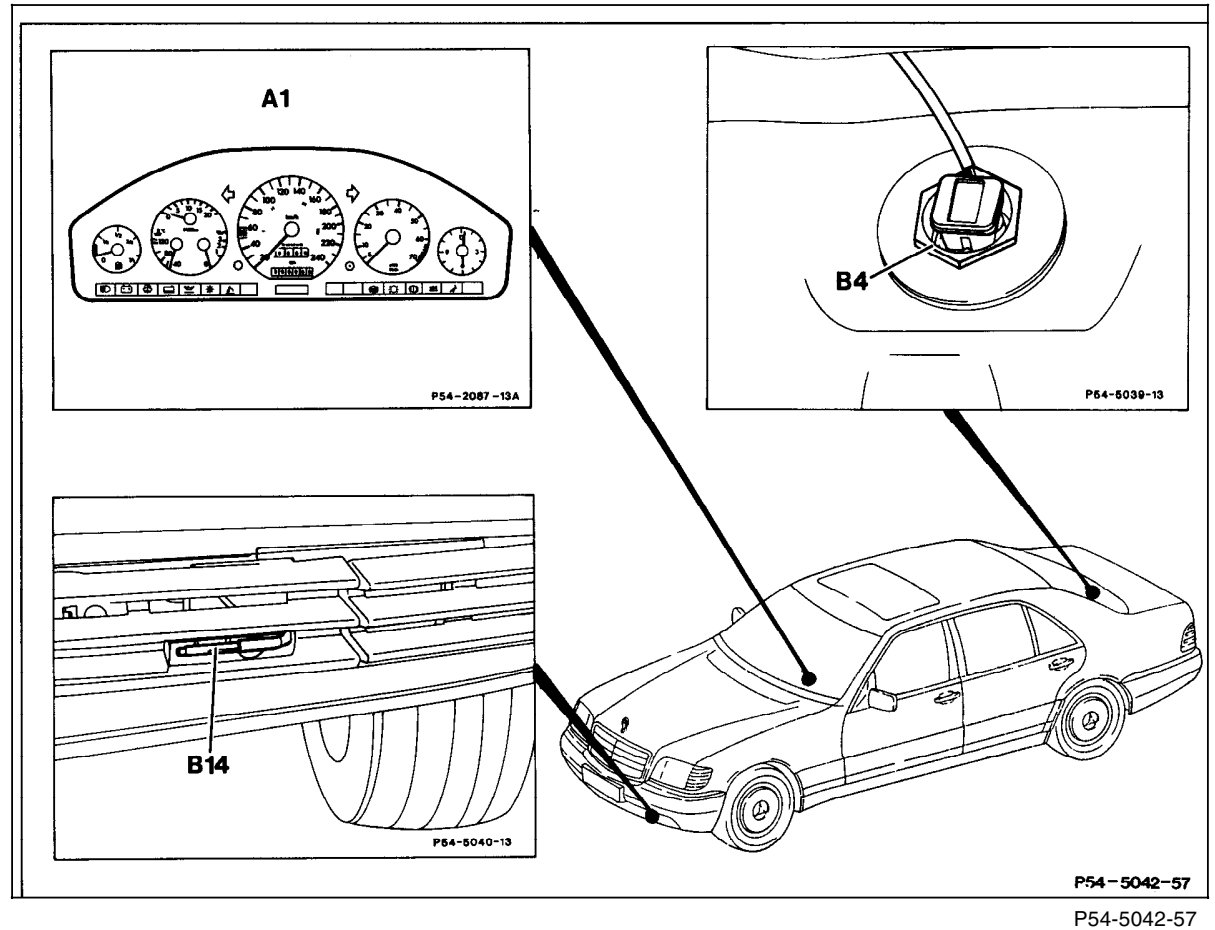


Figure 3

- A1 Instrument cluster
- B4 Fuel level sensor
- B14 Outside temperature indicator temperature sensor

Electrical Test Program – Component Locations

Model 140

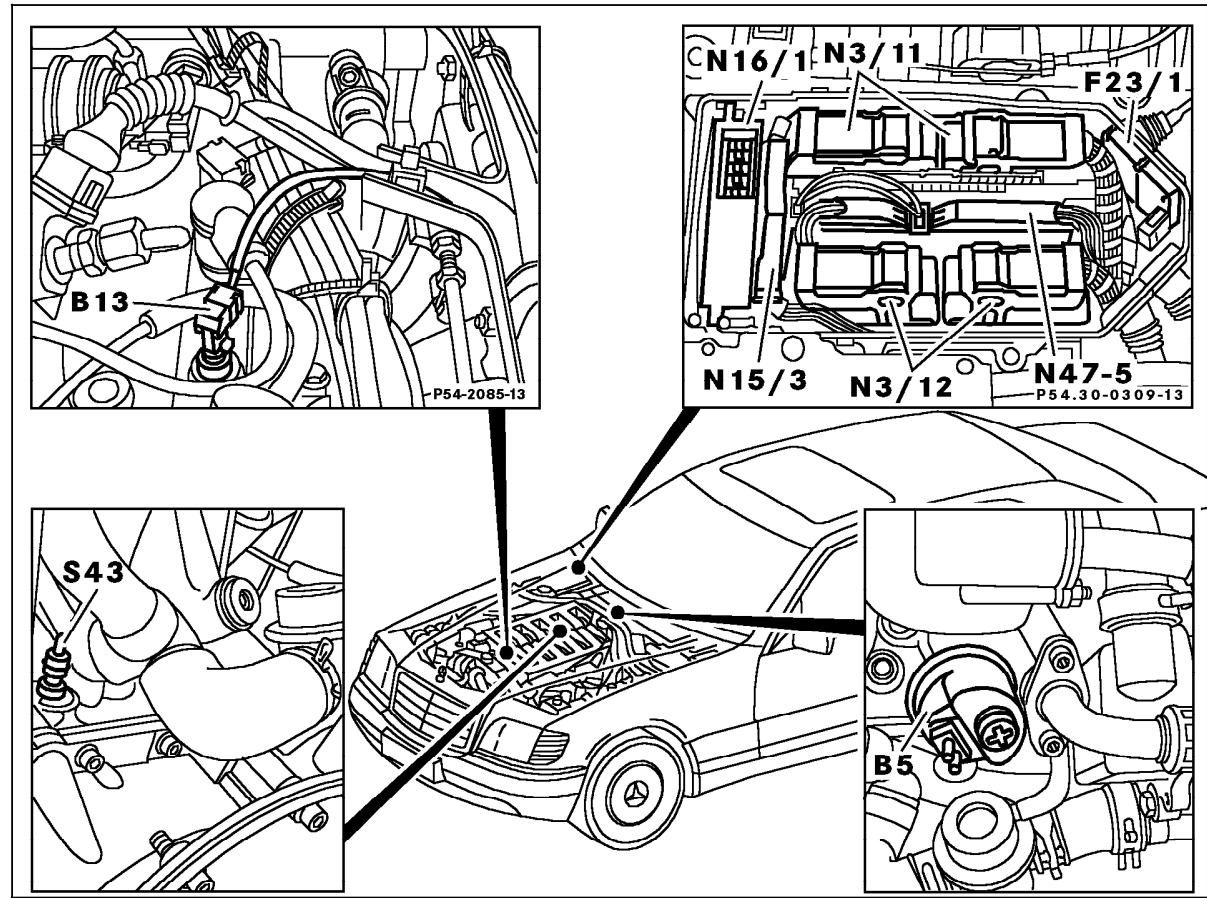


Figure 4

- B5 Oil pressure sensor
(Engine 119: right front;
engine 104, 120: left rear)
- B13 ECT sensor
- F23/1 Control module box
- N3/11 Left engine control module (ME-SFI)
- N3/12 Right engine control module (ME-SFI)
- N15/3 Transmission control module
- N16/1 Base module
- N47-5 ESP - SPS control module
- S43 Oil level switch
(Engine 119: right side of oil pan;
engine 104, 120: left side of oil pan)

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1.13 Instrument Cluster (IC)

All Models as of M.Y. 1997

Electrical Test Program – Component Locations

Model 202

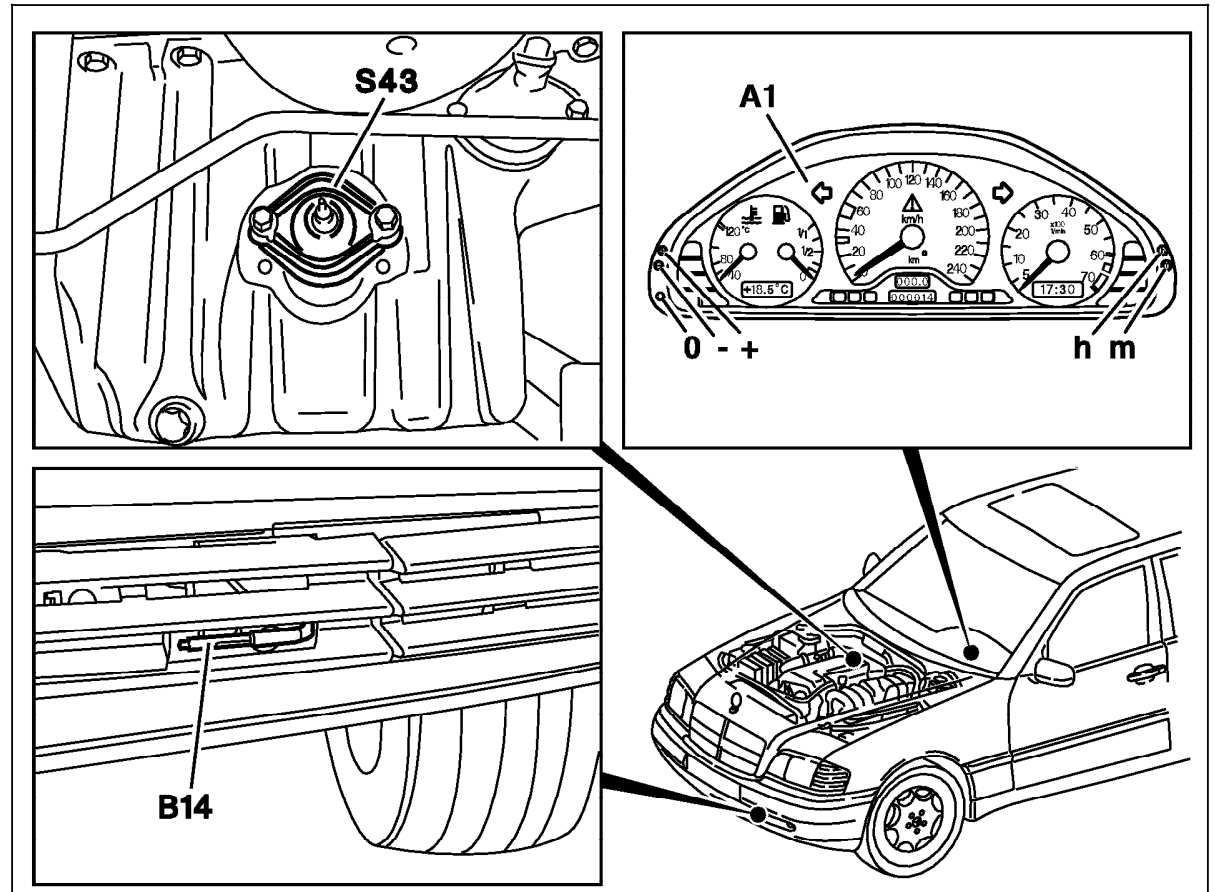


Figure 5

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

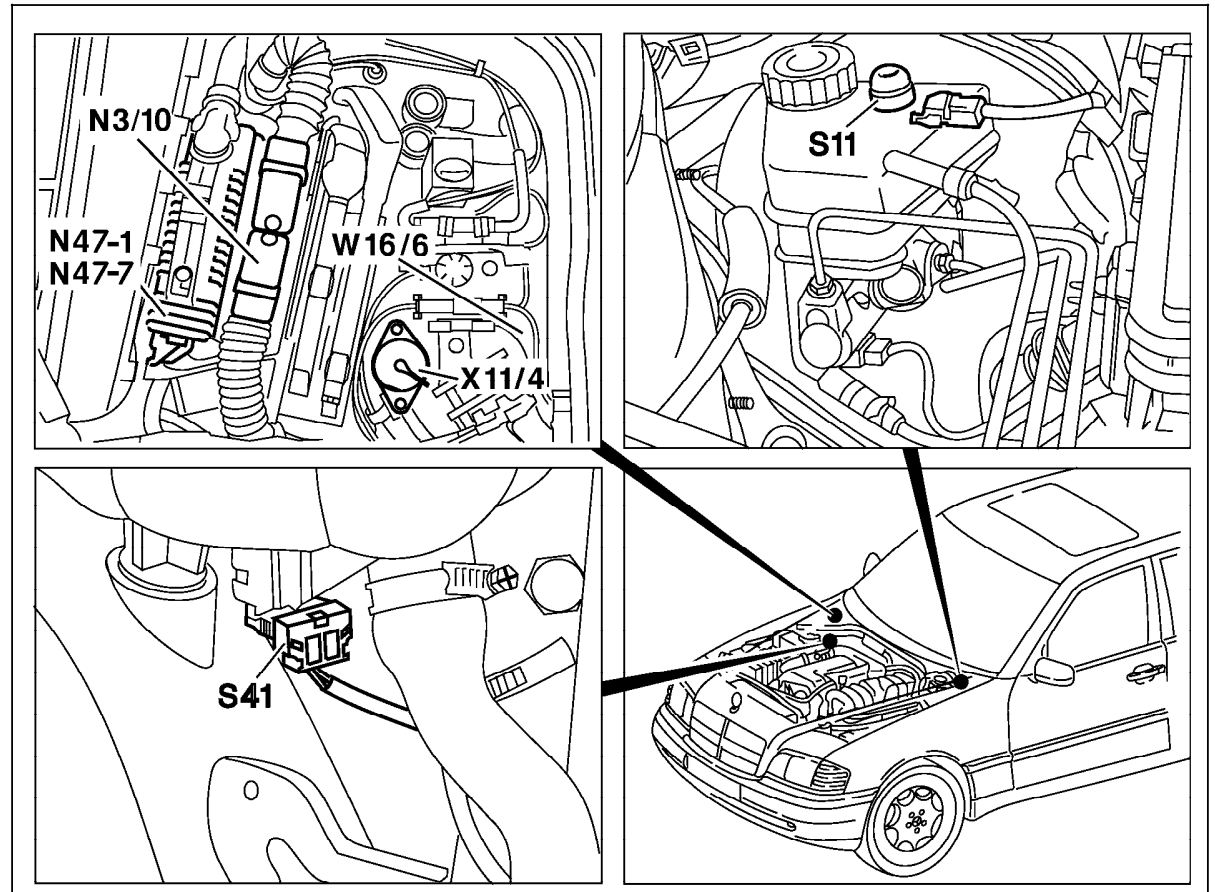
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1.13 Instrument Cluster (IC)

All Models as of M.Y. 1997

Electrical Test Program – Component Locations

Model 202



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1.13 Instrument Cluster (IC)

All Models as of M.Y. 1997

Electrical Test Program – Component Locations

Model 202

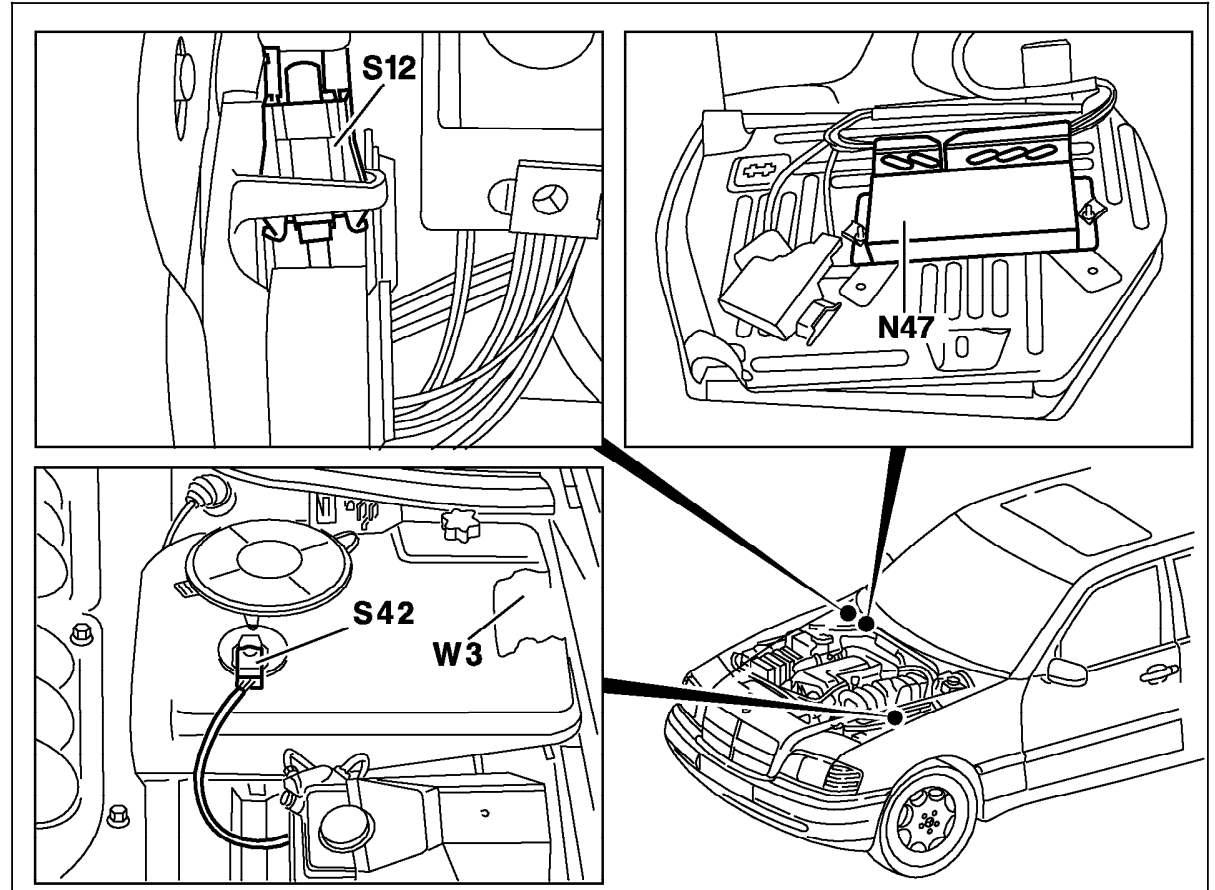


Figure 7

- N47 Instrument cluster
- S12 Parking brake switch
- S42 Windshield washer fluid level switch
- W3 Ground (left front wheel housing at ignition coil)

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Electrical Test Program – Component Locations

Model 202

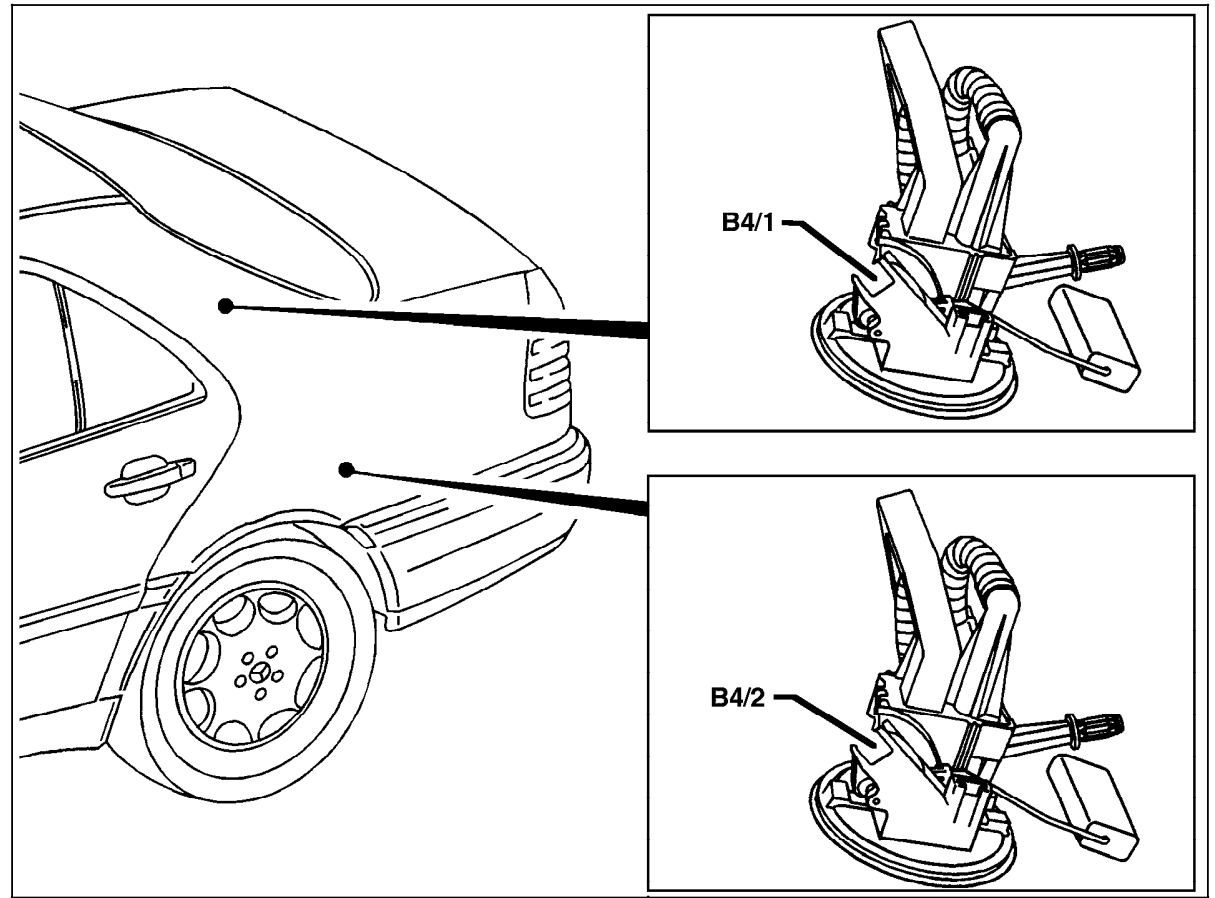


Figure 8

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

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1.13 Instrument Cluster (IC)

All Models as of M.Y. 1997

Electrical Test Program – Component Locations

Model 210

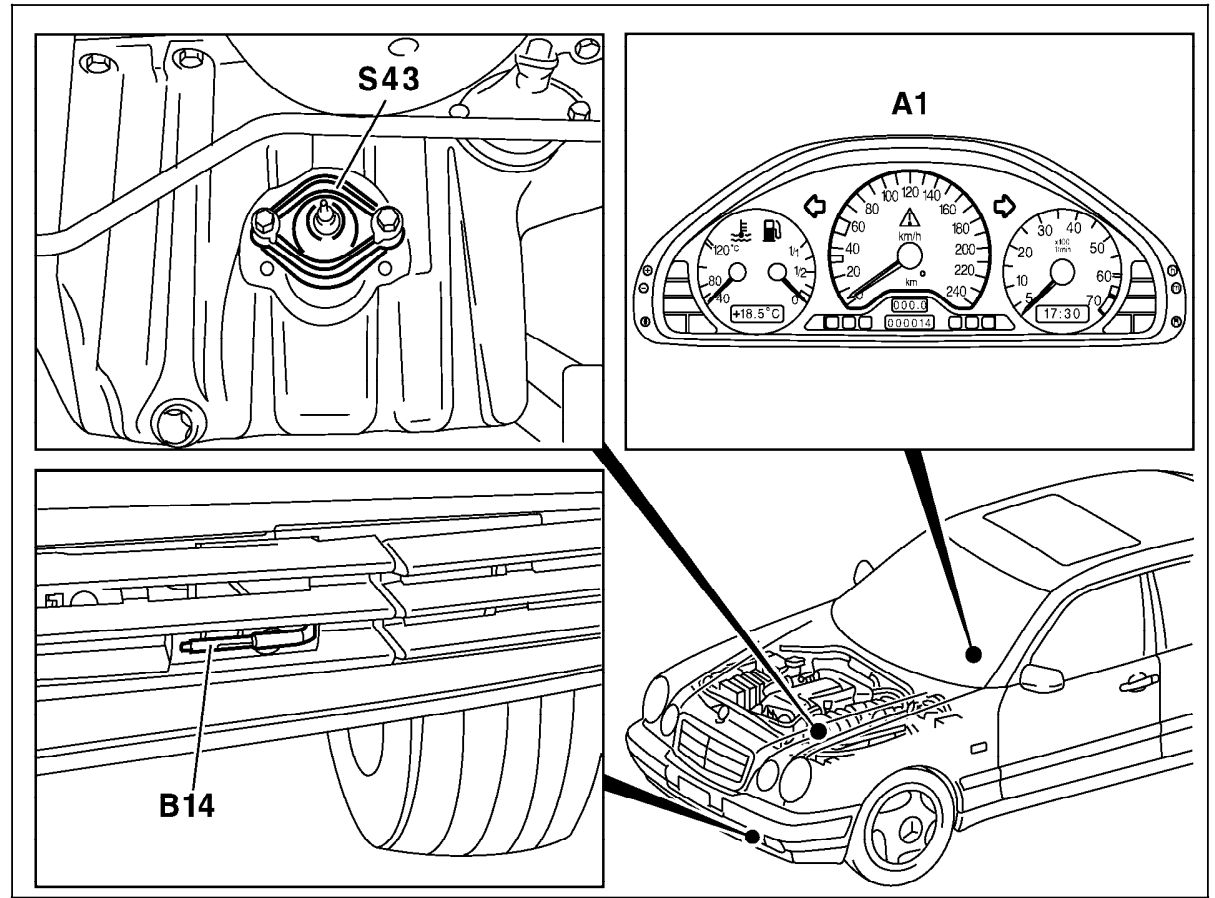


Figure 9

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

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1.13 Instrument Cluster (IC)

All Models as of M.Y. 1997

Electrical Test Program – Component Locations

Model 210

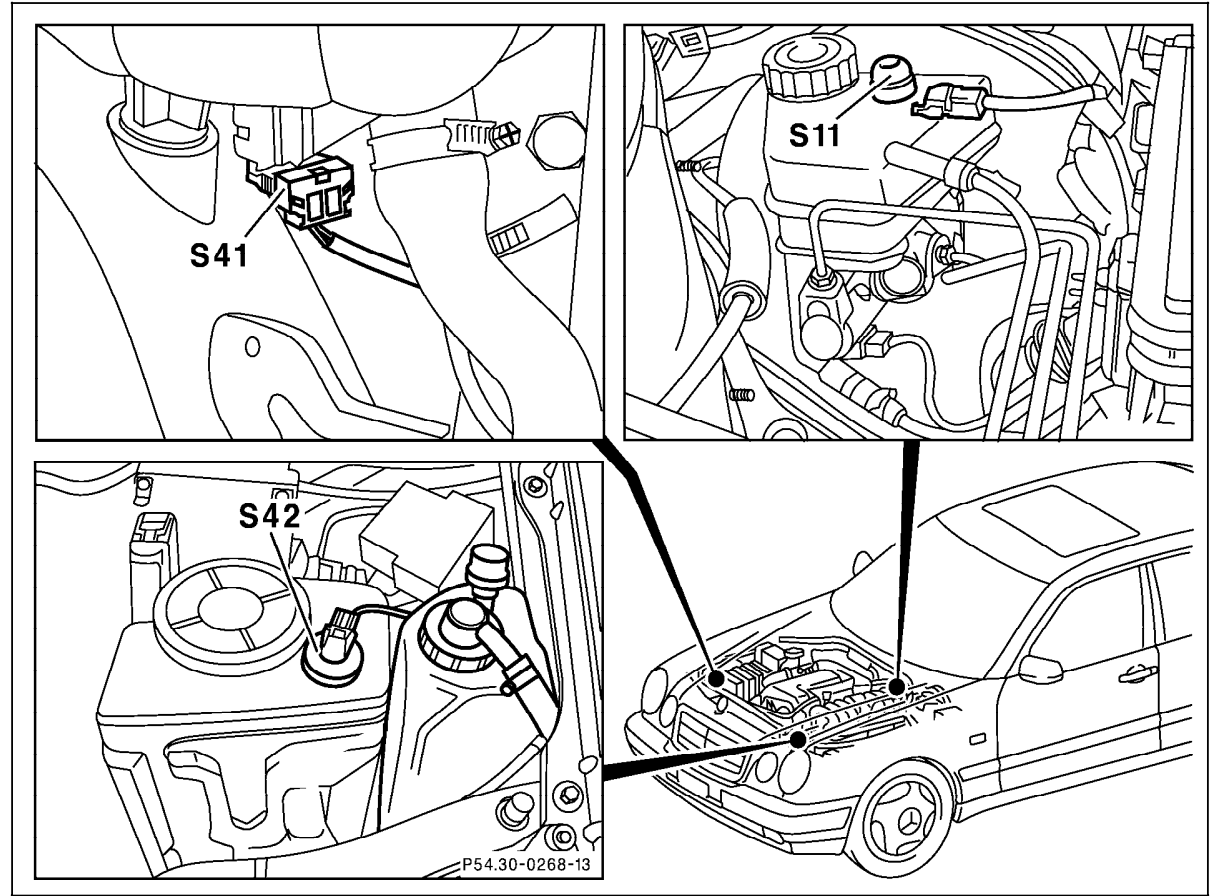


Figure 10

- S11 Brake fluid level switch
- S41 ECL switch
- S42 Windshield washer fluid level switch

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1.13 Instrument Cluster (IC)

All Models as of M.Y. 1997

Electrical Test Program – Component Locations

Model 210

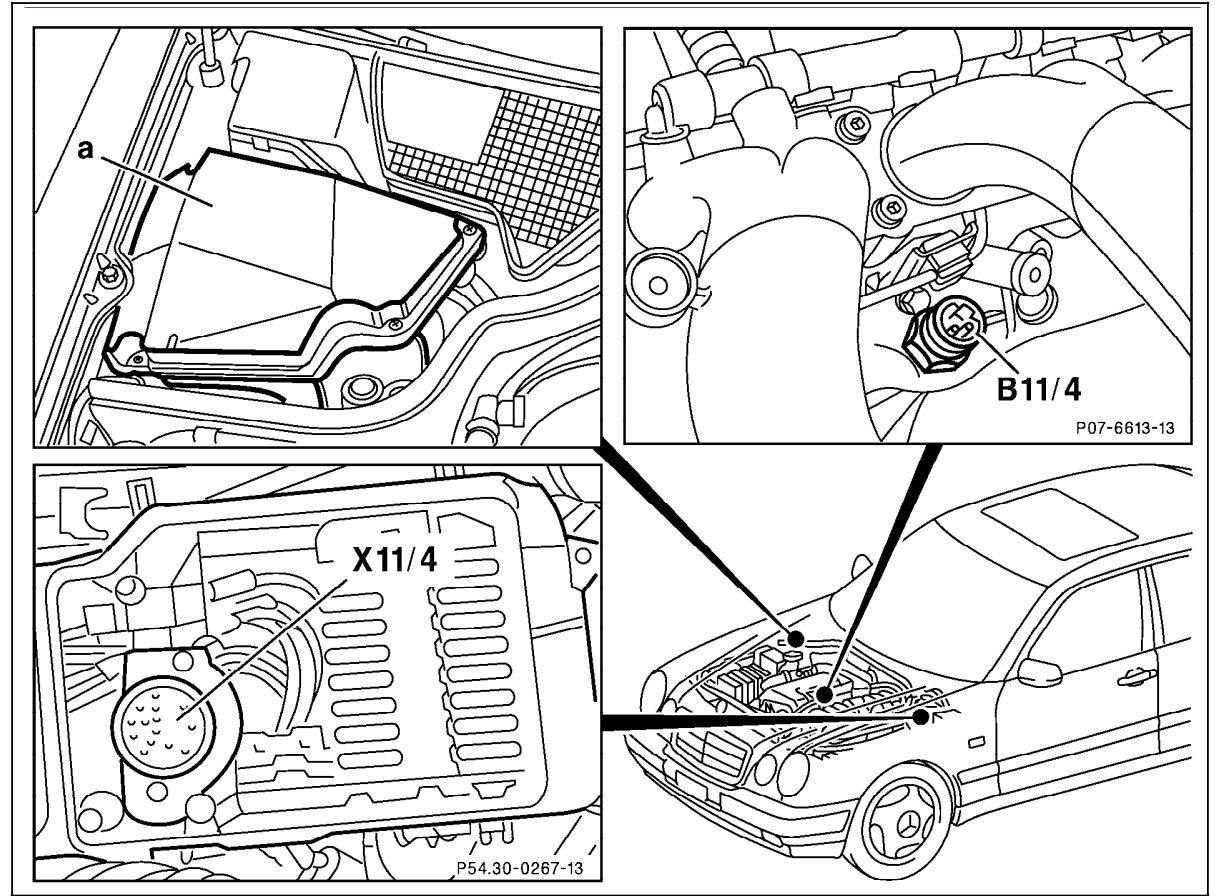


Figure 11

- B11/4 ECT sensor (EFI)
- X11/4 Data link connector (DTC readout)
- a Control module box (plastic)

1.13 Instrument Cluster (IC)

All Models as of M.Y. 1997

Electrical Test Program – Component Locations

Model 210

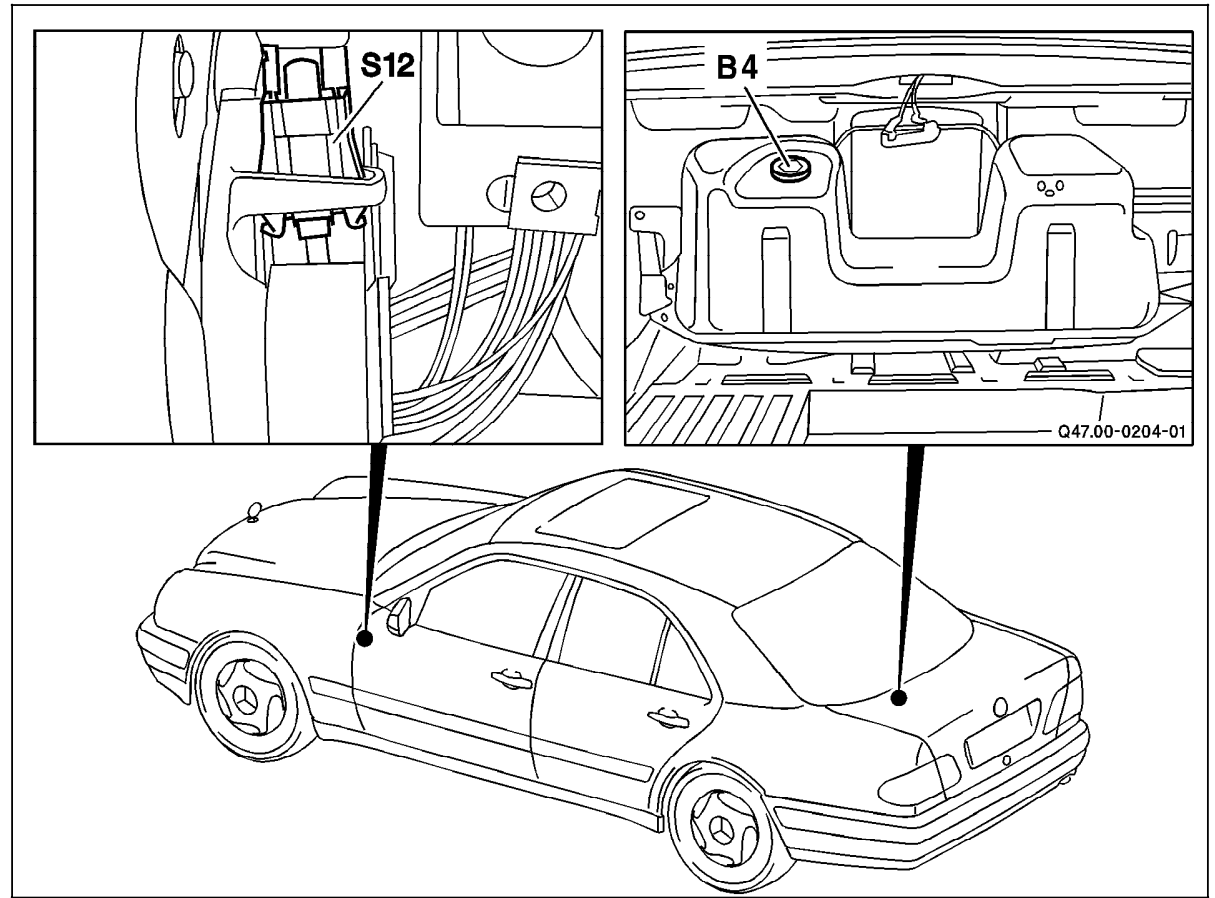


Figure 12

B4 Fuel level sensor
S12 Parking brake switch

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1.13 Instrument Cluster (IC)

All Models as of M.Y. 1997

Electrical Test Program – Component Locations

Model 170

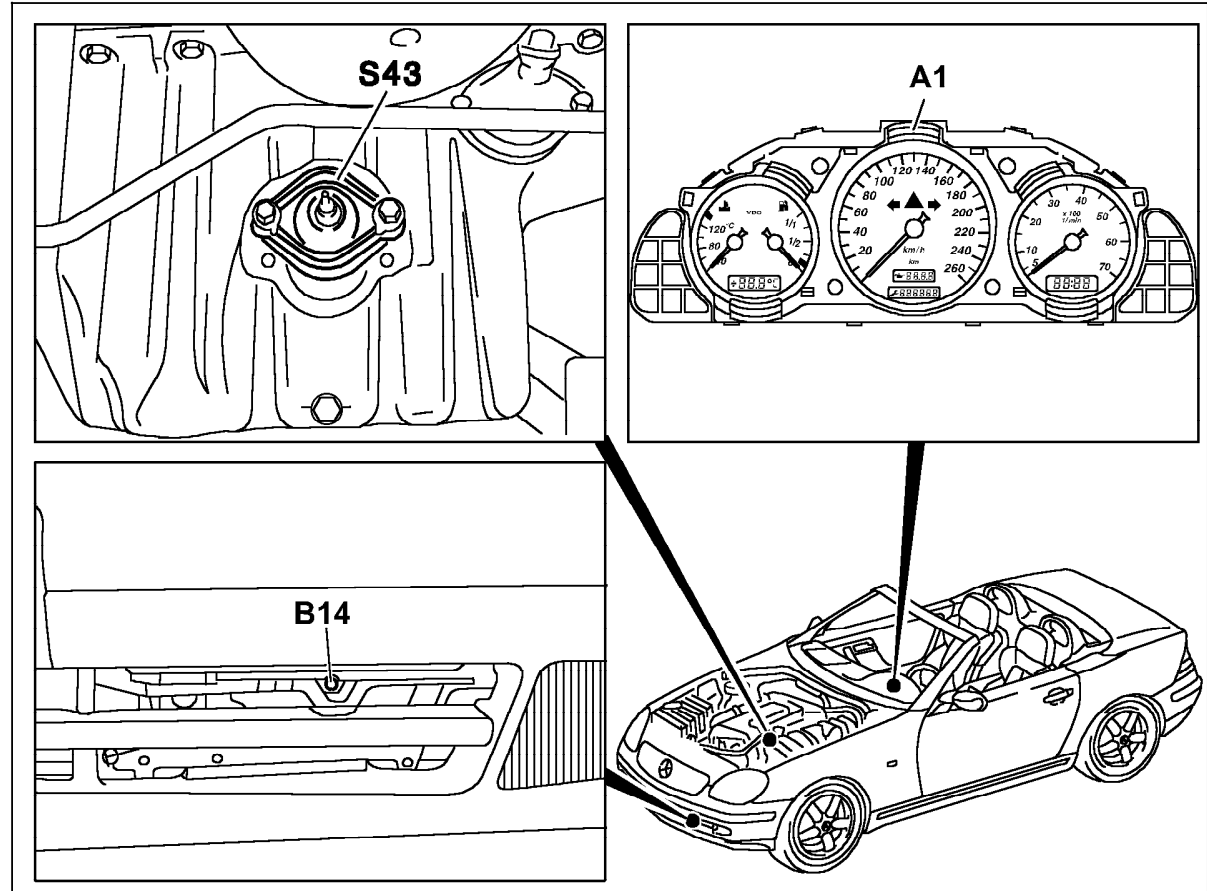


Figure 13

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

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1.13 Instrument Cluster (IC)

All Models as of M.Y. 1997

Electrical Test Program – Component Locations

Model 170

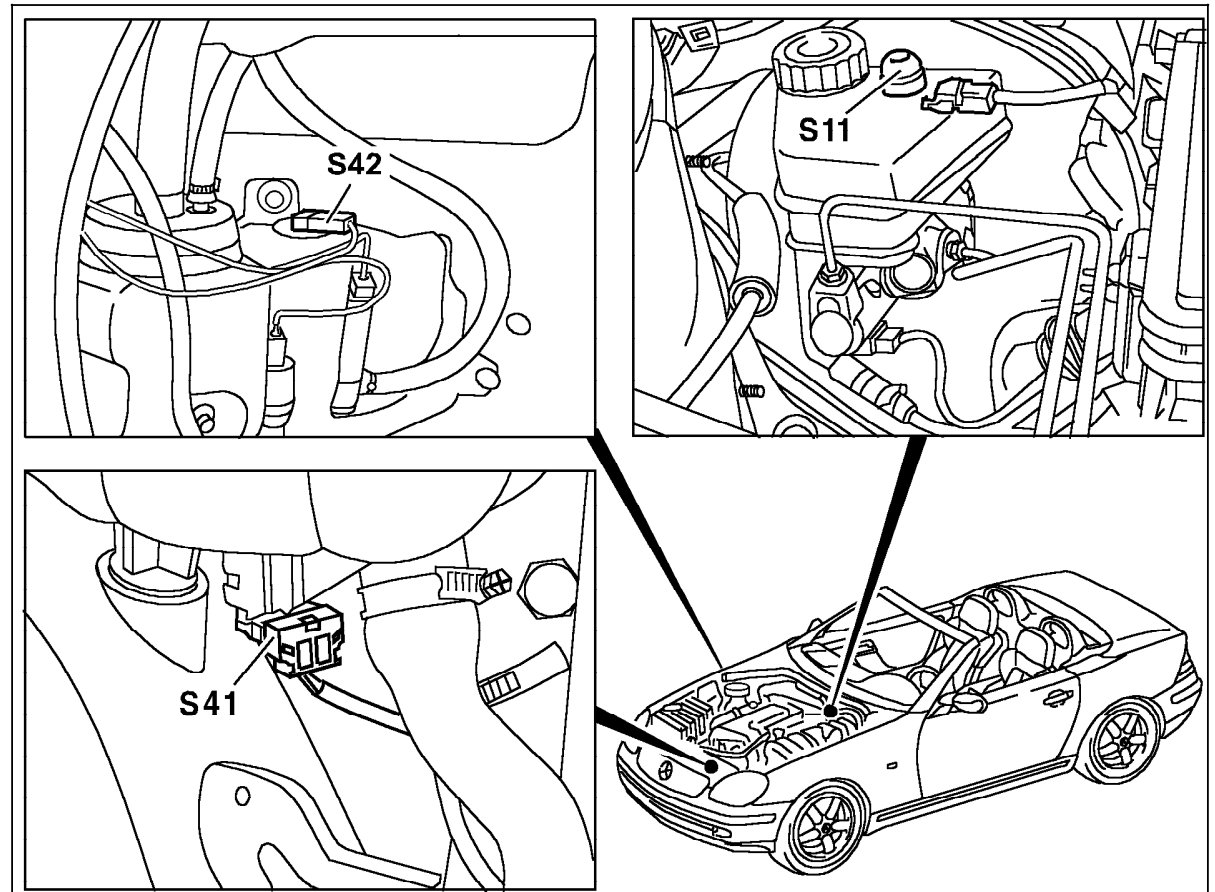


Figure 14

- S11 Brake fluid switch
- S41 ECL switch
- S42 Windshield washer fluid level switch

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1.13 Instrument Cluster (IC)

All Models as of M.Y. 1997

Electrical Test Program – Component Locations

Model 170

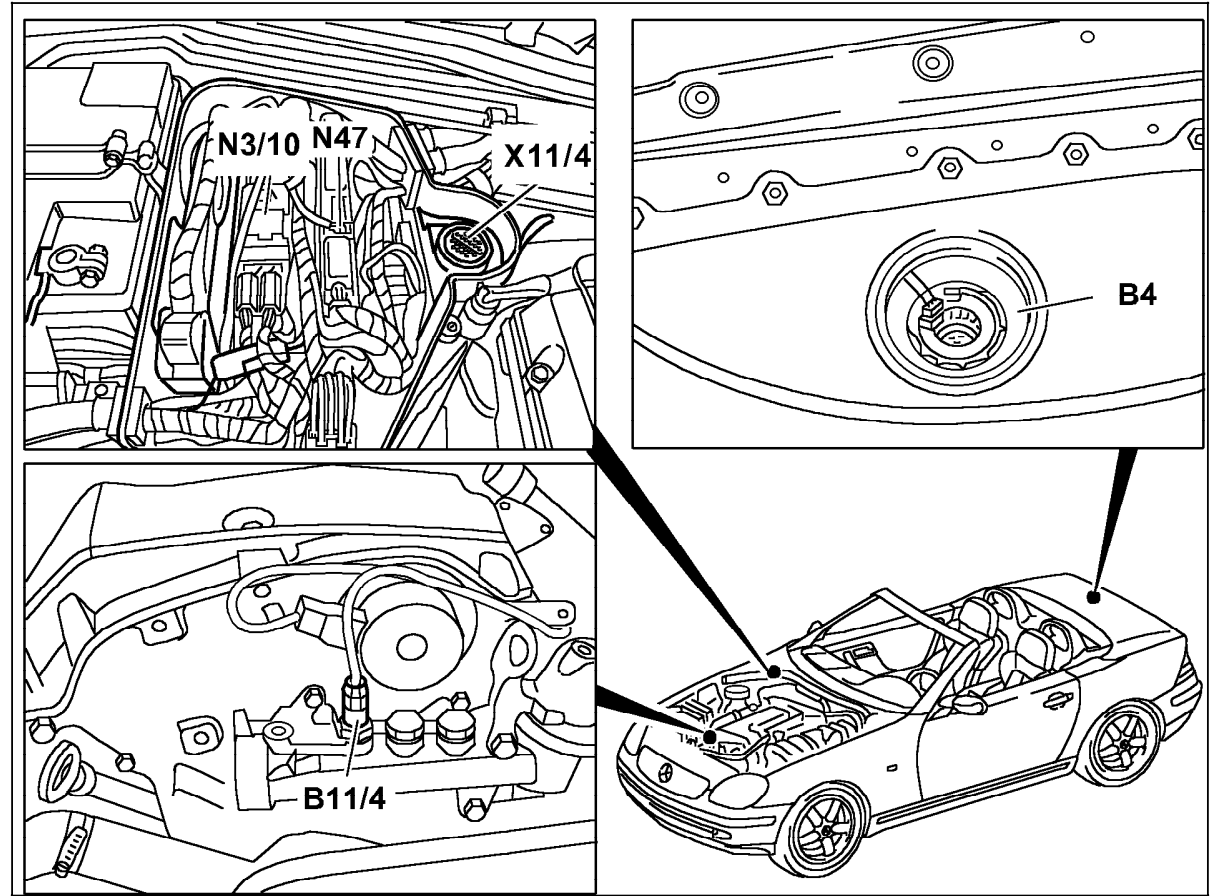


Figure 15

- B4 Fuel level sensor
- B11/4 ECT sensor (DFI,IFI)
- N3/10 Engine control module (ME-SFI)
- N47 Traction system control module
- X11/4 Data link connector (DTC readout)

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Electric Test Program – Preparation for Test

1. Battery voltage 11 – 14 V.
2. Check fuses.
3. Systems and fluid levels in order.

Electrical wiring diagrams:

See Electric Troubleshooting Manual, group 54

Note:

To prevent damage to the control modules referred to in 23, the connectors on the control modules must only be removed or installed with the ignition **OFF**.

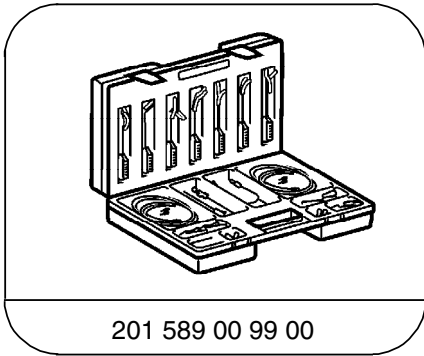
Conventional tools, test equipment

Description	Brand, model, etc.
Multimeter ¹⁾	Fluke models 23, 83, 85, 87

¹⁾ Available through the MBUSA Standard Equipment Program.

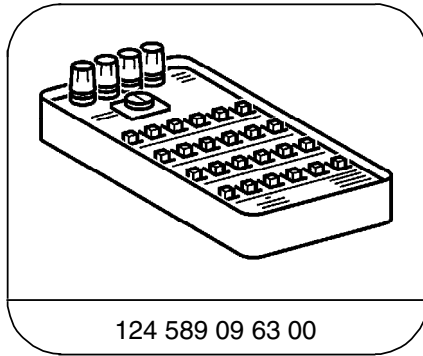
Electrical Test Program – Preparation for Test

Special Tools



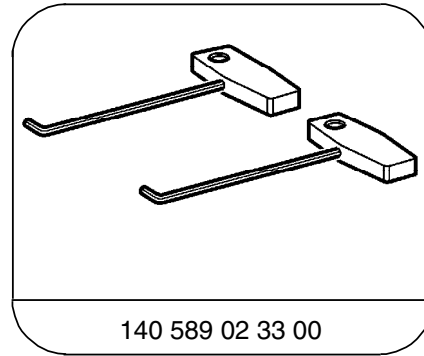
201 589 00 99 00

Electrical connecting set



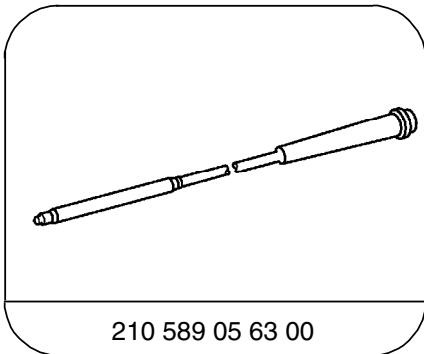
124 589 09 63 00

Ohm decade



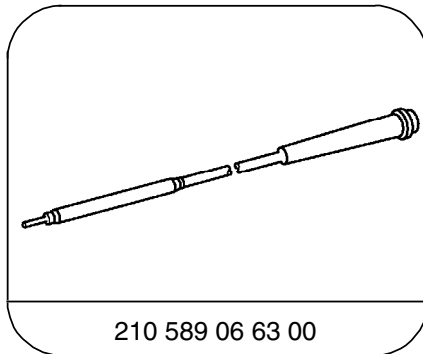
140 589 02 33 00

Extraction hook



210 589 05 63 00

Adapter cable



210 589 06 63 00

Adapter cable

Electrical Test Program – Test Model

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0	Instrument cluster (A1) Voltage supply Circuit 30	<p>3 — 11 (1A.3) (1A.11)</p> <p>12 — 11 (1A.12) (1A.11)</p>	Ignition: OFF Remove A1 Disconnect connector 1 (30-pole)	11 – 14 V	Fuse 14 in fuse and relay box (F1), Wiring, ⇒ 1.1
1.1	Voltage supply Circuit 15, fused	<p>3 — 9 (1A.3) (1A.9)</p>	Ignition: ON	11 – 14 V	Fuse 10 in fuse and relay box (F1), Wiring, A1
2.0	HHT interface Connection between A1 and data link connector (X11/4)	<p>15 — 11 X11/4 (1B.11)</p>	Ignition: OFF Remove A1, Disconnect connector 1 (30-pole)	5 Ω	Wiring.

Electrical Test Program – Test

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
3.0	ECL and windshield washer level: ECL level switch (S41), windshield washer level switch (S42) and wiring		Ignition: OFF Coolant level and windshield washer fluid level: OK Remove instrument cluster (A1) Disconnect connector 1 (30 pole).	233 - 297 Ω	Wiring ⇒ 3.1 Values O.K.: A1
3.1	ECL switch (S41)		Ignition: OFF Remove expansion tank Disconnect connector at ECL switch (S41). Coolant level OK	102 - 120 Ω	S41 Values O.K.: ⇒ 3.2
3.2	Windshield washer fluid level switch (S42)		Ignition: OFF Disconnect connector at S42. Washer fluid level OK	145 - 185 Ω	S42

Electrical Test Program – Test

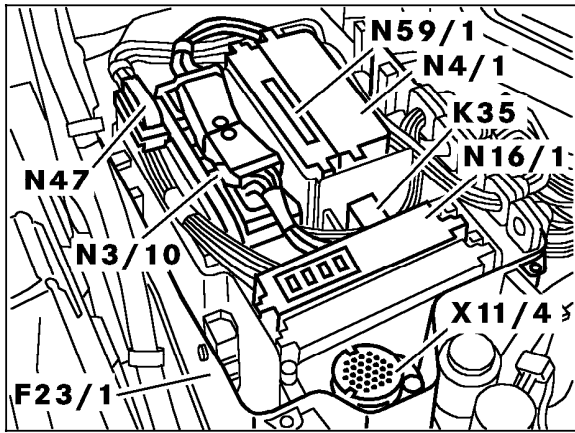


Figure 2 6 Cylinder models

- F23/1 Control module box
- K35 O2S 2 (after TWC) heater relay module
- N3/10 Engine control module (HFM - SFI)
- N4/1 EA/CC/ISC control module
- N16/1 Base module (BM)
- N47 Traction system control module
- N59/1 Diagnostic module (OBD I)
- X11/4 Data link connector

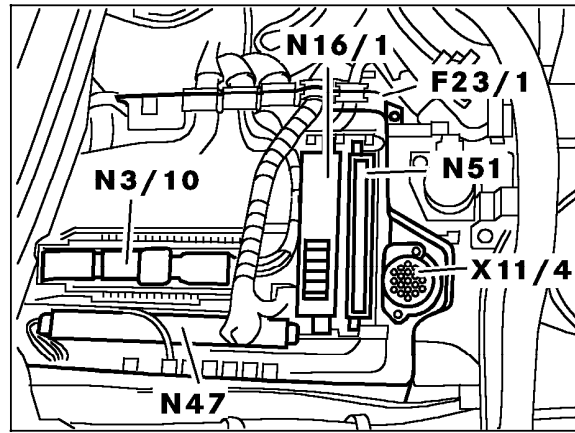


Figure 3 8 Cylinder models

- F23/1 Control module box
- N3/10 Engine control module (ME-SFI)
- N16/1 Base module (BM)
- N47 Traction system control module
- N51 ADS control module
- X11/4 Data link connector

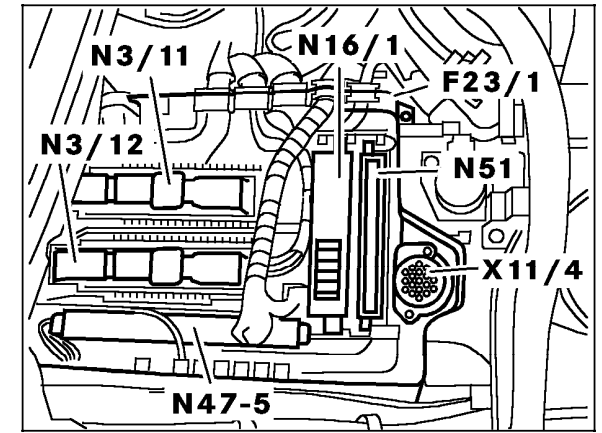


Figure 4 12 Cylinder models

- F23/1 Control module box
- N3/11 Left engine control module (ME-SFI)
- N3/12 Right engine control module (ME-SFI)
- N16/1 Base module (BM)
- N47/5 ESP/SPS control module
- N51 ADS control module
- X11/4 Data link connector

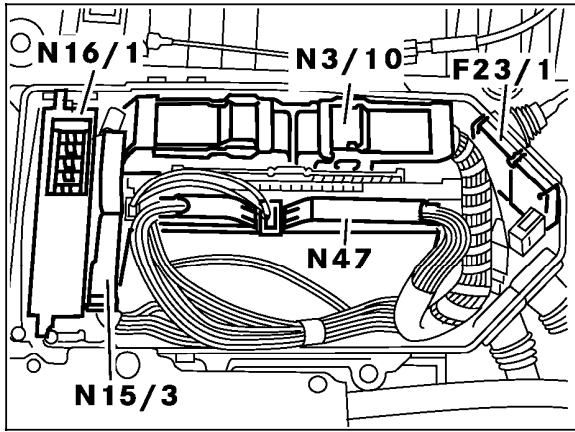
Electrical Test Program – Test

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0	Instrument cluster (A1) Voltage supply Circuit 30	<p>3 — (1A.3) ← → (1A.11) — 11</p> <p>12 — (1A.12) ← → (1A.11) — 11</p>	Ignition: OFF Remove instrument cluster (A1) Disconnect connector 1 (30-pole)	11 – 14 V	Fuse 17 in fuse and relay box (F3), Wiring, ⇒ 1.1
1.1	Voltage supply Circuit 15	<p>3 — (1A.3) ← → (1A.9) — 9</p>	Ignition: ON	11 – 14 V	Fuse 24 in fuse and relay box (F3), Wiring, A1
2.0	HHT interface Connection between A1 and data link connector (X11/4)	<p>15 — X11/4 ← → (1B.11) — 11</p>	Ignition: OFF Remove A1, Disconnect connector 1 (30-pole)	5 Ω	Wiring.

Electrical Test Program – Test

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
3.0	ECL and windshield washer level: ECL level switch (S41), windshield washer level switch (S42) and wiring		Ignition: OFF Coolant level and windshield washer fluid level: OK Remove A1 Disconnect connector 1 (30 pole).	233 - 297 Ω	Wiring ⇒ 3.1 Values O.K.: A1
3.1	ECL switch (S41)		Ignition: OFF Remove expansion tank Disconnect connector at S41. Coolant level OK	102 - 120 Ω	S41 Values O.K.: ⇒ 3.2
3.2	Windshield washer fluid level switch (S42)		Ignition: OFF Disconnect connector at S42. Washer fluid level OK	145 - 185 Ω	S42

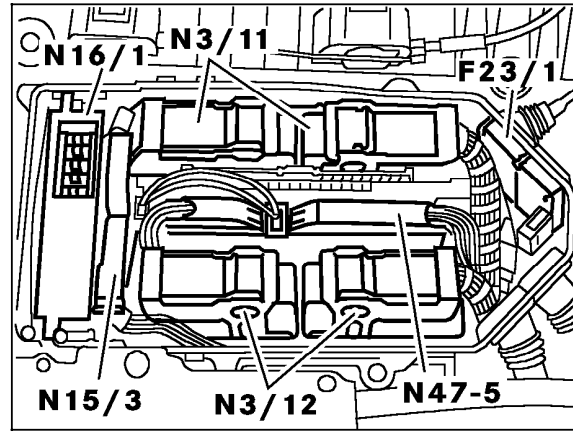
Electrical Test Program – Test



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Figure 1 6/8 Cylinder models

- F23/1 Control module box
- N3/10 Engine control module (ME - SFI)
- N15/3 Transmission control module
- N16/1 Base module (BM)
- N47 Traction system control module



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Figure 2 12 Cylinder models

- F23/1 Control module box
- N3/11 Left engine control module (ME-SFI)
- N3/12 Right engine control module (ME-SFI)
- N15/3 Transmission control module
- N16/1 Base module (BM)
- N47/5 ESP/SPS control module

Electrical Test Program – Test

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0	Instrument cluster (A1) Voltage supply Circuit 30		Ignition: OFF Remove Instrument cluster (A1) Disconnect connector 1 (30-pole)	11 – 14 V	Fuse 10 in fuse and relay box (F1), Wiring, ⇒ 1.1
1.1	Voltage supply Circuit 15		Ignition: ON	11 – 14 V	Fuse 3 in fuse and relay box (F1), Wiring, A1
2.0	HHT interface Connection between A1 and data link connector (X11/4)		Ignition: OFF Remove A1, Disconnect connector 1 (30-pole)	5 Ω	Wiring.

Electrical Test Program – Test

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
3.0	ECL and windshield washer level: ECL level switch (S41), windshield washer level switch (S42) and wiring		Ignition: OFF Coolant level and windshield washer fluid level: OK Remove A1 Disconnect connector 1 (30 pole).	233 - 297 Ω	Wiring ⇒ 3.1 Values O.K.: A1
3.1	ECL switch (S41)		Ignition: OFF Remove expansion tank Disconnect connector at S41 (refer to 21/6 for component location). Coolant level OK	102 - 120 Ω	S41 Values O.K.: ⇒ 3.2
3.2	Windshield washer fluid level switch (S42)		Ignition: OFF Disconnect connector at S42 (refer to 21/7 for component location). Washer fluid level OK	145 - 185 Ω	S42

Electrical Test Program – Test

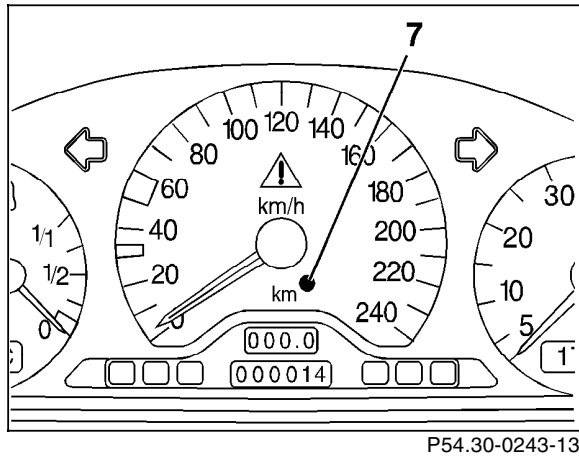


Figure 1

7 Photo transistor

Electrical Test Program – Test

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0	Instrument cluster (A1) Voltage supply Circuit 30		Ignition: OFF Remove instrument cluster (A1) Disconnect connector 1 (30-pole)	11 – 14 V	Fuse 4 in fuse and relay box (F1), Wiring, ⇒ 1.1
1.1	Voltage supply Circuit 15		Ignition: ON	11 – 14 V	Fuse 7 in fuse and relay box (F1), Wiring, A1
2.0	HHT interface Connection between A1 and data link connector (X11/4)		Ignition: OFF Remove A1, Disconnect connector 1 (30-pole)	5 Ω	Wiring.

Electrical Test Program – Test

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
3.0	ECL and windshield washer level: ECL level switch (S41), windshield washer level switch (S42) and wiring		Ignition: OFF Coolant level and windshield washer fluid level: OK Remove instrument cluster (A1) Disconnect connector 1 (30 pole).	233 - 297 Ω	Wiring ⇒ 3.1 Values O.K.: A1
3.1	ECL switch (S41)		Ignition: OFF Remove expansion tank Disconnect connector at S41 (refer to 21/10 for component location). Coolant level OK	102 - 120 Ω	S41 Values O.K.: ⇒ 3.2
3.2	Windshield washer fluid level switch (S42)		Ignition: OFF Disconnect connector at S42 (refer to 21/10 for component location). Washer fluid level OK	145 - 185 Ω	S42

Electrical Test Program – Test

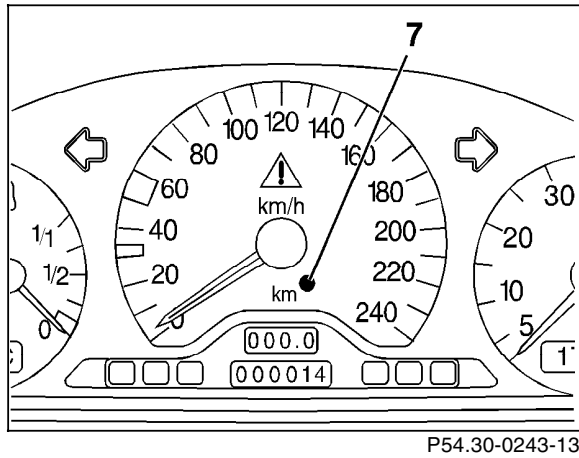
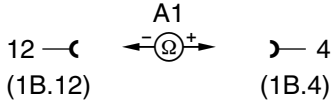
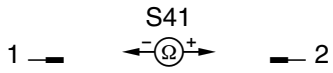
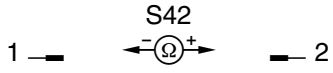


Figure 1
7 Photo transistor

Electrical Test Program – Test

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0	Instrument cluster (A1) Voltage supply Circuit 30	<p>3 — (1A.3) A1 11 (1A.11)</p> <p>12 — (1A.12) A1 11 (1A.11)</p>	Ignition: OFF Remove instrument cluster (A1) Disconnect connector 1 (30-pole)	11 – 14 V	Fuse 34 in fuse and relay box (F1), Wiring, ⇒ 1.1
1.1	Voltage supply Circuit 15	<p>3 — (1A.3) A1 9 (1A.9)</p>	Ignition: ON	11 – 14 V	Fuse 37 in fuse and relay box (F1), Wiring, A1
2.0	HHT interface Connection between A1 and data link connector (X11/4)	<p>15 — X11/4 A1 11 (1B.11)</p>	Ignition: OFF Remove A1, Disconnect connector 1 (30-pole)	5 Ω	Wiring.

Electrical Test Program – Test

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
3.0	ECL and windshield washer level: ECL level switch (S41), windshield washer level switch (S42) and wiring		Ignition: OFF Coolant level and windshield washer fluid level: OK Remove instrument cluster (A1) Disconnect connector 1 (30 pole).	233 - 297 Ω	Wiring ⇒ 3.1 Values O.K.: A1
3.1	ECL switch (S41)		Ignition: OFF Remove expansion tank Disconnect connector at S41 (refer to 21/14 for component location). Coolant level OK	102 - 120 Ω	S41 Values O.K.: ⇒ 3.2
3.2	Windshield washer fluid level switch (S42)		Ignition: OFF Disconnect connector at S42 (refer to 21/14 for component location). Washer fluid level OK	145 - 185 Ω	S42

Electrical Test Program – Test

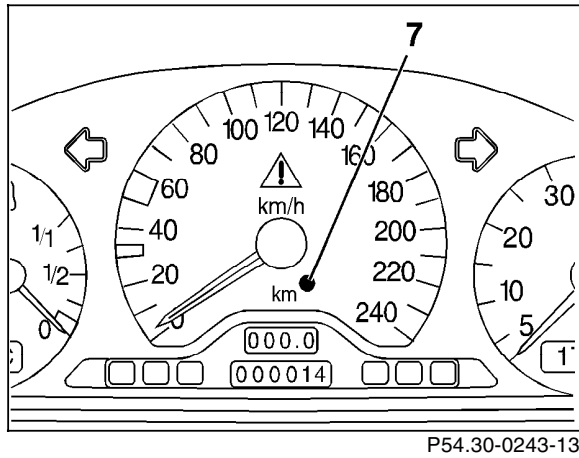


Figure 1
7 Photo transistor