

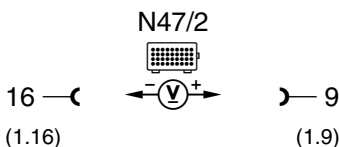
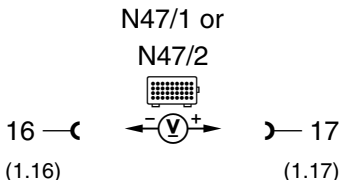
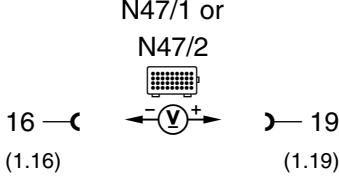
9.2 Traction Systems (ASR, ETS)

Electrical Test Program - Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0		ASR/SPS or ETS/SPS control module (N47/1 or N47/2) Circuit 87 Voltage supply	N47-1 or N47-2 16 — — — 27 (1.16) (1.27) 34 — — — 27 (1.34) (1.27)	Ignition: ON	11 – 14 V	⇒ 1.1, ⇒ 1.2.
1.1		Voltage supply from overvoltage protection relay module (K1, model 202) Relay module (K40, model 210)	N47/1 or N47/2 — — 27 (1.27)	Ignition: ON	11 – 14 V	Fuse on K1, (model 202) Fuse F1 on K40 (model 210) Wiring. K1 (model 202) K40 (model 210)
1.2		Ground wire Model 202 Model 210 Model 202 Model 210	N47/1 or N47/2 W16/4 — — — 16 W15/1 (1.16) W16/4 — — — 34 W15/1 (1.34)	Ignition: OFF Remove ASR/SPS or ETS/SPS control module (N47-1 or N47-2): Disconnect ground wire	< 1 Ω	Wiring, Model 202 (W16/4) ground, component compartment - right Model 210 (W15/1) ground, right footwell.

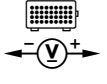
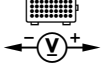
9.2 Traction Systems (ASR, ETS)

Electrical Test Program - Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
2.0 ETS only		ETS/SPS control module (N47-2) Circuit 30 Voltage supply		Ignition: OFF	11 – 14 V	Wiring. Model 210 only Fuse F1 on relay module (K40)
3.0		ABS MIL (A1e17)		Ignition: ON Engine: at Idle	< 2 V A1e17: ON 10 – 14 V A1e17: OFF	A1e17 Read out DTC, 12, Wiring, ASR/SPS or ETS/SPS control module (N47-1 or N47-2).
4.0		ASR or ETS warning lamp (A1e21 or A1e36)		Ignition: ON Engine: at Idle	< 2 V A1e21 or A1e36: ON 10 – 14 V A1e17: OFF A1e36: OFF	Wiring A1e21 or A1e36 Wiring

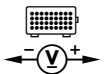
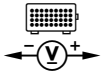
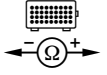
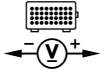
9.2 Traction Systems (ASR, ETS)

Electrical Test Program - Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
5.0		ASR or ETS warning lamp (A1e22 or A1e35)	N47-1 or N47-2 	Ignition: ON Engine: at Idle	< 2 V A1e22 or A1e35: ON 10 – 14 V A1e22 or A1e35: OFF	A1e22 or A1e35. Read out DTC 12 Wiring. ASR/SPS or ETS/SPS control module (N47-1 or N47-2).
6.0		Diagnostic output	N47-1 or N47-2 	Ignition: ON	10 – 14 V	Wiring. ASR/SPS or ETS/SPS control module (N47-1 or N47-2).
7.0		Voltage circuit 61		Ignition: ON Engine: at Idle	OFF ON	Wiring Generator (G2)

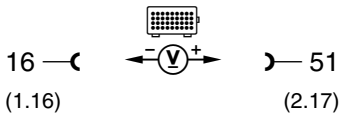
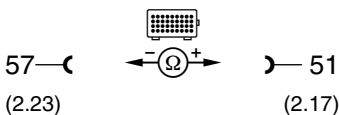
9.2 Traction Systems (ASR, ETS)

Electrical Test Program - Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
8.0		Solenoid valve relay: Model 202 (A7/3k1) Model 210: (N65k3) Voltage supply Control	N47-1 or N47-2  (1.16) (2.17) N47-1 or N47-2  (2.3) (2.17)	Ignition: ON	11 – 14 V	Read out DTC, 12, Wiring, ⇒ 8.1.
8.1		Coil resistance	N47-1 or N47-2  (2.3) (2.17)	Ignition: OFF Disconnect ASR/SPS or ETS/SPS control module (N47/1 or N47/2).	40 - 80 Ω	Wiring Model 202: (A7/3k1) Model 210 (N65) ⇒ 8.2.
8.2		Working contact	N47-1 or N47-2  (1.16) (2.7)	Ignition: ON	11 – 14 V	Wiring, Model 202: A7/3k1. Model 210: (N65)

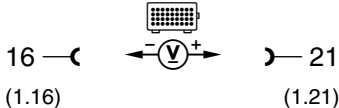
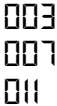
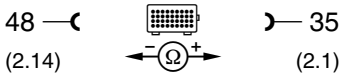
9.2 Traction Systems (ASR, ETS)

Electrical Test Program - Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
9.0		ASR/ETS hydraulic unit, high-pressure/return pump relay Model 202: (A7/3k2) Model 210: (N65k4) Voltage supply	N47-1 or N47-2 	Ignition: ON	11 – 14 V	Wiring, ⇒ 9.1.
9.1		Coil resistance	N47-1 or N47-2 	Ignition: OFF Disconnect control module (N47/1 or N47/2).	40 – 80 Ω	Wiring, Model 202: A7/3k2. Model 210: N65
10.0 ASR only		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.

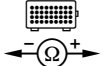
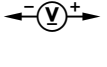
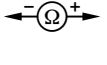
9.2 Traction Systems (ASR, ETS)

Electrical Test Program - Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
11.0		Stop lamp switch (S9/1) Normally open (N.O.) contact Normally closed (N.C.) contact		Ignition: ON Brakes not applied Brakes applied Brakes not applied Brakes applied	OFF ON OFF ON	Wiring, S9/1.
12.0 ETS only		ETS signal	N47-2 	Ignition: ON Engine: at Idle	< 1 V ETS MIL (A1e35): ON 11 – 14 V A1e35: OFF	Wiring, N47-2.
13.0		Left front axle VSS sensor (L6/1)		Raise front of vehicle Ignition: ON Rotate left front tire by hand (> 1 rev./sec.)	> 3 km/h	⇒ 13.1 ⇒ 13.2
13.1		Internal resistance	N47-1 or N47-2 	Ignition: OFF Disconnect control module (N47/1 or N47/2).	0.8 – 2.3 kΩ	Wiring, L6/1.

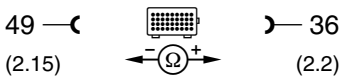
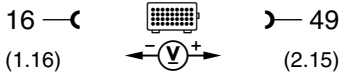
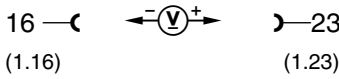
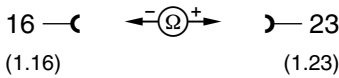
9.2 Traction Systems (ASR, ETS)

Electrical Test Program - Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
13.2		Insulation resistance	N47-1 or N47-2 	Ignition: OFF Disconnect control module (N47/1 or N47/2).	> 20 kΩ	Wiring, L6/1.
14.0		Left front axle VSS sensor (L6/1) output	N47-1 or N47-2 	Raise front of vehicle Ignition: ON Rotate left front tire by hand (> 1 rev./sec.)	> 3 V	Wiring, ⇒ 14.1, N47-1 or N47-2.
14.1		Load with control modules connected	N47-1 or N47-2 	Ignition: OFF Disconnect control module (N47-1 or N47-2).	> 5 kΩ	Wiring, Connected control modules (N4/1, N4/2, N22, etc.), ⇒ 13.0.
15.0	  	Right front axle VSS sensor (L6/2)		Raise front of vehicle Ignition: ON Rotate right front tire by hand (> 1 rev./sec.)	> 3 km/h	⇒ 15.1, ⇒ 15.2.

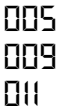
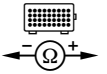
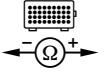
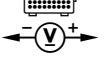
9.2 Traction Systems (ASR, ETS)

Electrical Test Program - Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
15.1		Internal resistance	N47-1 or N47-2 	Ignition: OFF Disconnect control module (N47/1 or N47/2).	0.8 – 2.3 kΩ	Wiring, L6/2.
15.2		Insulation resistance	N47-1 or N47-2 	Ignition: OFF Disconnect control module (N47/1 or N47/2).	> 20 kΩ	Wiring, L6/2.
16.0		Right front axle VSS sensor (L6/2) output	N47-1 or N47-2 	Raise front of vehicle Ignition: ON Rotate right front tire by hand (> 1 rev./sec.)	> 3 V	Wiring, ⇒ 16.1, N47-1 or N47-2.
16.1		Load with control modules connected	N47-1 or N47-2 	Ignition: OFF Disconnect control module (N47-1 or N47-2).	> 5 kΩ	Wiring, Connected control modules, ⇒ 15.0.

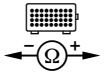
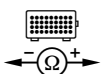
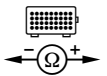
9.2 Traction Systems (ASR, ETS)

Electrical Test Program - Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
17.0		Left rear axle VSS sensor (L6/3)		Raise rear of vehicle Ignition: ON Rotate left rear tire by hand (> 1 rev./sec.)	> 3 km/h	⇒ 17.1, ⇒ 17.2.
17.1		Internal resistance	N47-1 or N47-2 	Ignition: OFF Disconnect control module (N47-1 or N47-2).	0.6 – 1.8 kΩ	Wiring, L6/3.
17.2		Insulation resistance	N47-1 or N47-2 	Ignition: OFF Disconnect control module (N47-1 or N47-2).	> 20 kΩ	Wiring.
18.0		Left rear axle VSS sensor (L6/3) output	N47/1 or N47/2 	Raise rear of vehicle Ignition: ON Rotate left rear tire by hand (> 1 rev./sec.)	> 3 V	Wiring, ⇒ 18.1, N47/1 or N47/2.

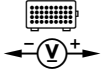
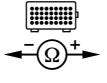
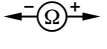
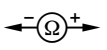
9.2 Traction Systems (ASR, ETS)

Electrical Test Program - Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
18.1		Load with control modules connected	N47-1 or N47-2 	Ignition: OFF Disconnect control module (N47-1 or N47-2).	> 5 kΩ	Wiring, Connected control modules (N3/4, N4/1, etc.), ⇒ 17.0.
19.0		Right rear axle VSS sensor (L6/4)		Raise rear of vehicle Ignition: ON Rotate right rear tire by hand (> 1 rev./sec.)	> 3 km/h	⇒ 19.1, ⇒ 19.2.
19.1		Internal resistance	N47-1 or N47-2 	Ignition: OFF Disconnect control module (N47-1 or N47-2).	0.6 – 1.6 kΩ	Wiring, L6/4.
19.2		Insulation resistance	N47-1 or N47-2 	Ignition: OFF Disconnect control module (N47-1 or N47-2).	> 20 kΩ	Wiring.

9.2 Traction Systems (ASR, ETS)

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	N47-1 or N47-2 	Raise rear of vehicle Ignition: ON Rotate right rear tire by hand (> 1 rev./sec.)	> 3 V	⇒ 20.1, N47-1 or N47-2.
20.1		Load with control modules connected	N47-1 or N47-2 	Ignition: OFF Disconnect control module (N47/1 or N47/2).	> 5 kΩ	Wiring, Connected control modules (N3/4, N4/1, etc.), ⇒ 19.0.
21.0	013	ASR/ETS hydraulic unit, left front axle solenoid valve (hold) (A7/3y6) Internal resistance	A7/3 (202)  (210) 	Ignition: OFF Disconnect electrical connector on A7/3.	5.4 – 12.6 Ω	Wiring, A7/3.

9.2 Traction Systems (ASR, ETS)

Electrical Test Program - Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
22.0	014	ASR/ETS hydraulic unit, left front axle solenoid valve (release) (A7/3y7) Internal resistance	A7/3 (202) — 1  — 13 (210) — 15  — 6	Ignition: OFF Disconnect electrical connector on A7/3.	2.8 – 6.6 Ω	Wiring, A7/3.
23.0	015	ASR/ETS hydraulic unit, right front axle solenoid valve (hold) (A7/3y8) Internal resistance	A7/3 (202) — 1  — 3 (210) — 15  — 8	Ignition: OFF Disconnect electrical connector on A7/3.	5.4 – 12.6 Ω	Wiring, A7/3.
24.0	016	ASR/ETS hydraulic unit, right front axle solenoid valve (release) (A7/3y9) Internal resistance	A7/3 (202) — 1  — 14 (210) — 15  — 5	Ignition: OFF Disconnect electrical connector on A7/3.	2.8 – 6.6 Ω	Wiring, A7/3.
25.0	017	ASR/ETS hydraulic unit, left rear axle solenoid valve (hold) (A7/3y10) Internal resistance	A7/3 (202) — 1  — 19 (210) — 15  — 10	Ignition: OFF Disconnect electrical connector on A7/3.	5.4 – 12.6 Ω	Wiring, A7/3.

9.2 Traction Systems (ASR, ETS)

Electrical Test Program - Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
26.0		ASR/ETS hydraulic unit, left rear axle solenoid valve (release) (A7/3y11) Internal resistance	A7/3 202 1 —  — 18 210 15 —  — 11	Ignition: OFF Disconnect electrical connector on A7/3.	2.8 – 6.6 Ω	Wiring, A7/3.
27.0		ASR/ETS hydraulic unit, right rear axle solenoid valve (hold) (A7/3y12) Internal resistance	A7/3 202 1 —  — 20 210 15 —  — 9	Ignition: OFF Disconnect electrical connector on A7/3.	5.4 – 12.6 Ω	Wiring, A7/3.
28.0		ASR/ETS hydraulic unit, right rear axle solenoid valve (release) (A7/3y13) Internal resistance	A7/3 202 1 —  — 17 210 15 —  — 13	Ignition: OFF Disconnect electrical connector on A7/3.	2.8 – 6.6 Ω	Wiring, A7/3.
29.0		ASR/ETS hydraulic unit, switchover/solenoid valve (A7/3y5) Internal resistance	A7/3 202 1 —  — 21 210 15 —  — 1	Ignition: OFF Disconnect electrical connector on A7/3.	5.4 – 12.6 Ω	Wiring, A7/3.

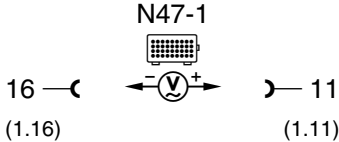
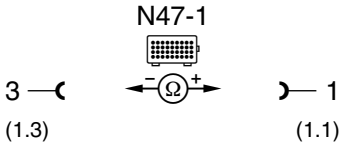
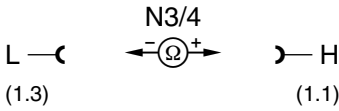
9.2 Traction Systems (ASR, ETS)

Electrical Test Program - Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
30.0		ASR/ETS hydraulic unit, inlet solenoid valve (A7/3y15) Internal resistance	A7/3 202 1 210 15 ←Ω→ ←Ω→ 202 16 210 12	Ignition: OFF Disconnect electrical connector on A7/3.	5.4 – 12.6 Ω	Wiring, A7/3.
31.0 ASR only		ASR Off switch (S76/5)		Ignition: ON Press and hold switch S76/5: ON Release switch Press and hold switch S76/5: OFF	1 – 2 V 3.5 – 5 V < 1 V	Wiring, S76/5, N47/1.

9.2 Traction Systems (ASR, ETS)

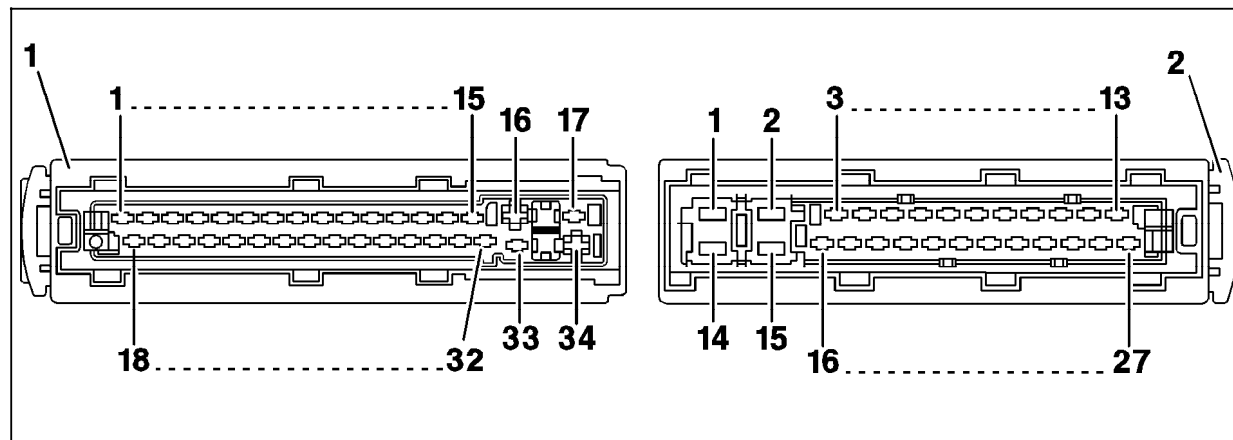
Electrical Test Program - Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
32.0		VSS sensor output status Signal: Vehicle stationary		Engine: at idle	> 3 V	
33		CAN bus (ASR ONLY)		Ignition: OFF Disconnect test cable or control module (N47/1) and test directly on control module using an ohmmeter.	< 115 - 125 Ω	Wiring for CAN BUS ⇒33.1
33.1		CAN element in HFM-SFI control module (N3/4) Resistance		Disconnect control module (N3/4) and test directly on control module using an ohmmeter.	< 115 - 125 Ω	N3/4, DM, Engines, Vol. 2, section 1.1 23.

9.2 Traction Systems (ASR, ETS)

Electrical Test Program - Test

Connector Layout - ASR/SPS or ETS/SPS control module (N47/1 or N47/2)



U42-5309-53

conn. 1 Interior harness connector

1	CAN bus (+)
2	not used
3	CAN bus (-)
4	ASR: Parking brake switch (S12)
5	ASR: ASR Off switch (S76/5)
6	not used
7	Stop lamp switch (S9/1) N.C. contact
8	Right rear axle VSS sensor (L6/4) output
9	ETS: Circuit 30 voltage supply
10	Diagnosis output to DLC (X11/4)
11	VSS sensor output status
12	Left rear axle VSS sensor (L6/3) (-)
13	Left rear axle VSS sensor (L6/3) (+)
14	Right rear axle VSS sensor (L6/4) (-)
15	Right rear axle VSS sensor (L6/4) (+)
16	Ground (W16/4 or W15/1)
17	ABS MIL (A1e17)
18	Left rear axle VSS sensor (L6/3) output
19	ASR or ETS warning lamp (A1e21 or A1e36)
20-21	not used
22	Stop lamp switch (S9/1) N.O. contact
23	Right front axle VSS sensor (L6/2) output
24	not used

25	Circuit 61 voltage
26	Left front axle VSS sensor (L6/1) output
27	Circuit 87 voltage
28-32	not used
33	ASR or ETS MIL (A1e22 or A1e35)
34	Ground (W16/4 or W15/1)

conn. 2 Engine harness connector

1	Left front axle VSS sensor (L6/1) (+)
2	Right front axle VSS sensor (L6/2) (+)
3	ASR/ETS hydraulic unit, solenoid valve relay (A7/3k1) (-)
4-5	not used
6	ASR/ETS hydraulic unit, inlet solenoid valve (A7/3y15) (-)
7	ASR/ETS hydraulic unit, left front axle solenoid valve (hold) (A7/3y6) (-)
8	ASR/ETS hydraulic unit, right front axle solenoid valve (release) (A7/3y9) (-)
9	not used
10	ASR/ETS hydraulic unit, switchover/solenoid valve (A7/3y5) (-)
11	not used

12	ASR/ETS hydraulic unit, left rear axle solenoid valve (release) (A7/3y11) (-)
13	ASR/ETS hydraulic unit, right rear axle solenoid valve (hold) (A7/3y12) (-)
14	Left front axle VSS sensor (L6/1) (-)
15	Right front axle VSS sensor (L6/2) (-)
16	not used
17	ASR/ETS hydraulic unit, high-pressure/return pump relay (A7/3k2) and solenoid valve relay (A7/3k1)
18-19	not used
20	ASR/ETS hydraulic unit, left front axle solenoid valve (release) (A7/3y7) (-)
21	not used
22	ASR/ETS hydraulic unit, right front axle solenoid valve (hold) (A7/3y8) (-)
23	ASR/ETS hydraulic unit, high-pressure/return pump relay (A7/3k2) (-)
24	not used
25	ASR/ETS hydraulic unit, high-pressure/return pump relay (A7/3k2) control
26	ASR/ETS hydraulic unit, left rear axle solenoid valve (hold) (A7/3y10) (-)
27	ASR/ETS hydraulic unit, right rear axle solenoid valve (release) (A7/3y13) (-)