10.1 Models 129 (with engine 104, 119) up to M.Y. 1999, Model 129 (with engine 120), 140, 210 as of M.Y. 1996

Diagnosis – Function Test

Test step/Test scope	Test condition	Nominal value	Possible cause/Remedy [1]
⇒ 1.0 Brake torque control circuit	⚠ **Test cables are not to be hooked up to the HHT while performing function tests.** Lift rear of vehicle so that both rear wheels can be rotated freely. ⚠ **Secure vehicle !** Engine: **at Idle** Selector lever in transmission range “D”. Apply WOT using accelerator pedal. ⚠ **CAUTION!** Should ASR not come into effect: Release accelerator pedal to idle speed.	The rear wheels are noticeably braked; simultaneously the high-pressure/ return pump can audibly be heard operating. Engine speed is reduced to approx. 1000 rpm. The ESP warning lamp blinks.	23, DM, Engines, Vol. 4, section 9.
⇒ 2.0 ESP off function using ESP OFF switch (S76/6)	Engine: **at Idle** Selector lever in “N”. Press ESP OFF switch (S76/6). Selector lever in transmission range “D”. Slowly depress accelerator pedal.	The ESP warning lamp illuminates. Engine speed is not reduced. The rear wheels are not braked. The ESP warning lamp blinks.	23 ⇒ 25.0

[1] Observe Preparation for Test, see 22.

Diagnosis – Function Test

Preparation for DTC Readout

1. Connect Hand-Held Tester (HHT) to data link connector (X11/4) according to connection diagram (see section 0).
2. Ignition: **ON**
3. Read out DTC memory for the BAS,ETS, ME and ETC systems.

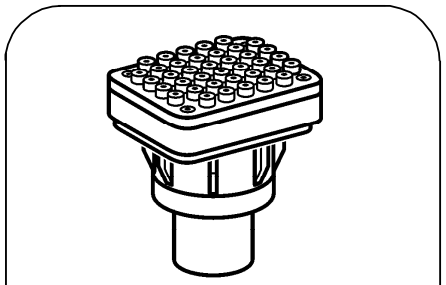
It is important to read out the DTC's from the BAS system **first,** since the DTC's from the other systems are stored in BAS during the diagnostic process.

⚠

DTC readout is not possible using an impulse counter scan tool.

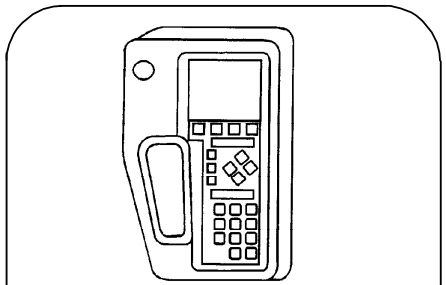
In case of complaint, and no fault is present in system, perform 23 in its entirety.

Special Tools



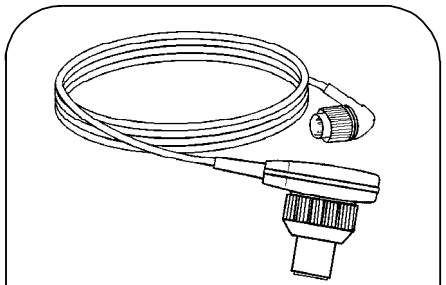
140 589 14 63 00

Adapter



965 589 00 01 00

Hand-Held-Tester



965 589 00 40 00

Test cable

Diagnosis – Diagnostic Trouble Code (DTC) Memory

DTC	Possible cause	Test step/Remedy [1]
C 1000	ESP/SPS control module (N47-5)	Replace control module.
C 1010	Battery voltage too low, circuit 87	23 ⇒ 1.0
C 1011	ASR/ETS/ESP hydraulic unit solenoid valve voltage supply, open/short circuit	23 ⇒ 2.0 23 ⇒ 22.0
C 1020	CAN communication faulty in general	23 ⇒ 30.0 Check version coding of ME control module, using HHT. Check version coding of ETC control module, using HHT.
C 1022	CAN communication with engine control module (ME-SFI, N30/10) or right engine control module (ME-SFI, N3/12), interrupted	23 ⇒ 30.0 Read out DTC (ME-SFI) memory, see DM, Engines, Vol. 4, section 9 12. Check version coding of ME control module, using HHT.
C 1023	CAN communication with left engine control module (ME-SFI, N3/11), interrupted	23 ⇒ 30.0 Read out DTC (ME-SFI) memory, see DM, Engines, Vol. 4, section 9 12. Check version coding of ME control module, using HHT.

[1] Observe Preparation for Test, see 22.

Diagnosis – Diagnostic Trouble Code (DTC) Memory

DTC	Possible cause	Test step/Remedy [1]
C 1024	CAN communication with transmission control module (N15/3), interrupted	Read out DTC (ETC [722.6]) memory , see DM, C&D, Vol. 1, section 2.3 12. Check version coding of ME control module, using HHT.
C 1100	Left front axle VSS sensor (L6/1), open circuit Left front axle VSS sensor (L6/1), loose contact Left front axle VSS sensor (L6/1), implausible [2]	23 ⇒ 13.0
C 1101	Right front axle VSS sensor (L6/2), open circuit Right front axle VSS sensor (L6/2), loose contact Right front axle VSS sensor (L6/2), implausible [2]	23 ⇒ 15.0
C 1102	Left rear axle VSS sensor (L6/3), open circuit Left rear axle VSS sensor (L6/3), loose contact Left rear axle VSS sensor (L6/3), implausible [2]	23 ⇒ 17.0
C 1103	Right rear axle VSS sensor (L6/4), open circuit Right rear axle VSS sensor (L6/4), loose contact Right rear axle VSS sensor (L6/4), implausible [2]	23 ⇒ 19.0
C 1120	ESP yaw sensor (N64) signal wire, open/short circuit ESP yaw sensor (N64) reference wire, open/short circuit	23 ⇒ 28.0
C 1140	Steering angle sensor (N49), open/short circuit Steering angle sensor (N49), initialization	23 ⇒ 29.0

1) Observe Preparation for Test, see 22.

2) Rotor with incorrect tooth count, dirt accumulation on or damage to rotor, incorrect rear axle ratio, wrong wheel or tire size.
If DTC appears only after repair work, it may be caused by applying the brakes or driving vehicle on a dynamometer, erase DTC.

Diagnosis – Diagnostic Trouble Code (DTC) Memory

DTC	Possible cause	Test step/Remedy [1]
C 1141	ESP brake pressure sensor (B34)	23 ⇒ 9.0 23 ⇒ 27.0
C 1142	ABS lateral acceleration sensor (B24/2), open/short circuit	23 ⇒ 26.0
C 1200	Stop lamp switch (4-pole) (S9/1), open/short circuit Stop lamp switch (4-pole) (S9/1), implausible	23 ⇒ 6.0
C 1300	Left front axle solenoid valve (hold) (A7/3y6), open/short circuit	23 ⇒ 23.0
C 1301	Left front axle solenoid valve (release) (A7/3y7), open/short circuit	23 ⇒ 23.0
C 1302	Right front axle solenoid valve (hold) (A7/3y8), open/short circuit	23 ⇒ 23.0
C 1303	Right front axle solenoid valve (release) (A7/3y9), open/short circuit	23 ⇒ 23.0
C 1304	Left rear axle solenoid valve (hold) (A7/3y10), open/short circuit	23 ⇒ 23.0
C 1305	Left rear axle solenoid valve (release) (A7/3y11), open/short circuit	23 ⇒ 23.0
C 1306	Right rear axle solenoid valve (hold) (A7/3y12), open/short circuit	23 ⇒ 23.0
C 1307	Right rear axle solenoid valve (release) (A7/3y13), open/short circuit	23 ⇒ 23.0
C 1308	Front axle precharge solenoid valve (A7/3y16), open/short circuit	23 ⇒ 24.0
C 1309	Rear axle precharge solenoid valve (A7/3y17), open/short circuit	23 ⇒ 24.0
C 1310	Front axle switchover valve (A7/3y18), open/short circuit	23 ⇒ 24.0

[1] Observe Preparation for Test, see 22.

Diagnosis – Diagnostic Trouble Code (DTC) Memory

DTC	Possible cause	Test step/Remedy [1]
C 1311	Rear axle switchover valve (A7/3y19), open/short circuit	23 ⇒ 24.0
C 1312	Master brake cylinder switchover valve (Y61)	23 ⇒ 8.0
C 1313	ASR/ETS/ESP hydraulic unit, solenoid valve relay (A7/3k1)	Replace control module (N47-5)
C 1400	ASR/ESP charging pump (M15), open/short circuit	23 ⇒ 9.0
C 1401	ASR/ETS/ESP hydraulic unit, high-pressure/return pump (A7/3m1), open/short circuit ASR/ETS/ESP hydraulic unit, high-pressure/return pump (A7/3m1), does not turn off	23 ⇒ 10.0 23 ⇒ 11.0
C 1500	VSS (L6/1, L6/2, L6/3, L6/4) implausible [2]	23 ⇒ 13.0, 15.0, 17.0, 19.0
C 1501	SPS P-valve (Y10)	23 ⇒ 12.0
C 1503	Pressure transfer piston unit	Check condition of rear brake pads, Pressure transfer piston unit.
C 1504	System has turned off	Steering angle sensor (N49) not initialized 23 ⇒ 29.0 Low voltage to ESP yaw rate sensor (N64) 23 ⇒ 28.0

1) Observe Preparation for Test, see 22.

2) Rotor with incorrect tooth count, dirt accumulation on or damage to rotor, incorrect rear axle ratio, wrong wheel or tire size.
If DTC appears only after repair work, it may be caused by applying the brakes or driving vehicle on a dynamometer, erase DTC.

Diagnosis – Complaint Related Diagnostic Chart

Complaint/Problem	Possible cause	Test step/Remedy [1]
ESP MIL (A1e42) or ABS MIL (A1e17) comes on with engine running		Check voltage supply and ground, Read DTC memory 12,
EPC MIL (A1e43) comes on with engine running	Fault in EA.	Read DTC memory 12, DM, Engines, Vol. 2, section 9
ESP MIL (A1e42) or ABS MIL (A1e17) comes on while driving and does not go out		Read DTC memory 12
ESP MIL (A1e42) or ABS MIL (A1e17) comes on while driving and then goes out	Vehicle system voltage < 11 V, too many electrical consumers in use, loose power or ground connection.	Check voltage supply and ground, Check generator (G2), Read DTC memory 12 Wiring
ESP MIL (A1e42) or ABS MIL (A1e17) does not come on with ignition turned on	Lamp, Wiring.	23 ⇒ 3.0
ABS MIL (A1e17) comes on with engine running after brake test or dynamometer use	Implausible wheel speed signal due to different rpm at front and rear axles.	Read, erase DTC memory 12

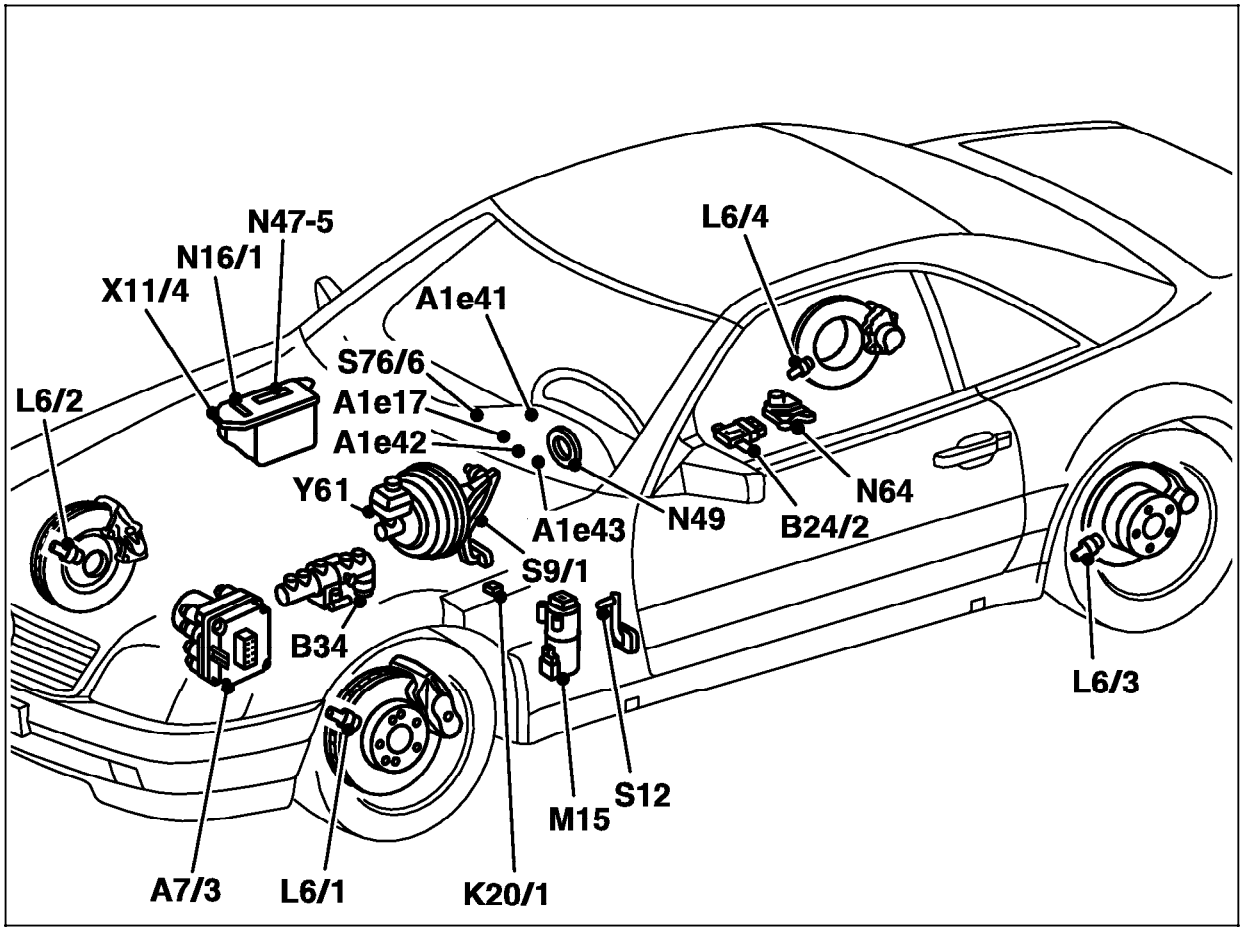
[1] Observe Preparation for Test, see 22.

Electrical Test Program – Component Locations

Model 129

Figure 1

A1e17	ABS MIL
A1e41	ESP warning lamp
A1e42	ESP MIL
A1e43	EPC MIL
A7/3	ASR/ETS/ESP hydraulic unit
B24/2	ABS lateral acceleration sensor
B34	ESP brake pressure sensor
K20/1	High-pressure/return pump relay
L6/1	Left front VSS sensor
L6/2	Right front VSS sensor
L6/3	Left rear VSS sensor
L6/4	Right rear VSS sensor
M15	ASR/ESP charging pump
N16/1	Base module
N47-5	ESP/SPS control module
N49	Steering angle sensor
N64	ESP yaw rate sensor
S9/1	Stop lamp switch
S12	Parking brake switch
S76/6	ESP Off switch
X11/4	Data link connector
Y61	Master brake clinder switchover valve



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Electrical Test Program – Component Locations

Model 140

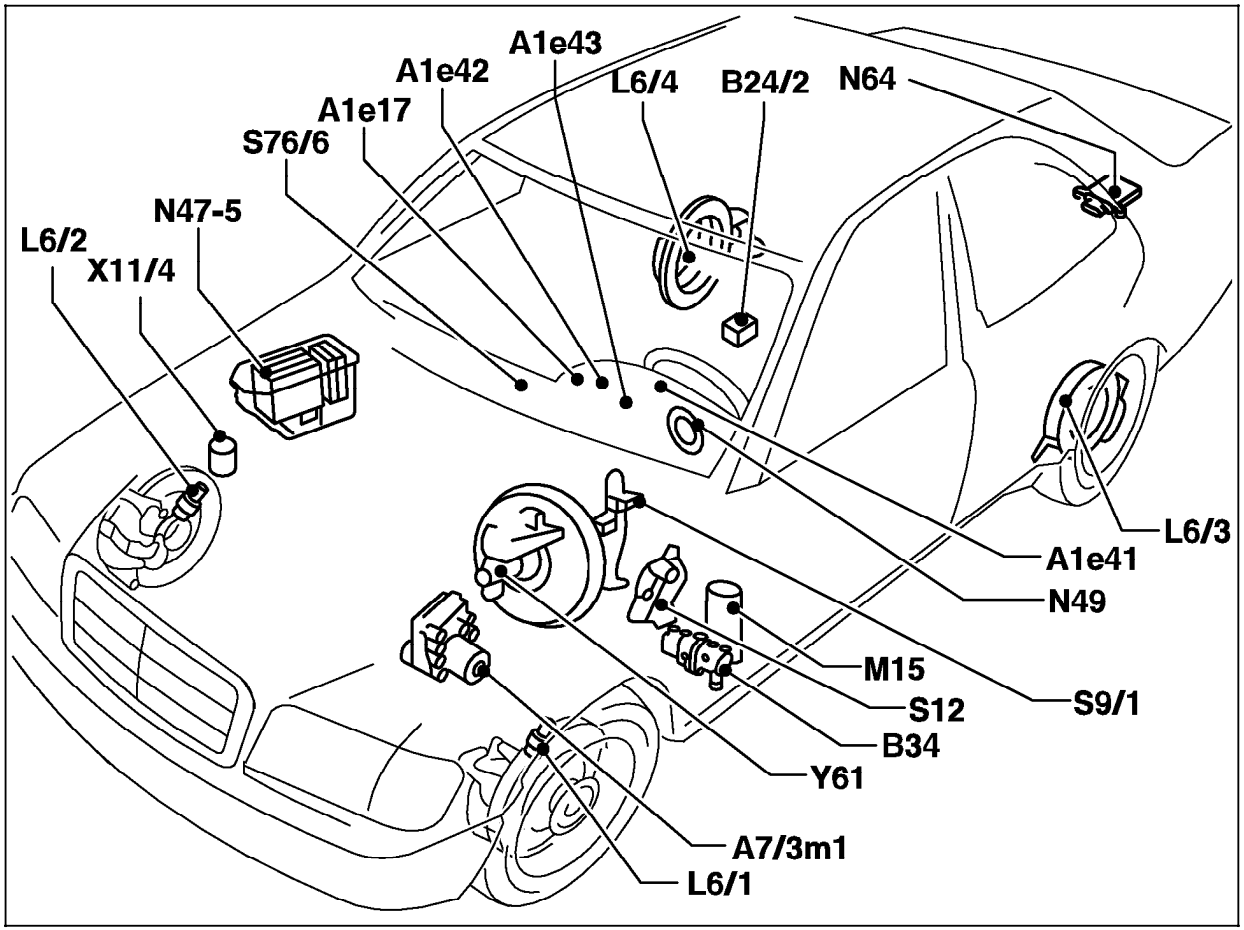

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Figure 2

A1e17	ABS MIL
A1e41	ESP warning lamp
A1e42	ESP MIL
A1e43	EPC MIL
A7/3	ASR/ETS/ESP hydraulic unit
B24/2	ABS lateral acceleration sensor
B34	ESP brake pressure sensor
K20/1	High-pressure/return pump relay
L6/1	Left front VSS sensor
L6/2	Right front VSS sensor
L6/3	Left rear VSS sensor
L6/4	Right rear VSS sensor
M15	ASR/ESP charging pump
N16/1	Base module
N47-5	ESP/SPS control module
N49	Steering angle sensor
N64	ESP yaw rate sensor
S9/1	Stop lamp switch
S12	Parking brake switch
S76/6	ESP Off switch
X11/4	Data link connector
Y61	Master brake clinder switchover valve

Electrical Test Program – Component Locations

Model 210

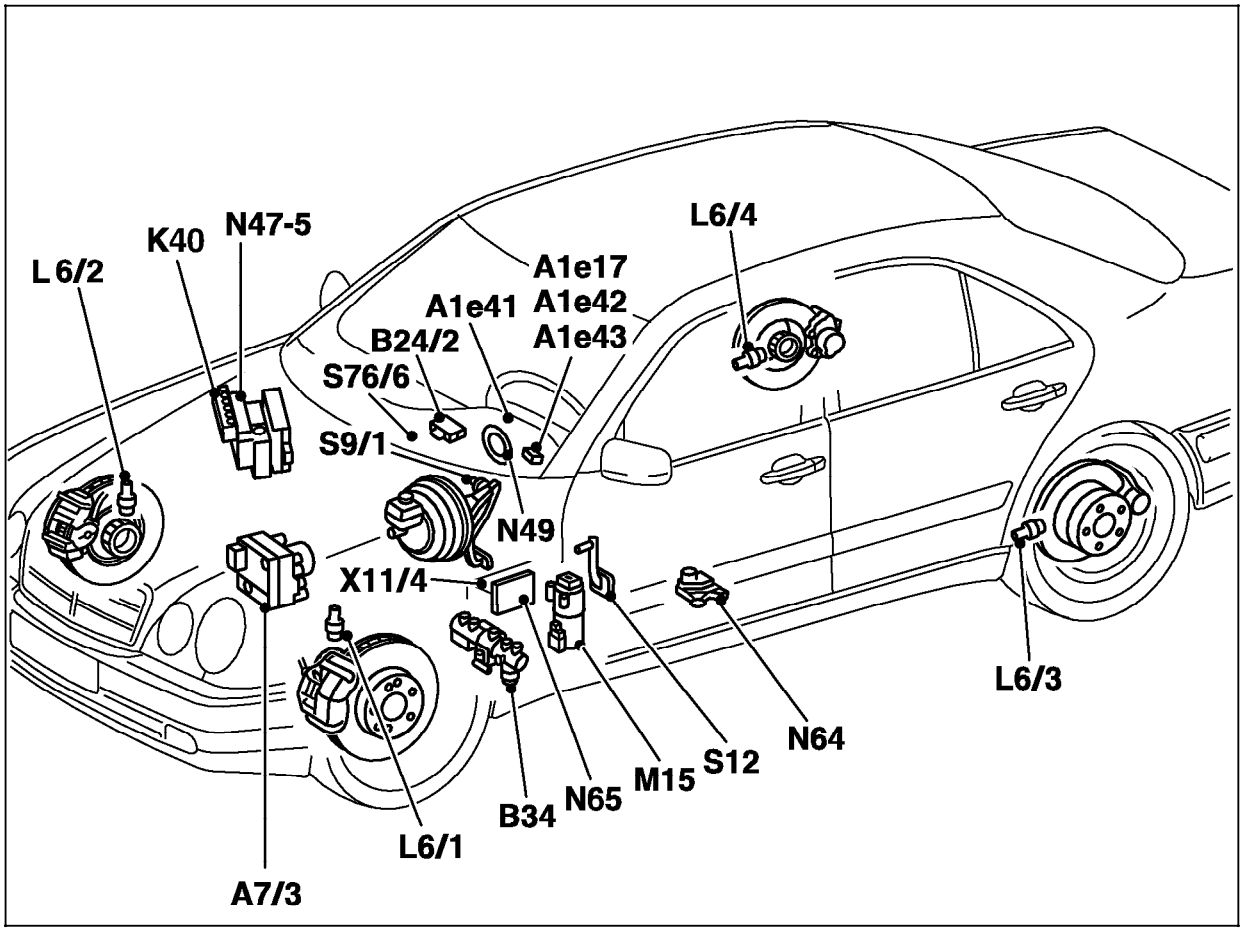

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Figure 3

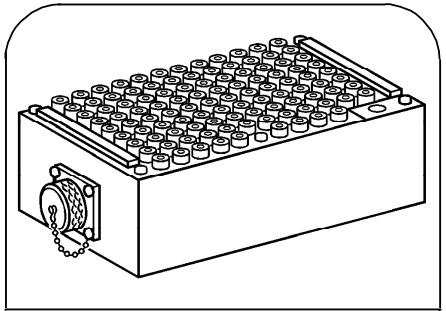
A1e17	ABS MIL
A1e41	ESP warning lamp
A1e42	ESP MIL
A1e43	EPC MIL
A7/3	ASR/ETS/ESP hydraulic unit
B24/2	ABS lateral acceleration sensor
B34	ESP brake pressure sensor
K40	Relay module (base function)
L6/1	Left front VSS sensor
L6/2	Right front VSS sensor
L6/3	Left rear VSS sensor
L6/4	Right rear VSS sensor
M15	ASR/ESP charging pump
N47-5	ESP/SPS control module
N49	Steering angle sensor
N64	ESP yaw rate sensor
N65	Pulse module (ETS/HCS/ATA,A/C)
S9/1	Stop lamp switch
S12	Parking brake switch
S76/6	ESP Off switch
X11/4	Data link connector

Electrical Test Program – Preparation for Test

1. Ignition: **OFF**
2. Disconnect ESP/SPS control module (N47-5).
3. Connect socket box with test cable as per connection diagram (Figure 1).

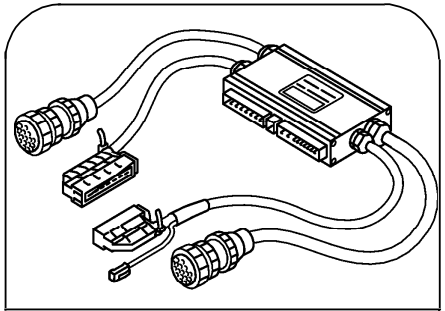
Electrical Wiring Diagrams:
(location of grounds and connectors)
Electrical Troubleshooting Manual, Model 129,
Electrical Troubleshooting Manual, Model 140,
Electrical Troubleshooting Manual, Model 210.

Special Tools



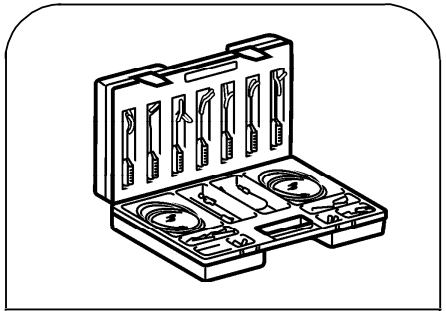
129 589 00 21 00

126-pin socket box



140 589 45 63 00

80-pin test cable



201 589 00 99 00

Electrical connecting set

Conventional tools, test equipment

Description	Brand, model, etc.
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

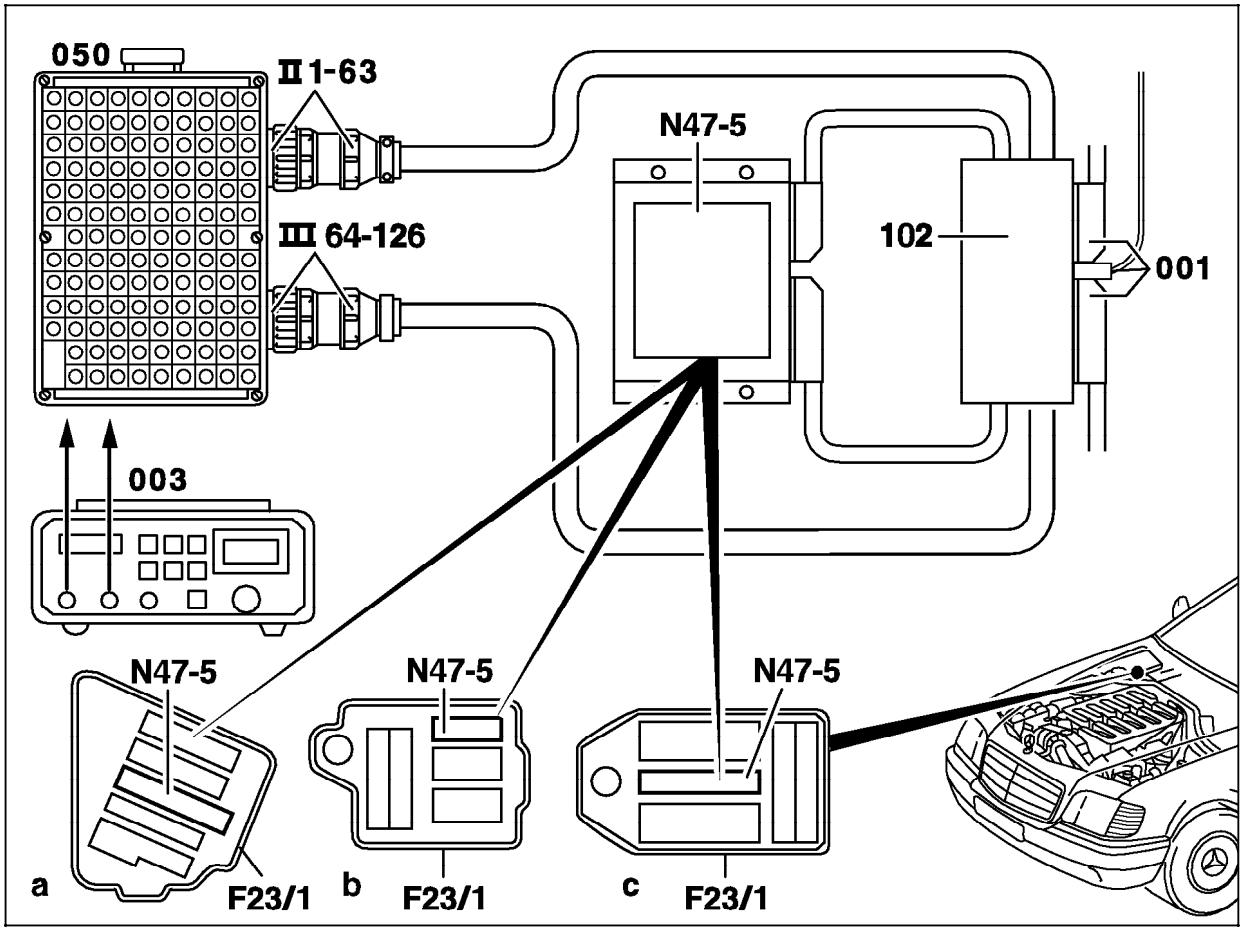


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Figure 1

001 ESP/SPS control module connector
003 Digital multimeter
050 Socket box, 126-pole
102 Test cable, 140 589 45 63 00
F23/1 Control module box
N47-5 ESP/SPS control module

a Model 210
b Model 129
c Model 140

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0	C 1010	**ESP/SPS control module (N47-5)** Circuit 87 Voltage supply	N47-5 57 (2.23) — V — 14 (1.14) 81 (2.47) — V — 14 (1.14)	Ignition: **ON**	11 – 14 V	⇒ 1.1, ⇒ 1.2
1.1		Voltage supply from: **Models 129, 140** Base module (N16/1) **Model 210** Relay module (K40)	N47-5 W15/1 — V — 14 (1.14)	Ignition: **ON**	11 – 14 V	Fuse (F3) on N16/1, DM, Chassis & Drivetrain, Vol. 1, sections 1.1 23, Wiring.
1.2		Ground wire **Model 129** **Model 140** **Model 210** **Model 129** **Model 140** **Model 210**	N47-5 W27 W15/1 — Ω — 57 (2.23) W16/3 W27 W15/1 — Ω — 81 (2.47) W16/3	Ignition: **OFF**	< 1 Ω	Wiring, **Model 129:** bracket ground (W27) (control module box/module box). **Model 140:** electronics- right footwell ground (W15/1). **Model 210:** output ground - left wheel housing ground (W16/3).

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
2.0		**ESP/SPS control module (N47-5)** Circuit 30 Voltage supply	N47-5 57 (2.23) — V — 58 (2.24) 57 (2.23) — V — 82 (2.48)	Ignition: **OFF**	11 – 14 V	Wiring.
3.0		**Instrument cluster data bus** (for vehicles without CAN connection to instrument cluster)	N47-5 57 (2.23) — V — 9 (1.9)	Ignition: **ON**	3 – 4 V A1e6, A1e7, A1e17, A1e41, A1e42: **ON**.	Wiring, N47-5.
4.0		**Diagnosis output**	N47-5 57 (2.23) — V — 13 (1.13)	Ignition: **ON**	10 – 14 V	Wiring, N47-5.
5.0		**Engine speed (rpm)**		Engine: **at Idle**	Engine speed	DM Engines Vol. 4, section 9

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
6.0	C 1200	**Stop lamp switch (S9/1)** N.O. contact N.C. contact		Brakes not applied. Brakes applied. Brakes not applied. Brakes applied.	OFF ON OFF ON	⇒ 6.1, Wiring, S9/1.
6.1		Circuit 15 Voltage supply		Brakes not applied. Brakes applied.	< 1V 11 – 14V	Wiring.
7.0		**Parking brake switch (S12)**		Engine: **at Idle** Apply parking brake. Release parking brake.	ON Parking brake indicator lamp (A1e7): **ON** OFF A1e7: **OFF**	Wiring, S12, A1e7.
8.0	C 1312	**Master brake cylinder switchover valve (Y61) (Models 129.067/076, 140 only)**		Press ON button. Press OFF button.	ON OFF Y61 audibly switches over.	⇒ 8.1, N47-5.

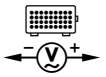
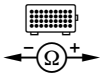
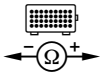
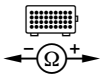
Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
8.1		Internal resistance	N47-5 44 (2.10) — Ω — 43 (2.9)	Ignition: **OFF** Disconnect control module (N47-5).	7 – 8 Ω	Wiring, Y61.
9.0	C 1400	**ASR/ESP charging pump (M15)**		Activate M15. Brake pressure sensor.	M15 audibly runs. 3 – 15 bar	Wiring, M15.
10.0	C 1401	**ASR/ETS/ESP hydraulic unit, high-pressure/return pump (A7/3m1)**		Activate A7/3m1.	A7/3m1 audibly runs.	Wiring, ⇒ 11.0
11.0	C 1401	**High-pressure/return pump relay (K20/1)** **Model 129, 140: K20/1** **Model 210: N65k4** Voltage supply	N47-5 57 (2.23) — V — 47 (2.13)	Ignition: **ON**	11 – 14 V	Wiring, ⇒ 7.1
11.1		Coil resistance	N47-5 46 (2.12) — Ω — 47 (2.13)	Ignition: **OFF** Disconnect control module (N47-5).	40 – 80 Ω	Wiring, **Models 129, 140:** K20/1 (relay box). **Model 210:** Pulse module (N65).

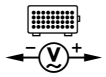
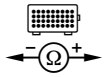
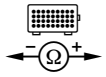
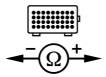
Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
12.0	C 1501	**SPS P-valve (Y10)** Voltage supply		Engine: **at Idle** Press MAX key Press MIN key	> 800mA steering is light < 400mA steering is heavy	⇒ 12.1, N47-5.
12.1		Coil resistance	N47-5 35 (2.1) — Ω — 36 (2.2)	Ignition: **OFF** Disconnect control module (N47-5).	3 – 8 Ω	Wiring, Y10.
13.0	C 1100 C 1500	**Left front axle VSS sensor (L6/1)**		Raise front of vehicle. Ignition: **ON** Rotate left front tire by hand (> 1 rev./sec.).	> 2 mph (3 km/h)	⇒ 13.1, ⇒ 13.2
13.1		Internal resistance	N47-5 77 (2.43) — Ω — 78 (2.44)	Ignition: **OFF** Disconnect control module (N47-5).	0.8 – 2.3 kΩ	Wiring, L6/1.
13.2		Insulation resistance	N47-5 57 (2.23) — Ω — 77 (2.43)	Ignition: **OFF** Disconnect control module (N47-5).	> 20 kΩ	Wiring, L6/1.

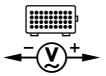
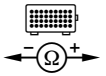
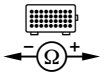
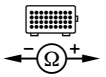
Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
14.0		**Left front axle VSS sensor (L6/1) output**	N47-5  57 (2.23) — 1 (1.1)	Raise front of vehicle. Ignition: **ON** Rotate left front tire by hand (> 1 rev./sec.).	> 3 V	Wiring, ⇒ 14.1, N47-5.
14.1		Load with control modules connected	N47-5  57 (2.23) — 1 (1.1)	Ignition: **OFF** Disconnect control module (N47-5).	> 5 kΩ	Wiring, Connected control modules (N3/12, etc.), ⇒ 13.0
15.0	C 1101 C 1500	**Right front axle VSS sensor (L6/2)**		Raise front of vehicle. Ignition: **ON** Rotate right front tire by hand (> 1 rev./sec.).	> 2 mph (3 km/h)	⇒ 15.1, ⇒ 15.2
15.1		Internal resistance	N47-5  52 (2.18) — 51 (2.17)	Ignition: **OFF** Disconnect control module (N47-5).	0.8 – 2.3 kΩ	Wiring, L6/2.
15.2		Insulation resistance	N47-5  57 (2.23) — 52 (2.18)	Ignition: **OFF** Disconnect control module (N47-5).	> 20 kΩ	Wiring, L6/2.

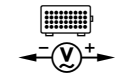
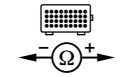
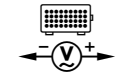
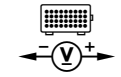
Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
16.0		**Right front axle VSS sensor (L6/2) output**	N47-5  57 (2.23) — 2 (1.2)	Raise front of vehicle. Ignition: **ON** Rotate right front tire by hand (> 1 rev./sec.).	> 3 V	Wiring, ⇒ 16.1, N47-5.
16.1		Load with control modules connected	N47-5  57 (2.23) — 2 (1.2)	Ignition: **OFF** Disconnect control module (N47-5).	> 5 kΩ	Wiring, Connected control modules, ⇒ 15.0
17.0	1102 1500	**Left rear axle VSS sensor (L6/3)**		Raise rear of vehicle. Ignition: **ON** Rotate left rear tire by hand (> 1 rev./sec.).	> 2 mph (3 km/h)	⇒ 17.1, ⇒ 17.2
17.1		Internal resistance	N47-5  26 (1.26) — 25 (1.25)	Ignition: **OFF** Disconnect control module (N47-5).	0.6 – 1.6 kΩ	Wiring, L6/3.
17.2		Insulation resistance	N47-5  57 (2.23) — 26 (1.26)	Ignition: **OFF** Disconnect control module (N47-5).	> 20 kΩ	Wiring.

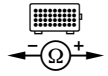
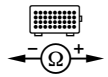
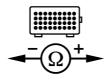
Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
18.0		**Left rear axle VSS sensor (L6/3) output**	N47-5  57 (2.23) — 3 (1.3)	Raise rear of vehicle. Ignition: **ON** Rotate left rear tire by hand (> 1 rev./sec.).	> 3 V	Wiring, ⇒ 18.1, N47-5.
18.1		Load with control modules connected	N47-5  57 (2.23) — 3 (1.3)	Ignition: **OFF** Disconnect control module (N47-5).	> 5 kΩ	Wiring, Connected control modules, ⇒ 17.0
19.0	[1103 [1500	**Right rear axle VSS sensor (L6/4)**		Raise rear of vehicle. Ignition: **ON** Rotate right rear tire by hand (> 1 rev./sec.).	> 2 mph (3 km/h)	⇒ 19.1, ⇒ 19.2
19.1		Internal resistance	N47-5  28 (1.28) — 27 (1.27)	Ignition: **OFF** Disconnect control module (N47-5).	0.6 – 1.6 kΩ	Wiring, L6/4.
19.2		Insulation resistance	N47-5  57 (2.23) — 28 (1.28)	Ignition: **OFF** Disconnect control module (N47-5).	> 20 kΩ	Wiring.

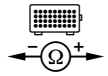
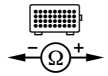
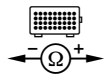
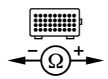
Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
20.0		**Right rear axle VSS sensor (L6/4) output**	N47-5  57 (2.23) — 4 (1.4)	Raise rear of vehicle. Ignition: **ON** Rotate right rear tire by hand (> 1 rev./sec.).	> 3 V	⇒ 20.1, N47-5.
20.1		Load with control modules connected	N47-5  57 (2.23) — 4 (1.4)	Ignition: **OFF** Disconnect control module (N47-5).	> 5 kΩ	Wiring, Connected control modules, ⇒ 19.0
21.0		**VSS sensor output status** Signal: Vehicle stationary	N47-5  57 (2.23) — 5 (1.5)	Ignition: **ON**	> 3 V	Wiring, N47-5.
22.0		**ASR/ETS/ESP hydraulic unit (A7/3)** Solenoid valve voltage supply	N47-5  57 (2.23) — 80 (2.46)	Ignition: **ON**	11 – 14 V	Wiring, N47-5.

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
23.0	C 1300 – C 1307	**ASR/ETS/ESP hydraulic unit (A7/3)** Solenoid valves (A7/3y6 – A7/3y13)		Raise vehicle. Activate all solenoid valves, one after the other. ON and apply brakes. OFF and apply brakes.	ON Wheels not braked. OFF Wheels braked.	Wiring, ⇒ 23.1 – 23.8
23.1	C 1300	ASR/ETS/ESP hydraulic unit, left front axle solenoid valve (hold) (A7/3y6) Internal resistance	N47-5  80 (2.46) — 73 (2.39)	Ignition: **OFF** Disconnect control module (N47-5).	5.4 – 12.6 Ω	Wiring, A7/3.
23.2	C 1301	ASR/ETS/ESP hydraulic unit, left front axle solenoid valve (release) (A7/3y7) Internal resistance	N47-5  80 (2.46) — 72 (2.38)	Ignition: **OFF** Disconnect control module (N47-5).	2.8 – 6.6 Ω	Wiring, A7/3.
23.3	C 1302	ASR/ETS/ESP hydraulic unit, right front axle solenoid valve (hold) (A7/3y8) Internal resistance	N47-5  80 (2.46) — 74 (2.40)	Ignition: **OFF** Disconnect control module (N47-5).	5.4 – 12.6 Ω	Wiring, A7/3.

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
23.4	C 1303	ASR/ETS/ESP hydraulic unit, right front axle solenoid valve (release) (A7/3y9) Internal resistance	N47-5  80 (2.46) — 71 (2.37)	Ignition: **OFF** Disconnect control module (N47-5).	2.8 – 6.6 Ω	Wiring, A7/3.
23.5	C 1304	ASR/ETS/ESP hydraulic unit, left rear axle solenoid valve (hold) (A7/3y10) Internal resistance	N47-5  80 (2.46) — 69 (2.35)	Ignition: **OFF** Disconnect control module (N47-5).	5.4 – 12.6 Ω	Wiring, A7/3.
23.6	C 1305	ASR/ETS/ESP hydraulic unit, left rear axle solenoid valve (release) (A7/3y11) Internal resistance	N47-5  80 (2.46) — 70 (2.36)	Ignition: **OFF** Disconnect control module (N47-5).	2.8 – 6.6 Ω	Wiring, A7/3.
23.7	C 1306	ASR/ETS/ESP hydraulic unit, right rear axle solenoid valve (hold) (A7/3y12) Internal resistance	N47-5  80 (2.46) — 64 (2.30)	Ignition: **OFF** Disconnect control module (N47-5).	5.4 – 12.6 Ω	Wiring, A7/3.

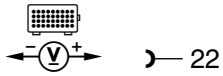
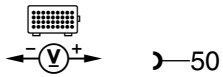
Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
23.8	C 1307	ASR/ETS/ESP hydraulic unit, right rear axle solenoid valve (release) (A7/3y13) Internal resistance	N47-5 80 (2.46) — Ω — 65 (2.31)	Ignition: **OFF** Disconnect control module (N47-5).	2.8 – 6.6 Ω	Wiring, A7/3.
24.0	C 1308 C 1311	**ASR/ETS/ESP hydraulic unit(A7/3)** Solenoid valves (A7/3y16 – A7/3y19)		Raise vehicle. Activate all solenoid valves, one after the other. ON and apply service brake. OFF and apply service brake.	ON Wheel not braked. OFF Wheel braked.	Wiring, ⇒ 24.1 – 24.4
24.1	C 1308	ASR/ETS/ESP hydraulic unit, front axle precharge solenoid valve (A7/3y16) Internal resistance	N47-5 80 (2.46) — Ω — 61 (2.27)	Ignition: **OFF** Disconnect control module (N47-5).	2.8 – 6.6 Ω	Wiring, A7/3.
24.2	C 1309	ASR/ETS/ESP hydraulic unit, rear axle precharge solenoid valve (A7/3y17) Internal resistance	N47-5 80 (2.46) — Ω — 63 (2.29)	Ignition: **OFF** Disconnect control module (N47-5).	2.8 – 6.6 Ω	Wiring, A7/3.

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
24.3	C 1310	ASR/ETS/ESP hydraulic unit, front axle switchover valve (A7/3y18) Internal resistance	N47-5 80 (2.46) — Ω — 60 (2.26)	Ignition: **OFF** Disconnect control module (N47-5).	5.4 – 12.6 Ω	Wiring, A7/3.
24.4	C 1311	ASR/ETS/ESP hydraulic unit, rear axle switchover valve (A7/3y19) Internal resistance	N47-5 80 (2.46) — Ω — 62 (2.28)	Ignition: **OFF** Disconnect control module (N47-5).	5.4 – 12.6 Ω	Wiring, A7/3.
25.0		**ESP Off switch (S76/6)**		Press and hold switch S76/6: **ON** Release switch Press and hold switch S76/6: **OFF**	1 – 2 V 3.5 – 6 V < 1 V	Wiring, S76/6, N47-5.
26.0	C 1142	**ABS lateral accelration sensor (B24/2)** Static sensor signal (off) Dynamic sensor signal (on)		Vigorously rock vehicle from side to side.	0±1 m/s² > 1 m/s² Value changes with movement of vehicle.	Wiring, B24/2, ⇒ 26.1

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
26.1	C 1142	Voltage suppply to sensor	N47-5  24 (1.24) — 22 (1.22)	Ignition: **ON**	4.75–5.25 V	N47-5.
27.0	C 1141	**ESP brake pressure sensor (B34)** Dynamic sensor signal (on)		Apply service brake.	– 17.5 bar – +17.5 bar Value increase when service brake is applied.	⇒ 27.1, B34.
27.1		Voltage supply	N47-5  48 (2.14) — 50 (2.16)	Ignition: **ON**	4.75–5.25 V	N47-5.
28.0	C 1120	**ESP yaw rate sensor (N64)** Static sensor signal (off) Dynamic sensor signal (on)		Vigorously rock vehicle from side to side.	– 3.5 °/s – +3.5 °/s Value change > 0.5 °/s	⇒ 28.1, Wiring, N64.

Electrical Test Program – Test

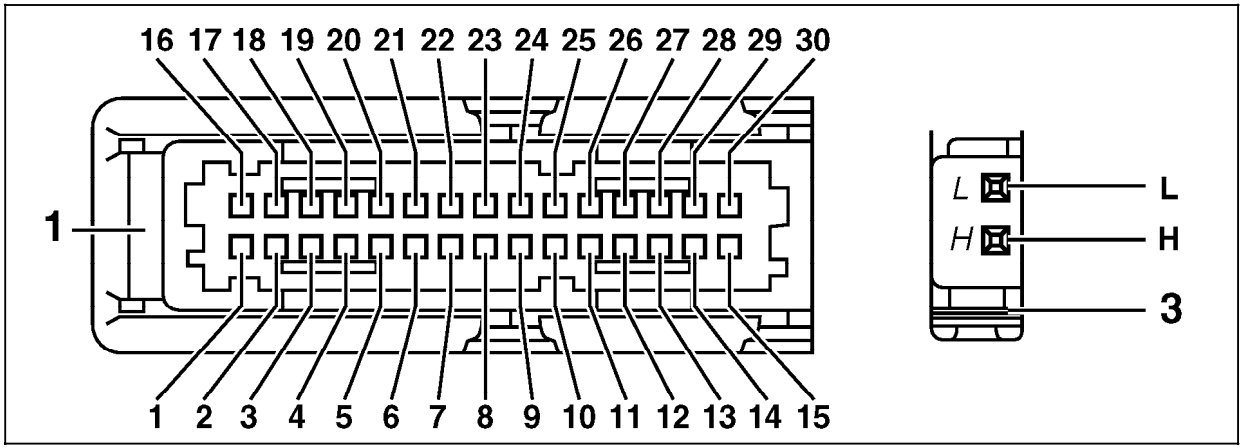
⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
28.1		Voltage suppply	N47-5 17 (1.17) — V — 18 (1.18)	Ignition: **ON**	11 – 14 V	N47-5.
29.0	C 1140	**Steering angle sensor (N49)**		Engine: **at Idle** Steering wheel in center position. Slowly turn steering wheel to left stop. Slowly turn steering wheel to right stop.	0° Value continuously changes.	Wiring, N49 not initialized, ⇒ 29.1, N47-5.
29.1		Circuit 30 Voltage supply	N49x1 2 — V — 4	Ignition: **OFF** Disconnect connector N49x1.	11 – 14 V	Wiring.
29.2		Circuit 87 Voltage supply	N49x1 2 — V — 3	Ignition: **ON**	11 – 14 V	Wiring.

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
30.0	[1020 [1022	**CAN data bus**		Engine: **at Idle**	Idle speed	Data bus, ⇒ 30.1, ⇒ 30.2
30.1		Engine 119 CAN element in engine control module (ME-SFI, N3/10) Resistance	N3/10 60 — Ω — 61	Disconnect control module (N3/10) and test directly on control module using an ohmmeter.	235 – 245 Ω	N3/10, DM, Engines, Vol. 4, sections 9.5 or 9.6 23.
		Engine 120 CAN element in left or right engine control module (ME-SFI, N3/11 or N3/12) Resistance	N3/11 or N3/12 60 — Ω — 61	Disconnect control module (N3/11 or N3/12) and test directly on control module using an ohmmeter.	235 – 245 Ω	N3/11 or N3/12, DM, Engines, Vol. 4, sections 9.5 or 9.6 23.
30.2		CAN element in RCL control module (N54) Resistance	N54 L — Ω — H	Disconnect 2-pole connector on control module (N54) and test directly on control module using an ohmmeter.	115 – 125 Ω	N54.

Electrical Test Program – Test

Connector Layout - Connector 1 (interior harness) and connector 3 (CAN data bus) ESP/SPS control module (N47-5)



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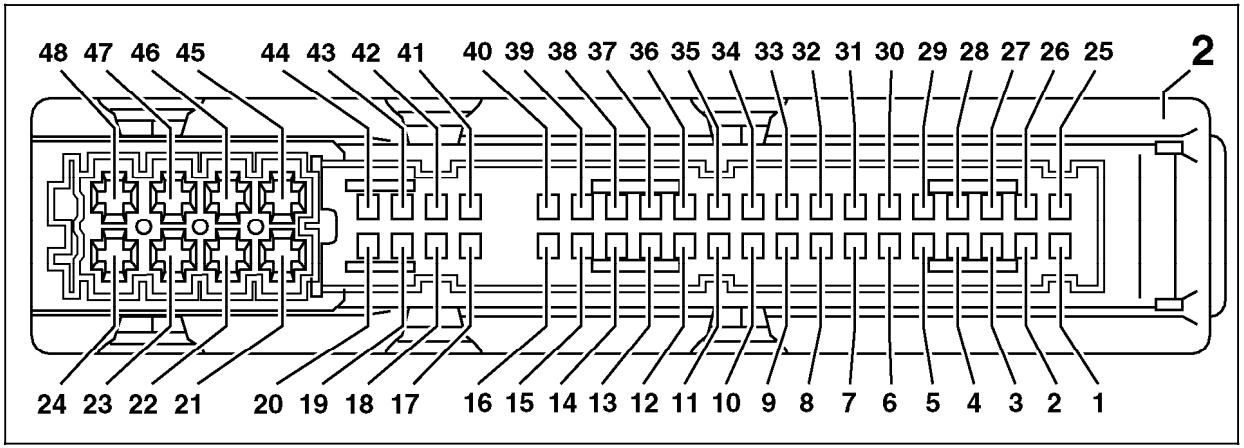
1	Left front axle VSS sensor (L6/1)	11	Stop lamp switch (S9/1) N.C. contact	21	ESP yaw rate sensor (N64) test
2	Right front axle VSS sensor (L6/2)	12	Circuit 61 voltage	22	ABS lateral acceleration sensor (B24/2) (+)
3	Left rear axle VSS sensor (L6/3)	13	Diagnosis output	23	ABS lateral acceleration sensor (B24/2) signal
4	Right rear axle VSS sensor (L6/4)	14	Circuit 87 ABS voltage supply	24	ABS lateral acceleration sensor (B24/2) (–)
5	VSS sensor output status	15	Stop lamp switch (S9/1) N.O. contact	25	Left rear axle VSS sensor (L6/3) (+)
6	not used	16	Steering angle sensor (N49)	26	Left rear axle VSS sensor (L6/3) (–)
7	ESP OFF switch (S76/6)	17	ESP yaw rate sensor (N64) (–)	27	Right rear axle VSS sensor (L6/4) (+)
8	Parking brake switch (S12)	18	ESP yaw rate sensor (N64) (+)	28	Right rear axle VSS sensor (L6/4) (–)
9	Instrument cluster data bus (for vehicles without CAN connection to intrument cluster)	19	ESP yaw rate sensor (N64) signal	29-30	Right rear brake pad wear sensor (S10/4)
		20	ESP yaw rate sensor (N64) reference	H	CAN data bus (+)
10	not used			L	CAN data bus (–)

Electrical Test Program – Test

Connector Layout - Connector 2
(engine harness)
ESP/SPS control module (N47-5)



P42.45-0226-53

1	Model 140 with SPS P-valve (Y10) (–)
2	Model 140 with SPS P-valve (Y10) (+)
3-8	not used
9	Master brake cylinder switchover valve (Y61) (+) (models 129.067/076, 140)
10	Master brake cylinder switchover valve (Y61) (–) (models 129.067/076, 140)
11	Model 140, 129 (K20/1), model 210 (N65k4): high pressure/retun pump relay module
12	Model 140, 129 (K20/1), model 210 (N65k4): high pressure/retun pump relay module (–)
13	Model 140, 129 (K20/1), model 210 (N65k4): high pressure/retun pump relay module (+)
14	ESP brake pressure sensor (B34) (–)
15	ESP brake pressure sensor (B34) signal
16	ESP brake pressure sensor (B34) (+)
17	Right front axle VSS sensor (L6/2) (+)
18	Right front axle VSS sensor (L6/2) (–)
19-20	Right front brake pad wear sensor (S10/2)
21	not used
22	ASR/ESP charging pump (M15) (+)
23	Ground (model 129: W27, model 140: W16/1, model 210: W16/3)
24	Circuit 30 voltage
25	not used
26	ASR/ETS/ESP hydraulic unit, rear axle switchover valve (A7/3y18) (–)
27	ASR/ETS/ESP hydraulic unit, rear axle switchover valve (A7/3y18) precharge
28	ASR/ETS/ESP hydraulic unit, switchover/solenoid valve (A7/3y5) (–)
29	ASR/ETS/ESP hydraulic unit, switchover/solenoid valve (A7/3y5) precharge
30	ASR/ETS/ESP hydraulic unit, right rear axle solenoid valve (hold) (A7/3y12) (–)
31	ASR/ETS/ESP hydraulic unit, right rear axle solenoid valve (release) (A7/3y13) (–)
32-34	not used
35	ASR/ETS/ESP hydraulic unit, left rear axle solenoid valve (hold) (A7/3y10) (–)
36	ASR/ETS/ESP hydraulic unit, left rear axle solenoid valve (release) (A7/3y11) (–)
37	ASR/ETS/ESP hydraulic unit, right front axle solenoid valve (release) (A73/y9) (–)
38	ASR/ETS/ESP hydraulic unit, left front axle solenoid valve (release) (A73/y7) (–)
39	ASR/ETS/ESP hydraulic unit, left front axle solenoid valve (hold) (A7/3y6) (–)
40	ASR/ETS/ESP hydraulic unit, right front axle solenoid valve (hold) (A7/3y8) (–)
41-42	Right front brake pad wear sensor (S10/2)
43	Left front axle VSS sensor (L6/1) (–)
44	Left front axle VSS sensor (L6/1) (+)
45	ASR/ESP charging pump (M15) (–)
46	Solenoid valve voltage supply
47	Ground (model 129: W27, model 140: W16/1, model 210: W16/3)
48	Circuit 30 voltage