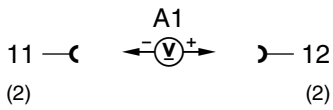
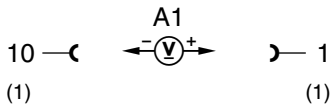
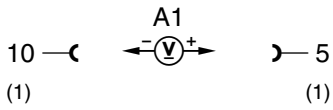
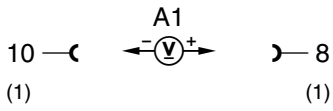


1.10 Instrument Cluster (IC) (with Digital Odometer)

Model 140


Electrical Test Program – Test (vehicles with ESP up to 05/96 or as of 09/95 and up to 05/96)

⇒	Mode	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0		Instrument cluster (A1) Voltage supply circuit 30		Remove A1 Disconnect connector 2	11 – 14 V	Wiring, Fuse F17 in Fuse box F3 ⇒ 1.1
1.1		Voltage supply Circuit 15, unfused		Remove A1 Disconnect connector 1 Ignition: ON	11 – 14 V	Wiring, Fuse F23 in Fuse box F3 ⇒ 1.2
1.2		Voltage supply Circuit 15, fused		Remove A1 Disconnect connector 1 Ignition: ON	11 – 14 V	Wiring, Fuse F24 in Fuse box F3 Values OK: A1
2.0		Instrument cluster (A1) Illumination		Remove A1 Disconnect connector 1 Ignition: ON Turn on parking lights	11 – 14 V	Wiring, Exterior lamp switch (S1), Short circuit in circuit 58d (output from A1).
3.0	1	Fuel level gauge (A1p2)		Activate test mode 1 (see 11 and 23 or 24 Figure 1).	Analog fuel gauge reading ≈ digital readout	A1, ⇒ 3.1

1.10 Instrument Cluster (IC) (with Digital Odometer)

Model 140

Electrical Test Program – Test (vehicles with ESP up to 05/96 or as of 09/95 and up to 05/96)

⇒	Mode	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
3.1	6 – 9	Fuel level gauge (A1p2)		Activate test modes 6 – 9	see 24 Figures 2 – 9	A1, ⇒ 3.2
3.2		Wires and connections and fuel level sensor (B4)		Ignition: OFF Disconnect connector at B4 Connect resistance substitution unit. Ignition: ON Resistance substitution unit setting: $87 \pm 2 \Omega$ $77 \pm 1 \Omega$ $68 \pm 3 \Omega$ $48 \pm 3 \Omega$ $27 \pm 3 \Omega$ $7 \pm 2 \Omega$ Note: Before changing each resistance value, the ignition must be turned off and then turned on again.	Display in A1p2: ≈ 0 ¹⁾ $\approx \text{Res.}$ ¹⁾ $\approx 1/4$ $\approx 1/2$ $\approx 3/4$ $\approx 1/1$	Wiring, Values OK: B4, ⇒ 3.3

¹⁾ Fuel reserve indicator lamp lights up.

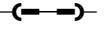
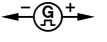
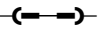
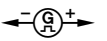
1.10 Instrument Cluster (IC) (with Digital Odometer)

Model 140

Electrical Test Program – Test (vehicles with ESP up to 05/96 or as of 09/95 and up to 05/96)

⇒	Mode	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
3.3	1	Programming fuel tank version in trip odometer		Ignition: ON Activate test mode 1	5E= Standard fuel tank 5R=Fuel tank with pass-through (non-U.S.)	Set fuel tank version to 5E by depressing reset button for trip odometer.
4.0	2	Fuel consumption indicator (A1p10)		Engine: at Idle Activate test mode 2 Increase engine rpm	With increasing rpm, the consumption in l/h increases. Note: The readout is only visible on the digital display. The analog reading shows 0.	⇒ 4.1
4.1	6 – 8	A1p10		Activate test modes 6 – 8	see Figures 2 – 9	A1, ⇒ 4.2


Electrical Test Program – Test (vehicles with ESP up to 05/96 or as of 09/95 and up to 05/96)

⇒	Mode	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
4.2	2	Fuel consumption signal from HFM-SFI control module (N3/4) or ME-SFI engine control module (N3/10 or N3/12) with HFM-SFI: with ME-SFI:	<p>N3/4</p> <p>18 (1) </p> <p>W16 </p> <p>N3/10 or N3/12</p> <p>56 (1) </p> <p>W16 </p> <p>N3/4 7 (1)</p> <p>N3/4 7 (1)</p> <p>N3/10 or N3/12 58 (1)</p> <p>N3/10 or N3/12 58 (1)</p>	<p>Ignition: OFF</p> <p>Disconnect N3/4 or N3/10 or N3/12 (Figures 11 to 14).</p> <p>Connect signal generator (Figure 15) and make connection for rpm signal as follows:</p> <p>HFM-SFI</p> <p>First bridge N3/4 pin socket 18 to pin socket 7, then connect signal generator (pin 7 and ground)</p> <p>ME-SFI</p> <p>First bridge N3/10 or N3/12 pin socket 56 to pin socket 58, then connect signal generator</p> <p>Set to a voltage amplitude of approx. 10 V.</p> <p>Ignition: ON</p> <p>Activate test mode 2.</p>	<p>HFM-SFI</p> <p>25 HZ ≈ 5 l/h 50 HZ ≈ 10 l/h 75 HZ ≈ 15 l/h 100 HZ ≈ 20 l/h</p> <p>Note:</p> <p>The readout is only visible on the digital display. The analog reading shows 0.</p>	<p>Wiring, A1, Values OK: N3/4 Engines, Volume 2 – 1.1 23</p> <p>N3/10 or N3/12 Engines, Volume 4 – 9.5 23 –9.6 23</p> <p>Note:</p> <p>If no plausible values are indicated while driving and the speedometer is in order: check instrument cluster (A1)</p>

1.10 Instrument Cluster (IC) (with Digital Odometer)

Model 140

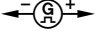
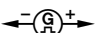
Electrical Test Program – Test (vehicles with ESP up to 05/96 or as of 09/95 and up to 05/96)

⇒	Mode	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
5.0	3	Engine oil pressure gauge (A1p3)		Engine: at Idle Activate test mode 3. Increase engine rpm	Analog reading ≈ digital readout. The oil pressure increases with increasing engine rpm.	A1, ⇒ 5.1
5.1	6 – 7	Oil pressure gauge (A1p3)		Activate test modes 6 – 7	see Figures 2 – 9	A1, ⇒ 5.2
5.2		Wires and connections and oil pressure sensor (B5)	1—  —2	Ignition: OFF Disconnect connector at B5. Connect resistance substitution unit. Engine: at Idle Resistance substitution unit setting: 13 Ω 40 Ω 90 Ω 150 Ω	Display in A1p3: ≈ 0 ≈ 1 ≈ 2 ≈ 3	Wiring, A1, Values OK: check oil pressure (see SMS Engine, Mechanical), B5

1.10 Instrument Cluster (IC) (with Digital Odometer)

Model 140

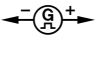
Electrical Test Program – Test (vehicles with ESP up to 05/96 or as of 09/95 and up to 05/96)

⇒	Mode	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
6.0	4	Tachometer (A1p5)		Engine: at Idle Activate test mode 4, increase engine rpm	Analog tachometer reading ≈ digital readout	A1, ⇒ 6.1
6.1		Tachometer (A1p5) with HFM-SFI: with ME-SFI:	<div> W16  N3/4 18 (1) </div> <div> W16  N3/10 or N3/12 56 (1) </div>	Disconnect plug on N3/4 (HFM-SFI) or N3/10 or N3/12 (ME-SFI) (Figures 11 to 14). Connect signal generator and set to a voltage amplitude of approx. 10 V (Figure 15). Ignition: ON	Engine 104, 120 Readout: 50 Hz ≈ 1000 rpm 194 Hz ≈ 4000 rpm Engine 119 Readout: 70 Hz ≈ 1000 rpm 270 Hz ≈ 4000 rpm	Wiring, A1, Values OK on HFM-SFI engine: N3/4 Values OK on ME-SFI engine: N3/10 or N3/12

1.10 Instrument Cluster (IC) (with Digital Odometer)

Model 140


Electrical Test Program – Test (vehicles with ESP up to 05/96 or as of 09/95 and up to 05/96)

⇒	Mode	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
7.0	5	Low engine oil level indicator lamp (A1e12)		Oil level correct. Engine: at Idle Activate test mode 5.	Readout in odometer: □.5 ≈ Oil level OK, indicaor: OFF ≈ Oil level not OK, indicaor: ON	Wiring, Oil level switch (S43)
8.0		Electronic speedometer (A1p8) Vehicles with ESP or vehicles with ASR or ETS as of 9/95: For left front axle VSS sensor (L6/1) output (feed signal to A1p8) from the Traction System control module (N47). See D.M., Chassis and Drivetrain, Vol. 3, 9.3 23 or Vol. 3, 10.1 23	W16  N47 1 (1)	Disconnect connector from N47 (Figure 11, or 12). Connect signal generator and set to a voltage amplitude of approx. 10 V Ignition: ON	With increasing frequency the speed on the speedometer increases.	Wiring, A1. Values OK: N47-1 or N47-2, D.M., Chassis and Drivetrain, Volume 3 – 9.3 23 N47-5 D.M., Chassis and Drivetrain, Volume 3 – 10.1 23

1.10 Instrument Cluster (IC) (with Digital Odometer)

Model 140


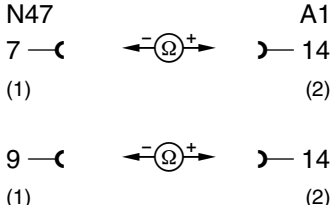
Electrical Test Program – Test (vehicles with ESP up to 05/96 or as of 09/95 and up to 05/96)

⇒	Mode	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
9.0		Outside temperature display (A1p4)	9—  —10	Disconnect 2-pole connector X24 (Figure 10). Connect resistance substitution unit. Ignition: ON Resistance substitution unit setting: 53 kΩ 9.8 kΩ 1 kΩ	Display in A1p4: ≈ − 30 °C ≈ 0 °C ≈ + 50 °C	Wiring, A1, ⇒ 9.1
9.1	6	Outside temperature indicator temperature sensor (B14)		Ignition: ON Activate test mode 6. 53 kΩ 9.8 kΩ 3.7 kΩ 1.6 kΩ	Readout in odometer: ≈ − 30 °C ≈ 0 °C ≈ 20 °C ≈ 40 °C	B14

1.10 Instrument Cluster (IC) (with Digital Odometer)

Model 140

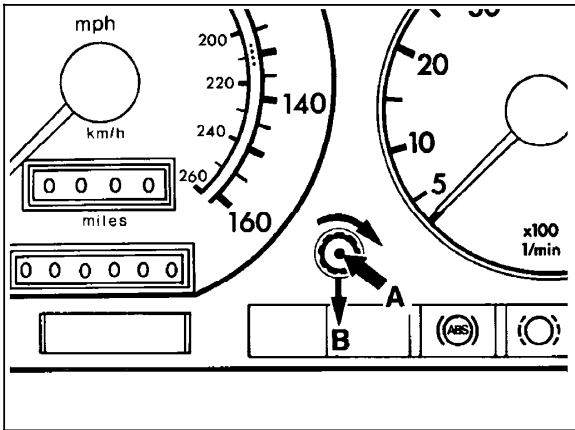
Electrical Test Program – Test (vehicles with ESP up to 05/96 or as of 09/95 and up to 05/96)

⇒	Mode	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
10.0		ECT gauge (A1p1)		Disconnect plug on ECT gauge sensor (B13). Connect resistance substitution unit. Ignition: ON Resistance substitution unit setting: 110 Ω 67 Ω 38 Ω 20 Ω	Display in A1p1: ≈ 60 °C ≈ 80 °C ≈ 100 °C ≈ 120 °C	Wiring, A1 Values OK: B13
11.0		Instrument cluster (A1) Data line from traction system control module (N47) ETS or ASR: ESP:		Remove A1 Disconnect connector 2	$\leq 5 \Omega$	Wiring, Values OK: N47, D.M., Chassis and Drivetrain, Vol. 3, 9.3 23 or D.M., Chassis and Drivetrain, Vol. 3, 10.1 23

1.10 Instrument Cluster (IC) (with Digital Odometer)

Model 140

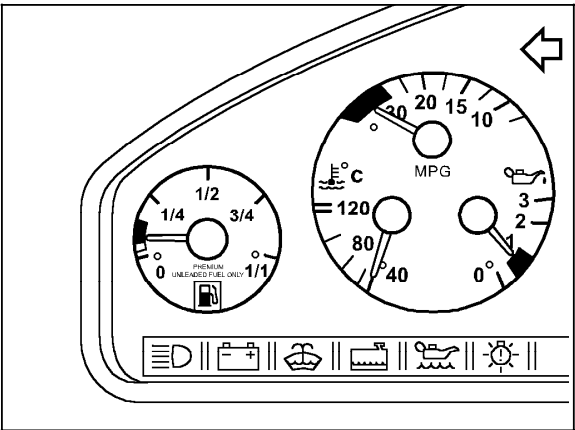
Electrical Test Program – Test (vehicles with ESP up to 05/96 or as of 09/95 and up to 05/96)



P54.30-0832-01

Figure 1

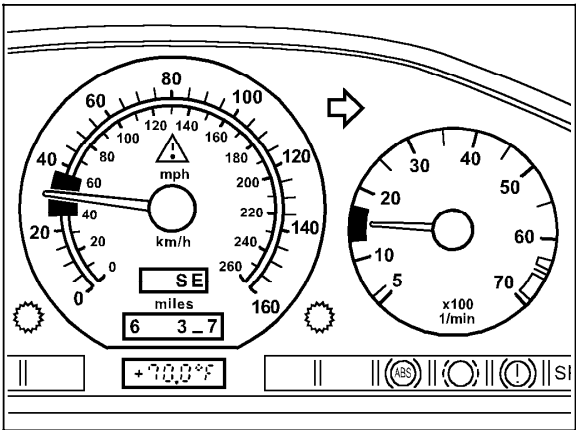
Activation of test mode



P54.30-0833-01

Figure 2

Activation of instruments
1st quarter: Fuel tank
Fuel consumption
Oil pressure



P54.30-0834-01

Figure 3

Activation of instruments
1st quarter: Speedometer, Tachometer

1.10 Instrument Cluster (IC) (with Digital Odometer)

Model 140

Electrical Test Program – Test (vehicles with ESP up to 05/96 or as of 09/95 and up to 05/96)

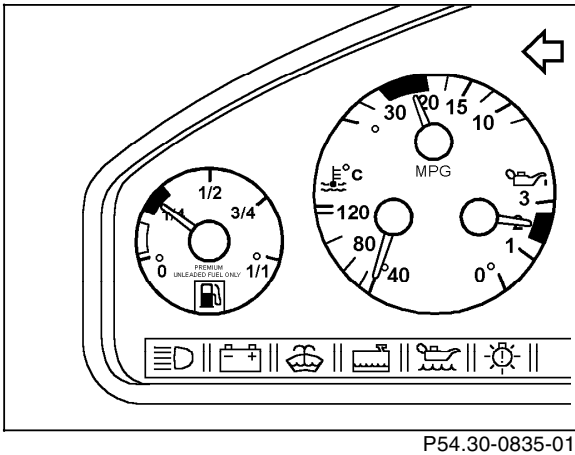


Figure 4

Activation of instruments

- 2nd quarter: Fuel tank
- Fuel consumption
- Oil pressure

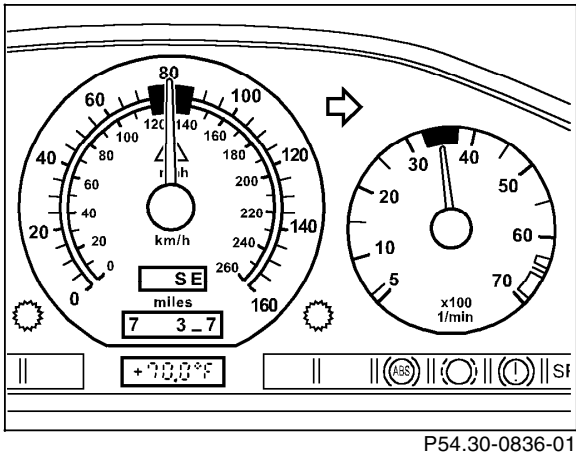


Figure 5

Activation of instruments

- 2nd quarter: Speedometer, Tachometer

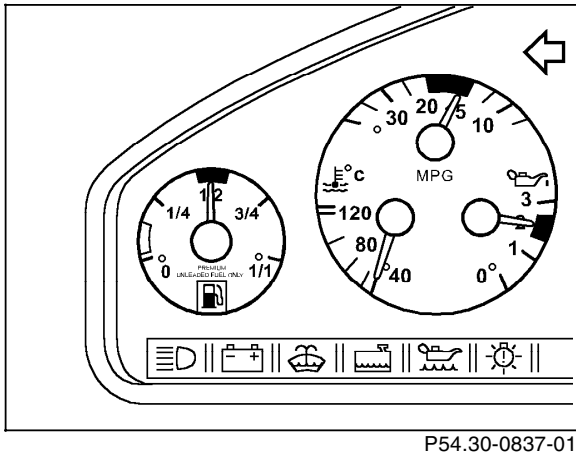


Figure 6

Activation of instruments

- 2nd quarter: Oil pressure
- 3rd quarter: Fuel tank
- Fuel consumption

1.10 Instrument Cluster (IC) (with Digital Odometer)

Model 140

Electrical Test Program – Test (vehicles with ESP up to 05/96 or as of 09/95 and up to 05/96)

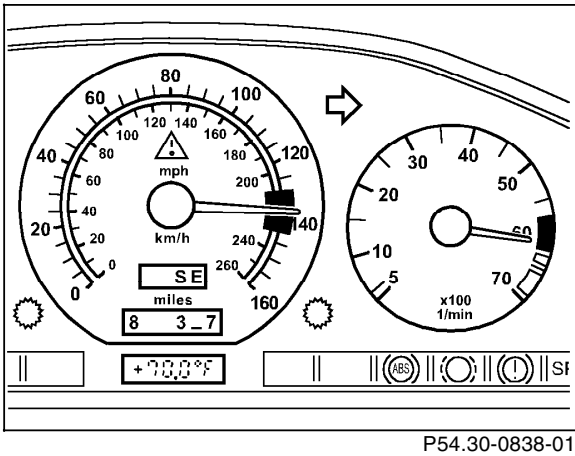


Figure 7

Activation of instruments

3rd quarter: Speedometer, Tachometer

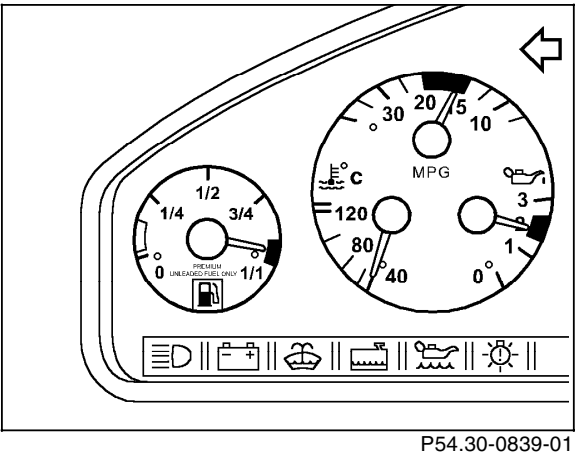


Figure 8

Activation of instruments

2nd quarter: Oil pressure
3rd quarter: Fuel consumption
4th quarter: Fuel tank

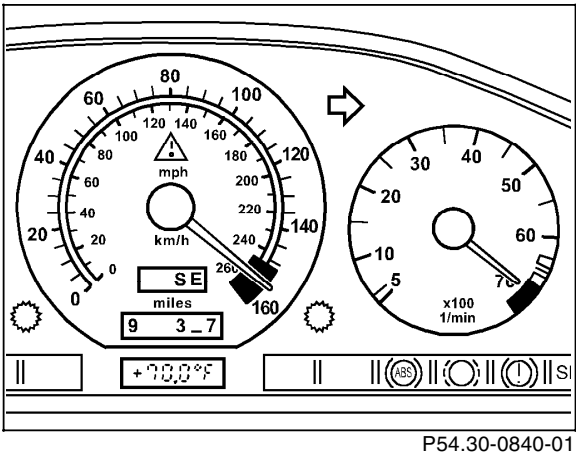


Figure 9

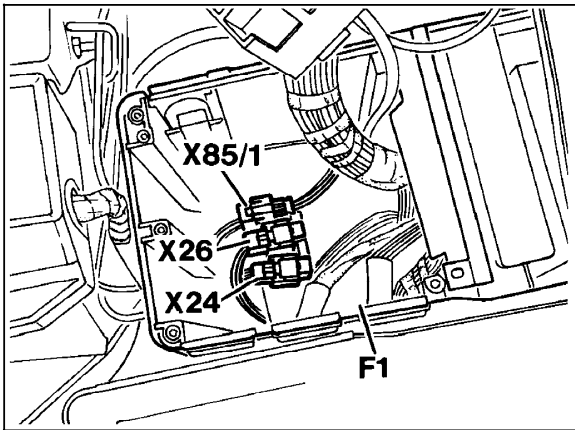
Activation of instruments

4th quarter: Speedometer, Tachometer

1.10 Instrument Cluster (IC) (with Digital Odometer)

Model 140

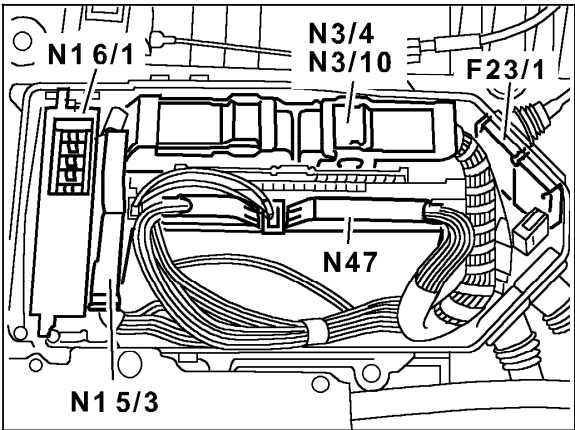
Electrical Test Program – Test (vehicles with ESP up to 05/96 or as of 09/95 and up to 05/96)



P54.30-0843-01

Figure 10

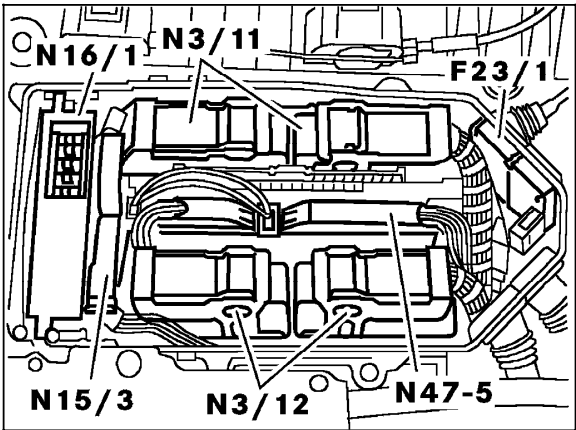
- F1 Fuse and relay box
- X24 Headlamp harness connector
- X26 Interior/engine connector
- X85/1 A/C harness/engine harness connector



P54.30-0310-01

Figure 11

- F23/1 Control module box
- N3/4 Engine control module (HFM-SFI)
- N3/10 Engine control module (ME-SFI)
- N15/3 Transmission control module
- N16/1 Base module (BM)
- N47 Traction systems control module



P54.30-0309-01

Figure 12

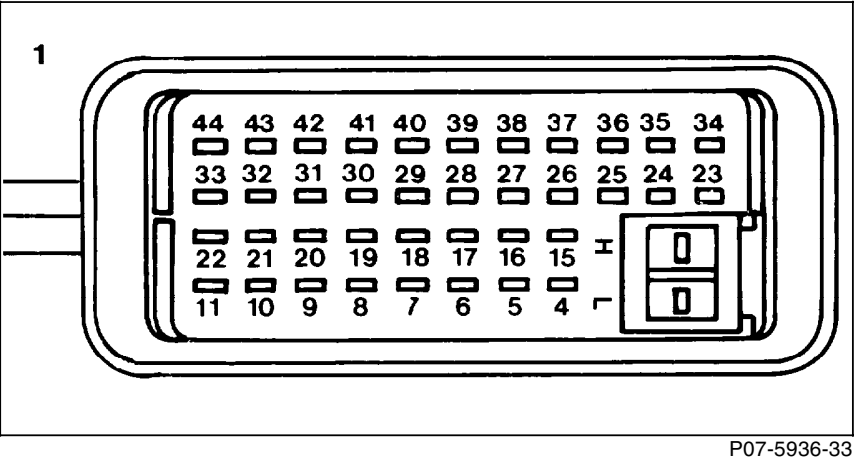
- F23/1 Control module box
- N3/11 Left engine control module (ME-SFI)
- N3/12 Right engine control module (ME-SFI)
- N15/3 Transmission control module
- N16/1 Base module (BM)
- N47-5 ESP/SPS control module

Electrical Test Program – Test (vehicles with ESP up to 05/96 or as of 09/95 and up to 05/96)

Figure 13

Engine control module (N3/4) (HFM-SFI)
connector “1”

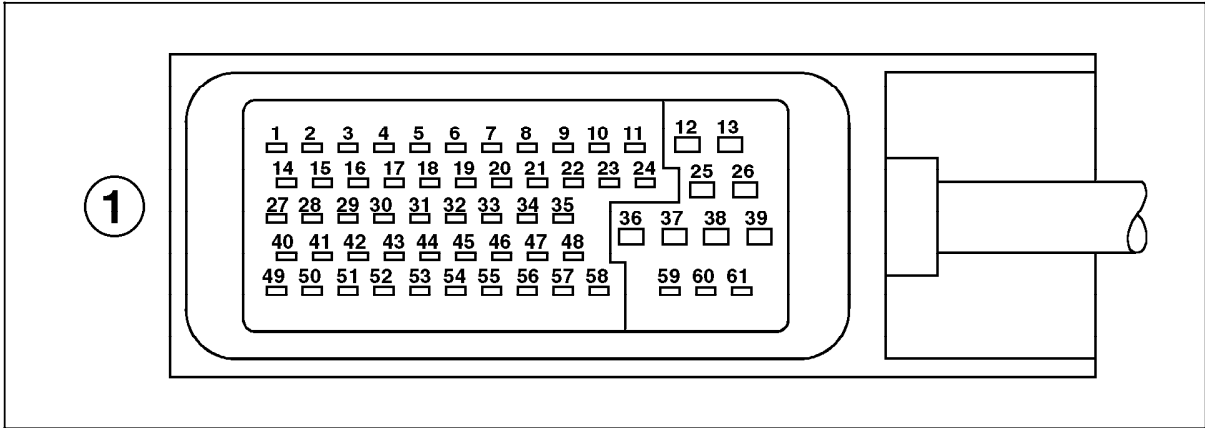
7	Fuel consumption signal
18	Engine rpm output signal (TN-signal)



Electrical Test Program – Test (vehicles with ESP up to 05/96 or as of 09/95 and up to 05/96)

Figure 14

Engine control module (N3/10 or N3/12) (ME-SFI)
connector “1”
56 Engine rpm output signal (TN-signal)
58 Fuel consumption signal



P07-6727-53

Electrical Test Program – Test (vehicles with ESP up to 05/96 or as of 09/95 and up to 05/96)

Connection Diagram – Signal Generator

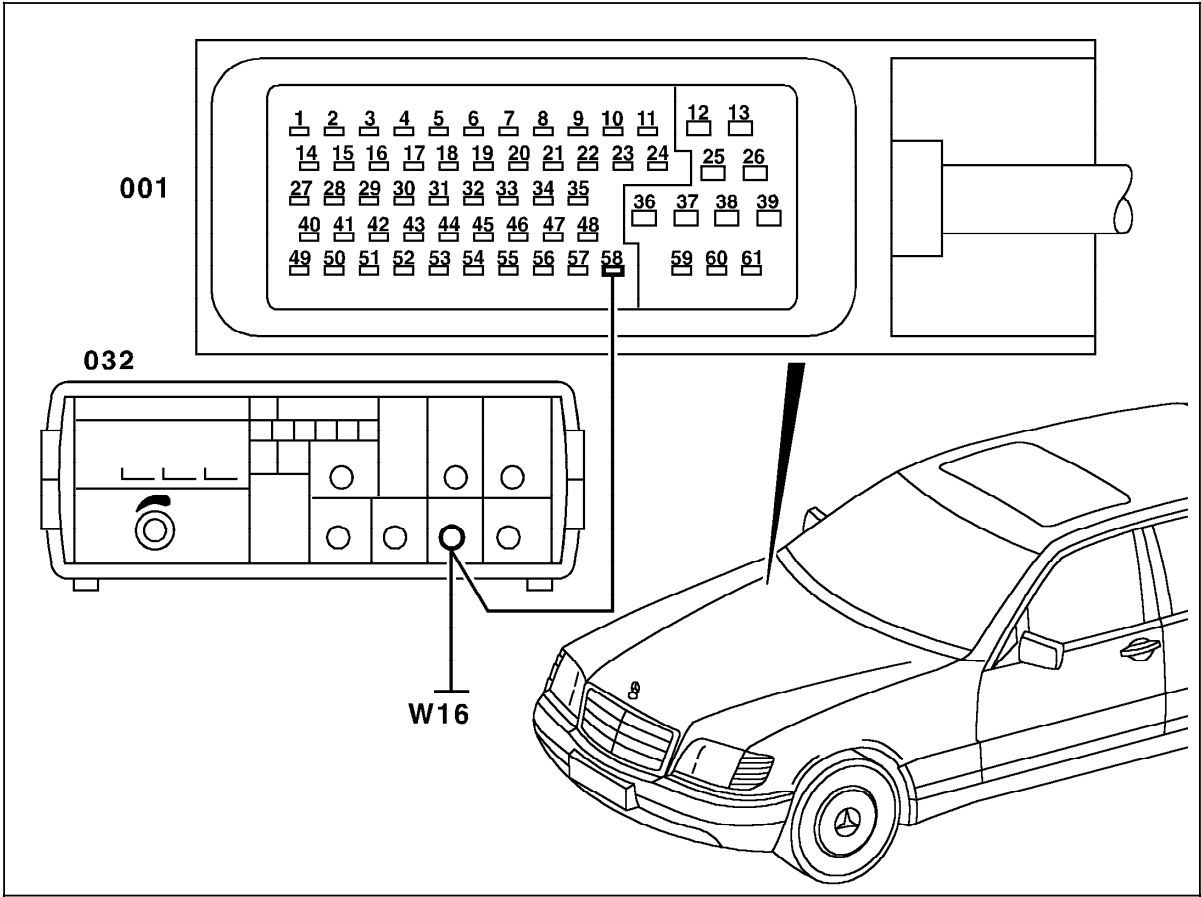


Figure 15

- 001 ME-SFI control module connector "1"
- 032 Signal generator
- W16 Ground (component compartment)

P54.30-0303-06