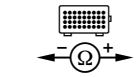
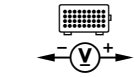
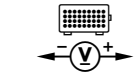
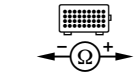
9.4 Traction Systems (ETS) (4MATIC) and SPS

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0	C 1010 C 1012	**ETS/SPS control module (N47-2)** Circuit 87 Voltage supply	N47-2 57 (2.23) — V — 10 (1.10) 81 (2.47) — V — 10 (1.10)	Ignition: **ON**	11 – 14 V	⇒ 1.1, ⇒ 1.2
1.1		Voltage supply from: Passenger-side fuse and relay module box (K40/4)	N47-2 ⊥ — V — 10 (1.10)	Ignition: **ON**	11 – 14 V	Fuse (F2) on K40/4, Wiring.
1.2		Ground wire	N47-2 W15/1 — Ω — 57 (2.23) W15/1 — Ω — 81 (2.47)	Ignition: **OFF** Disconnect ETS/SPS control module (N47-2).	< 1 Ω	Wiring, Ground (output ground - component compartment - left) (W16/3).
2.0	C 1011 C 1314	**ETS/SPS control module (N47-2)** Circuit 30 Voltage supply	N47-2 57 (2.23) — V — 82 (2.48)	Ignition: **OFF**	11 – 14 V	Wiring.

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
3.0	C 1020	**CAN databus**	N47-2  34 (3.L) — 33 (3.H)	Ignition: **ON**	55 – 65 Ω	Wiring, End resistors in ME and RCL control modules, see D.M., Engines, Body and Accessories.
4.0		**Diagnostic output**	N47-2  57 (2.23) — 9 (1.9)	Ignition: **ON**	10 – 14 V	Wiring, ETS/SPS control module (N47-2).
5.0	C 1401	**High pressure/return pump relay module (K40/2k4)** Voltage supply	N47-2  57 (2.23) — 61 (2.27)	Ignition: **ON**	11 – 14 V	Wiring, ⇒ 5.1
5.1		Coil resistance	N47-2  60 (2.26) — 61 (2.27)	Ignition: **OFF** Disconnect ETS/SPS control module (N47-2).	40 – 80 Ω	Wiring, High pressure/return pump relay module (K40/2k4).

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
6.0	C 1501 C 1514	**SPS P-valve (Y10)** Coil resistance	N47-2 35 (2.1) — Ω — 36 (2.2)	Ignition: **OFF** Disconnect ETS/SPS control module (N47-2).	3 - 8 Ω	Wiring, SPS P-valve (Y10).
7.0	C 1100	**Left front axle VSS sensor (L6/1)** Internal resistance	N47-2 77 (2.43) — Ω — 78 (2.44)	Ignition: **OFF** Disconnect ETS/SPS control module (N47-2).	0.8 - 2.3 kΩ	⇒7.1, Wiring, L6/1
7.1		Insulation resistance	N47-2 57 (2.23) — Ω — 77 (2.43)	Ignition: **OFF** Disconnect ETS/SPS control module (N47-2).	>20 kΩ	Wiring, L6/1
8.0		**Left front axle VSS sensor (L6/1)** Output	N47-2 57 (2.23) — V — 1 (1.1)	Raise front of vehicle Ignition: **ON** Rotate left front tire by hand (> 1 rev./sec.)	>3 V~	Wiring, ⇒8.1, ETS/SPS control module (N47-2)
8.1		Load with control modules connected	N47-2 57 (2.23) — Ω — 1 (1.1)	Ignition: **OFF** Disconnect ETS/SPS control module (N47-2).	> 5 kΩ	Wiring, Connected control modules, ⇒ 7.0

9.4 Traction Systems (ETS) (4MATIC) and SPS

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
9.0	C 1101	**Right front axle VSS sensor (L6/2)** Internal resistance	N47-2 52 (2.18) — Ω — 51 (2.17)	Ignition: **OFF** Disconnect ETS/SPS control module (N47-2).	0.8 – 2.3 kΩ	⇒ 9.1, Wiring, L6/2
9.1		Insulation resistance	N47-2 57 (2.23) — Ω — 52 (2.18)	Ignition: **OFF** Disconnect ETS/SPS control module (N47-2).	> 20 kΩ	Wiring, L6/2
10.0		**Right front axle VSS sensor (L6/2)** Output	N47-2 57 (2.23) — V~ — 2 (1.2)	Raise front of vehicle Ignition: **ON** Rotate right front tire by hand (> 1 rev./sec.)	> 3 V ~	Wiring, ⇒ 10.1, ETS/SPS control module (N47-2).
10.1		Load with control modules connected	N47-2 57 (2.23) — Ω — 2 (1.2)	Ignition: **OFF** Disconnect control module (N47).	> 5 kΩ	Wiring, Connected control modules, ⇒ 9.0

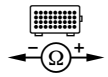
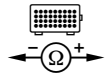
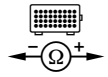
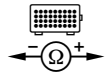
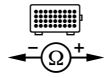
Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
11.0	C 1102 C 1500 C 1106	**Left rear axle VSS sensor (L6/3)** Internal resistance	N47-2 13 (1.13) — Ω — 12 (1.12)	Ignition: **OFF** Disconnect ETS/SPS control module (N47-2).	0.6 – 1.8 kΩ	⇒ 11.1 Wiring, L6/3
11.1		Insulation resistance	N47-2 57 (2.23) — Ω — 13 (1.13)	Ignition: **OFF** Disconnect ETS/SPS control module (N47-2).	> 20 kΩ	Wiring, L6/3
12.0		**Left rear axle VSS sensor (L6/3)** Output	N47-2 57 (2.23) — V~ — 3 (1.3)	Raise front of vehicle Ignition: **ON** Rotate right front tire by hand (> 1 rev./sec.)	> 3 V ~	Wiring, ⇒ 12.1, ETS/SPS control module (N47-2).
12.1		Load with control modules connected	N47 57 (2.23) — Ω — 3 (1.3)	Ignition: **OFF** Disconnect ETS/SPS control module (N47-2).	> 5 kΩ	Wiring, Connected control modules, ⇒ 11.0

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
13.0	C 1103 C 1107 C 1500	**Right rear axle VSS sensor (L6/4)** Internal resistance	N47-2 15 (1.15) — Ω — 14 (1.14)	Ignition: **OFF** Disconnect ETS/SPS control module (N47-2).	0.6 – 1.8 kΩ	⇒ 13.1, Wiring, L6/4
13.1		Insulation resistance	N47-2 57 (2.23) — Ω — 15 (1.15)	Ignition: **OFF** Disconnect ETS/SPS control module (N47-2).	> 20 kΩ	Wiring, L6/4
14.0	C 1314	**ASR/ETS/ESP hydraulic unit (A7/3)** Solenoid valve voltage supply	N47-2 57 (2.23) — V — 80 (2.46)	Ignition: **OFF**	11 – 14 V	Wiring, ETS/SPS control module (N47-2).
15.0	C 1300	**Left front axle solenoid valve (hold) (A7/3y6)** Internal resistance	N47-2 73 (2.39) — Ω — 80 (2.46)	Ignition: **OFF** Disconnect ETS/SPS control module (N47-2).	5.4 – 12.6 Ω	Wiring, A7/3
16.0	C 1301	**ASR/ETS hydraulic unit, left front axle solenoid valve (release) (A7/3y7)** Internal resistance	N47-2 72 (2.38) — Ω — 80 (2.46)	Ignition: **OFF** Disconnect ETS/SPS control module (N47-2).	2.8 – 6.6 Ω	Wiring, A7/3

Electrical Test Program – Test

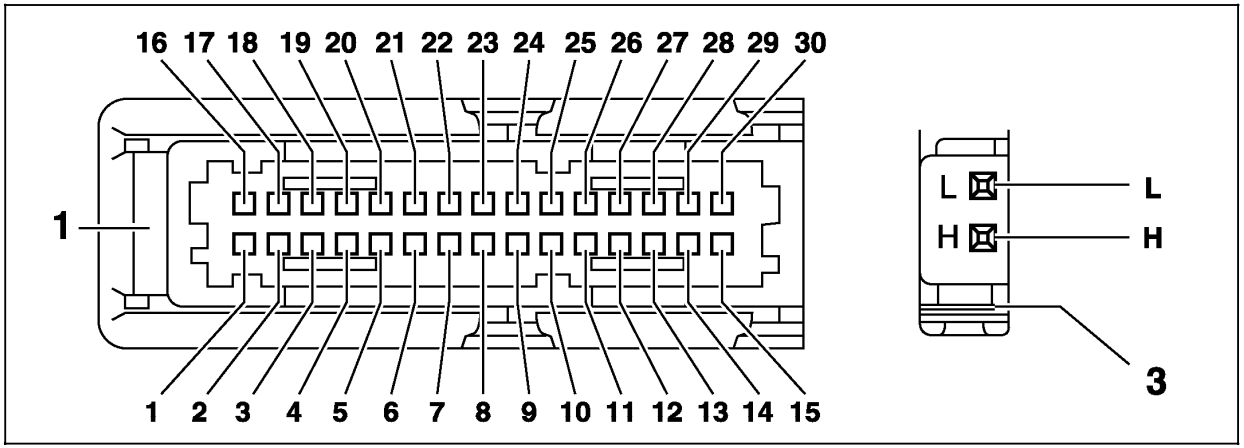
⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
17.0	C 1302	**Right front axle solenoid valve (hold) (A7/3y8)** Internal resistance	N47-2  74 (2.40) — 80 (2.46)	Ignition: **OFF** Disconnect ETS/SPS control module (N47-2).	5.4 – 12.6 Ω	Wiring, A7/3
18.0	C 1303	**Right front axle solenoid valve (release) (A7/3y9)** Internal resistance	N47-2  71 (2.37) — 80 (2.46)	Ignition: **OFF** Disconnect ETS/SPS control module (N47-2).	2.8 – 6.6 Ω	Wiring, A7/3
19.0	C 1304	**Left rear axle solenoid valve (hold) (A7/3y10)** Internal resistance	N47-2  69 (2.35) — 80 (2.46)	Ignition: **OFF** Disconnect ETS/SPS control module (N47-2).	5.4 – 12.6 Ω	Wiring, A7/3
20.0	C 1305	**Left rear axle solenoid valve (release) (A7/3y11)** Internal resistance	N47-2  70 (2.36) — 80 (2.46)	Ignition: **OFF** Disconnect ETS/SPS control module (N47-2).	2.8 – 6.6 Ω	Wiring, A7/3
21.0	C 1306	**Right rear axle solenoid valve (hold) (A7/3y12)** Internal resistance	N47  64 (2.30) — 80 (2.46)	Ignition: **OFF** Disconnect ETS/SPS control module (N47-2).	5.4 – 12.6 Ω	Wiring, A7/3

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
22.0	C 1307	**Right rear axle solenoid valve (release) (A7/3y13)** Internal resistance	N47 65 (2.31) — Ω — 80 (2.46)	Ignition: **OFF** Disconnect ETS/SPS control module (N47-2).	2.8 – 6.6 Ω	Wiring, A7/3
23.0	C 1310	**Front axle switchover valve (A7/3y18)** Internal resistance	N47 44 (2.10) — Ω — 80 (2.46)	Ignition: **OFF** Disconnect ETS/SPS control module (N47-2).	5.4 – 12.6 Ω	Wiring, A7/3
24.0	C 1311	**Rear axle switchover valve (A7/3y19)** Internal resistance	N47-2 62 (2.28) — Ω — 80 (2.46)	Ignition: **OFF** Disconnect ETS/SPS control module (N47-2).	5.4 – 12.6 Ω	Wiring, A7/3
25.0	C 1342	**Front axle inlet solenoid valve (A7/3y22)** Internal resistance	N47-2 45 (2.11) — Ω — 80 (2.46)	Ignition: **OFF** Disconnect ETS/SPS control module (N47-2).	5.4 – 12.6 Ω	Wiring, A7/3
26.0	C 1315	**Rear axle inlet solenoid valve (A7/3y23)** Internal resistance	N47-2 63 (2.29) — Ω — 80 (2.46)	Ignition: **OFF** Disconnect ETS/SPS control module (N47-2).	5.4 – 12.6 Ω	Wiring, A7/3

Electrical Test Program – Test

Connector Layout - Connector 1 (interior harness) and connector 3 (CAN data bus), ETS/ SPS control module (N47-2)



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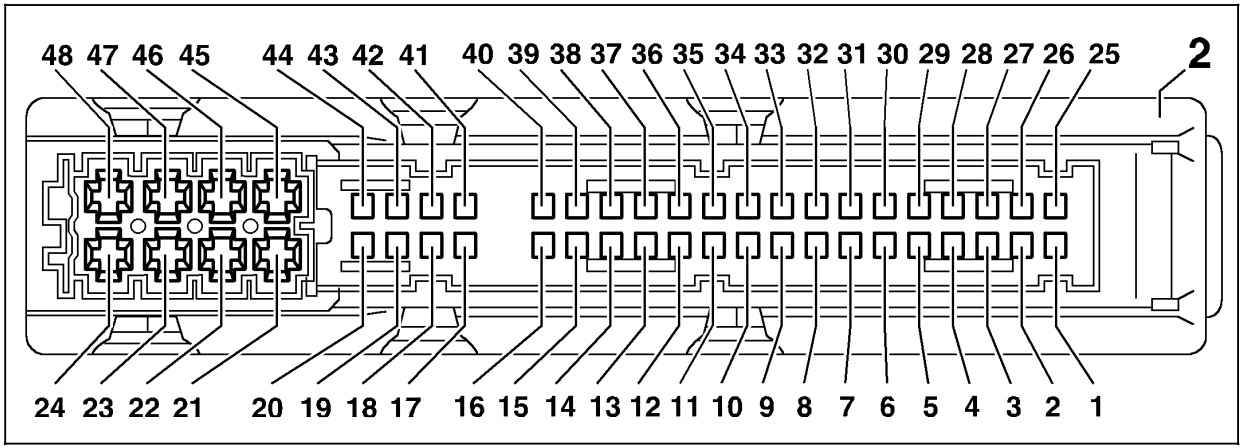
	Connector 1				Connector 3
1	Left front axle VSS sensor (L6/1) output	10	Circuit 87, voltage supply, ABS	H	CAN data bus (+)
2	Right front axle VSS sensor (L6/2) output	11	Stop lamp switch (4 pole) (S9/1) N.C. contact	L	CAN data bus (–)
3	Left rear axle VSS sensor (L6/3) output	12	Left rear axle VSS sensor (L6/3) (+)		
4	Stop lamp switch (4 pole) (S9/1) N.O. contact	13	Left rear axle VSS sensor (L6/3) (–)		
5	–	14	Right rear axle VSS sensor (L6/4) (+)		
6	Parking brake switch (S12)	15	Right rear axle VSS sensor (L6/4) (–)		
7	–	16-28	–		
8	–	29-30	Right rear brake pad wear sensor (S10/4)		
9	Diagnostic output				

Electrical Test Program – Test

Connector Layout - Connector 2 (engine harness), ETS/SPS control module (N47-2)



P42.45-0226-04

Connector 2

1	SPS P-valve (Y10) (–)
2	SPS P-valve (Y10) (+)
3-9	—
10	Front axle switchover valve (A7/3y18) (–)
11	Front axle inlet solenoid valve (A7/3y22) (–)
12-16	—
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)
21-22	—
23	Ground (W15/1)
24	—
25	High pressure/return pump relay module (N65k4) (+) monitoring
26	High pressure/return pump relay module (K40/2k4) (+)
27	High pressure/return pump relay module (K40/2k4) (–)
28	Rear axle switch over valve (A7/3y19) (–)
29	Rear axle inlet solenoid valve (A7/3y23) (–)
30	Right rear axle solenoid valve (A7/3y12) (hold) (–)
31	Right rear axle solenoid valve (A7/3y13) (release) (–)
32-34	—
35	Left rear axle solenoid valve (A7/3y10) (hold) (–)
36	Left rear axle solenoid valve (A7/3y11) (release) (–)
37	Right front axle solenoid valve (A7/3y9) (release) (–)
38	Left front axle solenoid valve (A7/3y7) (release) (–)
39	Left front axle solenoid valve (A7/3y6) (release) (–)
40	Right front axle solenoid valve (A7/3y8) (release) (–)
41-42	Left front brake pad wear wear sensor (S10/1), contact
43	Left front axle VSS sensor (–)
44	Left front axle VSS sensor (+)
45	—
46	Solenoid valves, voltage supply
47	Ground (W15/1)
48	Circuit 30, voltage