

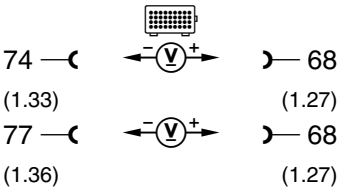
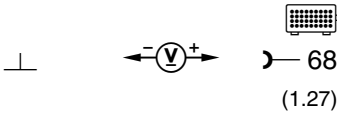

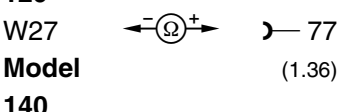


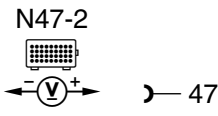
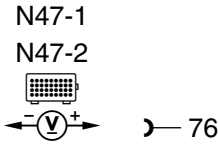
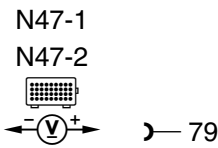



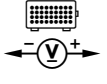
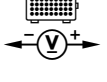

Electrical Test Program - Test

⇒		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 N47-2 	Ignition: ON	11 – 14 V	⇒ 1.1, ⇒ 1.2
1.1		Voltage supply from base module (N16/1)		Ignition: ON	11 – 14 V	Fuse (F1) on N16/1, DM, Chassis & Drivetrain, Vol. 1, sections 1.1 or 1.2 23, Wiring.
1.2		Ground wire	N47-1 N47-2  N47-1 N47-2 	Ignition: OFF Control module (N47-1 or N47-2) disconnected. Disconnect ground wire.	< 1 Ω	Model 129 Wiring, Ground (module box bracket) (W27). Model 140 Wiring, Ground (electronics output ground - right footwell) (W15).



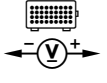
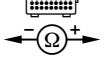
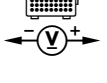
Electrical Test Program - Test

⇒		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	 <p>N47-2</p> <p>74 —(C) ←(V)→ —(D) 47 (1.33) (1.6)</p>	Ignition: OFF	11 – 14 V	Wiring.
3.0		ABS MIL (A1e17)	 <p>N47-1 N47-2</p> <p>74 —(C) ←(V)→ —(D) 76 (1.33) (1.35)</p>	Ignition: ON Engine: at Idle	< 2 V A1e17: ON 10 – 14 V A1e17: OFF	A1e17. Read DTC memory 12, Wiring, N47-1 or N47-2.
4.0		ASR MIL or ETS MIL (A1e22 or A1e35)	 <p>N47-1 N47-2</p> <p>74 —(C) ←(V)→ —(D) 79 (1.36) (1.38)</p>	Ignition: ON Engine: at Idle	< 2 V A1e22 or A1e35: ON 10 – 14 V A1e22 or A1e35: OFF	A1e22 or A1e35. Read DTC memory 12, Wiring, N47-1 or N47-2.



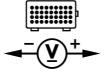
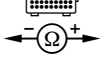

Electrical Test Program - Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
5.0		ASR or ETS warning lamp (A1e21 or A1e36)	<p>N47-1 N47-2</p>  <p>74 —((1.33) —) 57 (1.16)</p>	<p>Ignition: ON</p> <p>Engine: at Idle</p>	<p>< 2 V A1e21 or A1e36: ON</p> <p>10 – 14 V A1e21 or A1e36: OFF</p>	<p>Wiring, A1e21 or A1e36.</p> <p>Wiring.</p>
6.0		Diagnosis output	<p>N47-1 N47-2</p>  <p>74 —((1.33) —) 53 (1.12)</p>	<p>Ignition: ON</p>	<p>10 – 14 V</p>	<p>Wiring, N47-1 or N47-2.</p>
7.0		Circuit 61 Voltage supply		<p>Ignition: ON</p> <p>Engine: at Idle</p>	<p>OFF</p> <p>ON</p>	<p>Wiring, Generator (G2).</p>











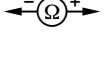
Electrical Test Program - Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
8.0		ASR/ETS/ESP hydraulic unit, solenoid valve relay (A7/3k1) Voltage supply Control	N47-1 N47-2  74 —((1.33))— 7 (2.7)	Ignition: ON	11 – 14 V	12, Wiring, ⇒ 8.1
8.1		Coil resistance	N47-1 N47-2  27 —((1.27))— 7 (2.7)	Ignition: OFF Control module (N47-1 or N47-2) disconnected.	40 – 80 Ω	Wiring, A7/3k1, ⇒ 8.2
8.2		Working contact	N47-1 N47-2  74 —((1.33))— 18 (2.18)	Ignition: ON	11 – 14 V	Wiring, A7/3k1.


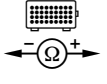
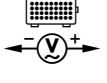
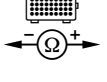


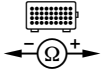
Electrical Test Program - Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
9.0		ASR/ETS/ESP hydraulic unit, high-pressure/return pump relay (A7/3k2) Voltage supply	N47-1 N47-2 	Ignition: ON	11 – 14 V	Wiring, ⇒ 9.1
9.1		Coil resistance	N47-1 N47-2 	Ignition: OFF Control module (N47-1 or N47-2) disconnected.	40 – 80 Ω	Wiring, A7/3k2.
10.0		Parking brake switch (S12)		Engine: at Idle Apply parking brake. Release parking brake.	OFF Parking brake indicator lamp (A1e7): ON OFF A1e7: OFF	Wiring, S12, A1e7.


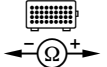
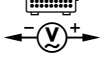
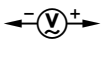
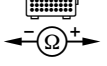
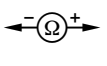
Electrical Test Program - Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
11.0		Stop lamp switch (S9/1) N.O. contact N.C. contact		Ignition: ON Brakes not applied. Brakes applied. Brakes not applied. Brakes applied.	OFF ON OFF ON	Wiring, S9/1.
12.0		Models 129.076, 140.04/05/07 Master brake cylinder switchover valve (Y61) Internal resistance	1 —  — 2	Ignition: OFF Pull connector off of Y61.	7 – 8 Ω	Y61.
13.0	  	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	N47-1 N47-2  10 —  — 30 (2.10) (2.30)	Ignition: OFF Control module (N47-1 or N47-2) disconnected.	0.8 – 2.3 kΩ	Wiring, L6/1.







Electrical Test Program - Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
13.2		Insulation resistance	<p>N47-1 N47-2</p> 	Ignition: OFF Control module (N47-1 or N47-2) disconnected.	> 20 kΩ	Wiring, L6/1.
14.0		Left front axle VSS sensor (L6/1) output	<p>N47-1 N47-2</p> 	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	<p>N47-1 N47-2</p> 	Ignition: OFF Control module (N47-1 or N47-2) disconnected.	> 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.).	> 2 mph (3 km/h)	⇒ 15.1, ⇒ 15.2
15.1		Internal resistance	<p>N47-1 N47-2</p> 	Ignition: OFF Control module (N47-1 or N47-2) disconnected.	0.8 – 2.3 kΩ	Wiring, L6/2.


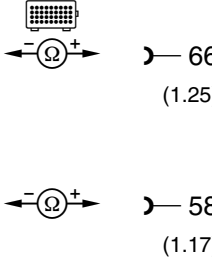


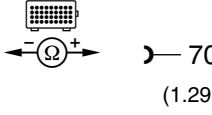
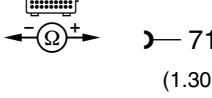
Electrical Test Program - Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
15.2		Insulation resistance	<p>N47-1 N47-2</p>  <p>74 —(C) —(Ω)— 13 (1.33) (2.13)</p>	Ignition: OFF Control module (N47-1 or N47-2) disconnected.	> 20 kΩ	Wiring, L6/2.
16.0		Right front axle VSS sensor (L6/2) output	<p>N47-1 N47-2</p> <p>ASR</p>  <p>74 —(C) —(V)— 44 (1.33) (1.3)</p> <p>ETS</p>  <p>74 —(C) —(V)— 65 (1.33) (1.24)</p>	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	<p>N47-1 N47-2</p> <p>ASR</p>  <p>74 —(C) —(Ω)— 44 (1.33) (1.3)</p> <p>ETS</p>  <p>74 —(C) —(Ω)— 65 (1.33) (1.24)</p>	Ignition: OFF control module (N47-1 or N47-2) disconnected.	> 5 kΩ	Wiring, Connected control modules (N16/1, N51, etc.), ⇒ 15.0


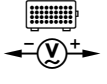
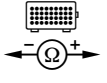

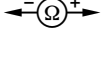


Electrical Test Program - Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
17.0	005 009 011	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	N47-1 N47-2  73 — Ω — 72 (1.32) (1.31)	Ignition: OFF Control module (N47-1 or N47-2) disconnected.	0.6 – 1.8 kΩ	Wiring, L6/3.
17.2		Insulation resistance	N47-1 N47-2  74 — Ω — 73 (1.33) (1.32)	Ignition: OFF Control module (N47-1 or N47-2) disconnected.	> 20 kΩ	Wiring.
18.0		Left rear axle VSS sensor (L6/3) output	N47-1 N47-2  ASR 74 — V — 66 (1.33) (1.25)  ETS 74 — V — 58 (1.33) (1.17)	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.



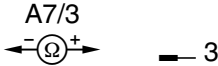

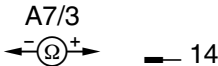

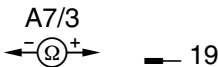

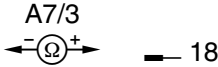
Electrical Test Program - Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
18.1		Load with control modules connected	<p>N47-1 N47-2</p>  <p>ASR 74 —(1.33) — Ω — (1.25) 66</p> <p>ETS 74 —(1.33) — Ω — (1.17) 58</p>	Ignition: OFF Control module (N47-1 or N47-2) disconnected.	> 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.).	> 2 mph (3 km/h)	⇒ 19.1, ⇒ 19.2
19.1		Internal resistance	<p>N47-1 N47-2</p>  <p>71 —(1.30) — Ω — (1.29) 70</p>	Ignition: OFF Control module (N47-1 or N47-2) disconnected.	0.6 – 1.8 kΩ	Wiring, L6/4.
19.2		Insulation resistance	<p>N47-1 N47-2</p>  <p>74 —(1.33) — Ω — (1.30) 71</p>	Ignition: OFF Control module (N47-1 or N47-2) disconnected.	> 20 kΩ	Wiring, L6/4.


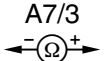
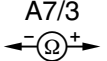
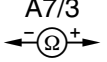
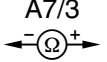
Electrical Test Program - Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
20.0		Right rear axle VSS sensor (L6/4) output	<p>N47-1 N47-2</p>  <p>74 —(74 (1.33) —(67 (1.26)</p>	<p>Raise rear of vehicle. Ignition: ON Rotate right rear tire by hand (> 1 rev./sec.).</p>	> 3 V	⇒ 20.1, N47-1 or N47-2.
20.1		Load with control modules connected	<p>N47-1 N47-2</p>  <p>74 —(74 (1.33) —(67 (1.26)</p>	<p>Ignition: OFF Control module (N47-1 or N47-2) disconnected.</p>	> 5 kΩ	Wiring, Connected control modules (N3/4, N4/1, etc.), ⇒ 19.0
21.0		ASR/ETS/ESP hydraulic unit, left front axle solenoid valve (hold) (A7/3y6) Internal resistance	<p>A7/3</p>  <p>1 — 1 — 12</p>	<p>Ignition: OFF Disconnect electrical connector on A7/3.</p>	5.4 – 12.6 Ω	Wiring, A7/3.
22.0		ASR/ETS/ESP hydraulic unit, left front axle solenoid valve (release) (A7/3y7) Internal resistance	<p>A7/3</p>  <p>1 — 1 — 13</p>	<p>Ignition: OFF Disconnect electrical connector on A7/3.</p>	2.8 – 6.6 Ω	Wiring, A7/3.




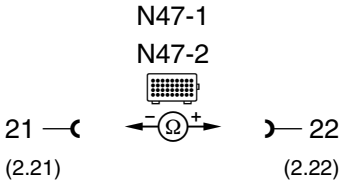



Electrical Test Program - Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
23.0		ASR/ETS/ESP hydraulic unit, right front axle solenoid valve (hold) (A7/3y8) Internal resistance	1 —  3	Ignition: OFF Disconnect electrical connector on A7/3.	5.4 – 12.6 Ω	Wiring, A7/3.
24.0		ASR/ETS/ESP hydraulic unit, right front axle solenoid valve (release) (A7/3y9) Internal resistance	1 —  14	Ignition: OFF Disconnect electrical connector on A7/3.	2.8 – 6.6 Ω	Wiring, A7/3.
25.0		ASR/ETS/ESP hydraulic unit, left rear axle solenoid valve (hold) (A7/3y10) Internal resistance	1 —  19	Ignition: OFF Disconnect electrical connector on A7/3.	5.4 – 12.6 Ω	Wiring, A7/3.
26.0		ASR/ETS/ESP hydraulic unit, left rear axle solenoid valve (release) (A7/3y11) Internal resistance	1 —  18	Ignition: OFF Disconnect electrical connector on A7/3.	2.8 – 6.6 Ω	Wiring, A7/3.


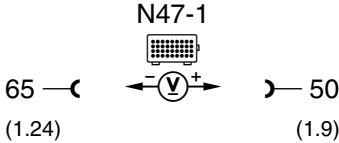

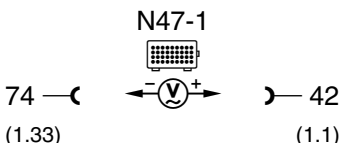
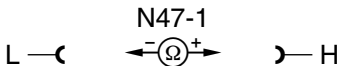
Electrical Test Program - Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
27.0	019	ASR/ETS/ESP hydraulic unit, right rear axle solenoid valve (hold) (A7/3y12) Internal resistance	1 —  — 20	Ignition: OFF Disconnect electrical connector on A7/3.	5.4 – 12.6 Ω	Wiring, A7/3.
28.0	020	ASR/ETS/ESP hydraulic unit, right rear axle solenoid valve (release) (A7/3y13) Internal resistance	1 —  — 17	Ignition: OFF Disconnect electrical connector on A7/3.	2.8 – 6.6 Ω	Wiring, A7/3.
29.0	022	ASR/ETS/ESP hydraulic unit, inlet solenoid valve (A7/3y15) Internal resistance	1 —  — 16	Ignition: OFF Disconnect electrical connector on A7/3.	5.4 – 12.6 Ω	Wiring, A7/3.
30.0	021	ASR/ETS/ESP hydraulic unit, switchover/solenoid valve (A7/3y5) Internal resistance	1 —  — 21	Ignition: OFF Disconnect electrical connector on A7/3.	5.4 – 12.6 Ω	Wiring, A7/3.


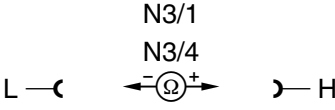
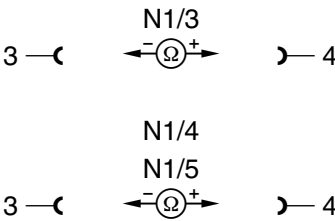
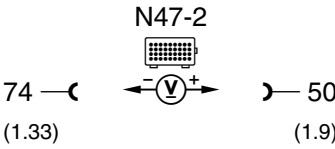
Electrical Test Program - Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
31.0		Model 140 SPS P-valve (Y10) Voltage supply		Engine: at Idle Press MAX key Press MIN key	> 800 mA steering is light < 400 mA steering is heavy	⇒ 31.1, N47-1 or N47-2.
31.1		Coil resistance	N47-1 N47-2 	Ignition: OFF Control module (N47-1 or N47-2) disconnected.	3 – 8 Ω	Wiring, Y10.
32.0	 	Models 129.076, 140.04/05/07 ABS lateral accelration sensor (B24/2) Static sensor signal (off) Dynamic sensor signal (on)		Vigorously rock vehicle from side to side.	0±1 m/s ² > 1 m/s ² Value changes with movement of vehicle	Wiring, B24/2, ⇒ 32.1

Electrical Test Program - Test

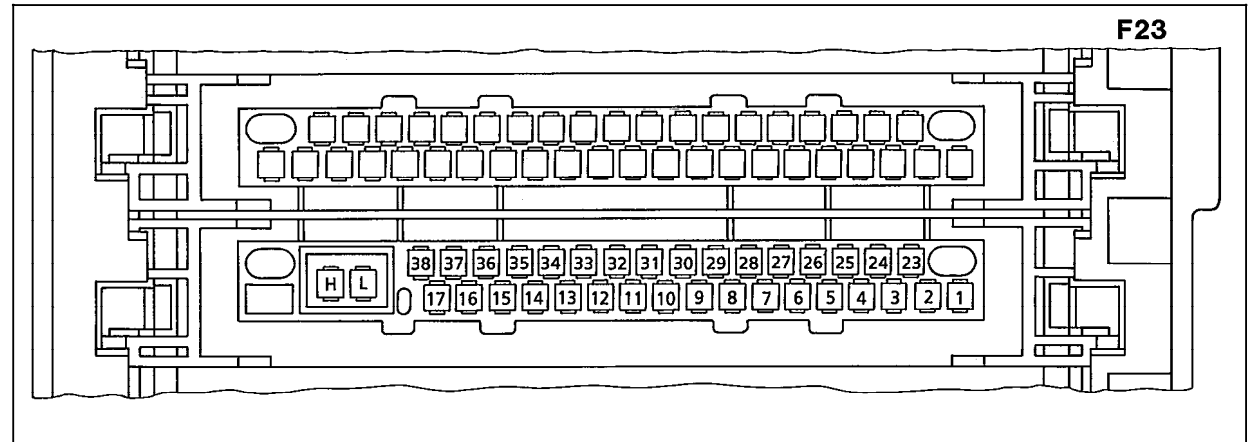
⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
32.1		Voltage supply to sensor input	<p>N47-1</p> 	Ignition: ON Disconnect connector on B24/2.	4.75–5.25 V	Wiring, N47-1.
33.0 ASR only		ASR OFF switch (S76/5)		Press and hold switch S76/5: ON Release switch Press and hold switch S76/5: OFF	1 – 2 V 3.5 – 6 V < 1 V	Wiring, S76/5, N47-1.
34.0		VSS sensor output status Signal: Vehicle stationary	<p>N47-1</p> 	Engine: at Idle	> 3 V	⇒ 34.1
35.0 ASR only	<p>030</p> <p>031</p> <p>032</p> <p>033</p>	CAN bus	<p>N47-1</p> 	Ignition: OFF Disconnect contact module 2 or N47-1. Test directly at both wide connectors using an ohmmeter.	55 – 65 Ω	Data bus, ⇒ 35.1, ⇒ 35.2

Electrical Test Program - Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
35.1		Engine 104, 119 CAN element in LH-SFI or engine control module (N3/1 or N3/4) Resistance		Disconnect control module (N3/1 or N3/4) and test directly on control module using an ohmmeter.	115 – 125 Ω	N3/1 or N3/4, DM, Engines, Vol. 2, sections 3.1 or 1.1 23.
35.2		CAN element in DI control module (N1/3, N1/4 or N1/5) Resistance Engine 104/119 LH-SFI Engine 120		Disconnect connector B on control module (N1/3, N1/4 or N1/5) and test directly on control module using an ohmmeter.	115 – 125 Ω	Engine 104/119 LH-SFI N1/3, DM, Engines, Vol. 2, section 5.2 23. Engine 120 N1/4 or N1/5, DM, Engines, Vol. 2, section 5.3 23.
36.0 ETS only		ETS signal		Ignition: ON Engine: at Idle	< 1 V ETS MIL (A1e35): ON 10 – 14 V A1e35: OFF	Wiring, N47-2.

Electrical Test Program - Test

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

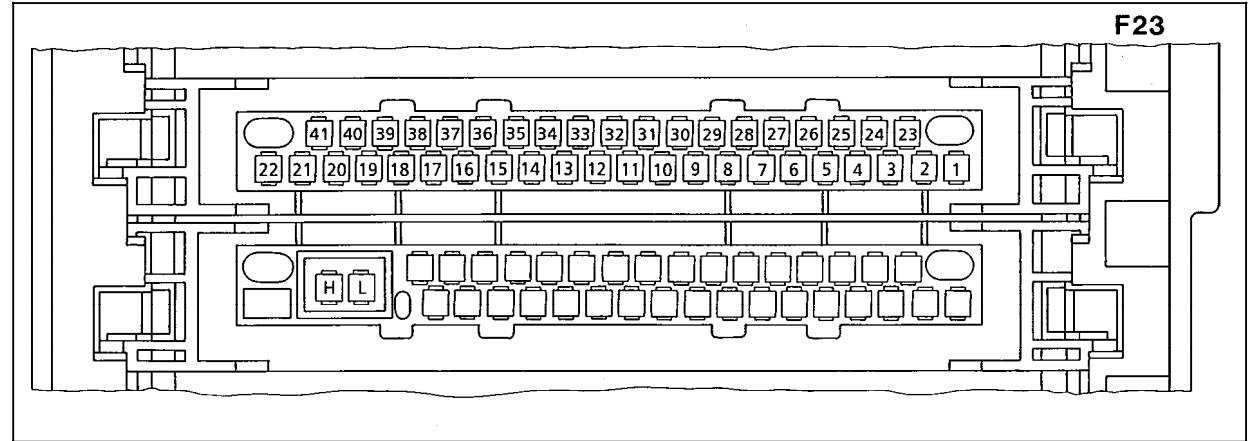


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1	VSS sensor output status	15	not used	30	Right rear axle VSS sensor (L6/4) (-)
2	not used	16	ASR or ETS warning lamp (A1e21 or A1e36)	31	Left rear axle VSS sensor (L6/3) (+)
3	ASR: Right front axle VSS sensor (L6/2) output	17	ASR: Models 129.076, 140.04/05/07	32	Left rear axle VSS sensor (L6/3) (-)
4	ETS: Stop lamp switch (S9/1), N.C. contact		ASR lateral acceleration sensor (B24/2) signal	33	Ground
5	ASR: Stop lamp switch (S9/1), N.C. contact		ETS: Left rear axle VSS sensor (L6/3) output		Model 140: W15
6	ASR: Circuit 61 voltage	18-22	not used		Model 129: W27
	ETS: Circuit 30 voltage	23	Left front axle VSS sensor (L6/1) output	34	not used
7	ASR: ASR Off switch (S76/5)	24	ASR: Models 129.076, 140.04/05/07	35	ABS MIL (A1e17)
8	ASR: Stop lamp switch (S9/1) N.O. contact		ASR lateral acceleration sensor (B24/2) (-)	36	Ground
9	ASR: Models 129.076, 140.04/05/07		ETS: Right front axle VSS sensor (L6/2) output		W16/1 or W27
	ASR lateral acceleration sensor (B24/2) (+)	25	ASR: Left rear axle VSS sensor (L6/3) output	37	not used
	ETS: ETS signal		ETS: Circuit 61 voltage	38	ASR or ETS MIL (A1e22 or A1e35)
10-11	not used	26	Right rear axle VSS sensor (L6/4) output	H	ASR: CAN bus (+)
12	Diagnosis output to DLC (X11/4)	27	Circuit 87 voltage	L	ASR: CAN bus (-)
13	not used	28	ETS: Stop lamp switch (S9/1) N.O. contact		
14	ASR: Parking brake switch (S12)	29	Right rear axle VSS sensor (L6/4) (+)		

Electrical Test Program - Test

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



P07-5170-53

1	not used	17	ASR/ETS hydraulic unit, inlet solenoid valve (A7/3y15) (-)	29	not used
2	ASR/ETS hydraulic unit, left rear axle solenoid valve (release) (A7/3y11) (-)	18	ASR/ETS hydraulic unit, left front axle solenoid valve (hold) (A7/3y6) (-)	30	Left front axle VSS sensor (L6/1) (+)
3	ASR/ETS hydraulic unit, right rear axle solenoid valve (hold) (A7/3y12) (-)	19	ASR/ETS hydraulic unit, switchover/solenoid valve (A7/3y5) (-)	31-33	not used
4	Master brake cylinder switchover valve (Y61)	20	ASR/ETS hydraulic unit, left front axle solenoid valve (release) (A7/3y7) (-)	34	Right front axle VSS sensor (L6/2) (+)
5-6	not used	21	Model 140: SPS P-valve (Y10) (-)	35	not used
7	ASR/ETS hydraulic unit, high-pressure/return pump relay (A7/3k2) and solenoid valve relay (A7/3k1)	22	Model 140: SPS P-valve (Y10) (+)	36	ASR/ETS hydraulic unit, high-pressure/return pump relay (A7/3k2) control
8-9	not used	23	ASR/ETS hydraulic unit, right rear axle solenoid valve (hold) (A7/3y12) (-)	37	not used
10	Left front axle VSS sensor (L6/1) (-)	24	ASR/ETS hydraulic unit, right rear axle solenoid valve (hold) (A7/3y13) (-)	38	ASR/ETS hydraulic unit, right front axle solenoid valve (hold) (A7/3y8) (-)
11-12	not used	25-26	not used	39	ASR/ETS hydraulic unit, right front axle solenoid valve (release) (A7/3y9) (-)
13	Right front axle VSS sensor (L6/2) (-)	27	ASR/ETS hydraulic unit, solenoid valve relay (A7/3k1) (-)	40-41	not used
14-16	not used	28	ASR/ETS hydraulic unit, high-pressure/return pump relay (A7/3k2) (-)		