

6.3 Model 202 up to 05/94

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Diagnosis - Diagnostic Trouble Code (DTC) Memory

Test Preparation for DTC Readout

1. Connect impulse counter scan tool or Hand-Held Tester to 38-pole data link connector (X11/4) as shown in section 0.

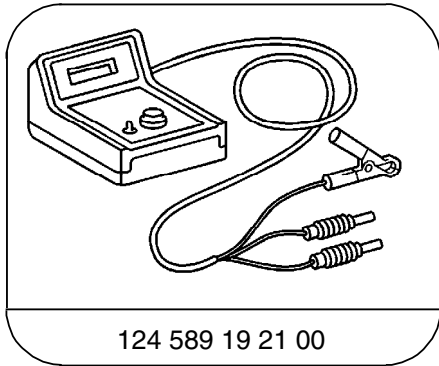
Note:

Connect yellow wire from impulse counter scan tool as follows:
ABS control module (N30) socket 6

3. Read out DTC memory of ABS control module (N30).

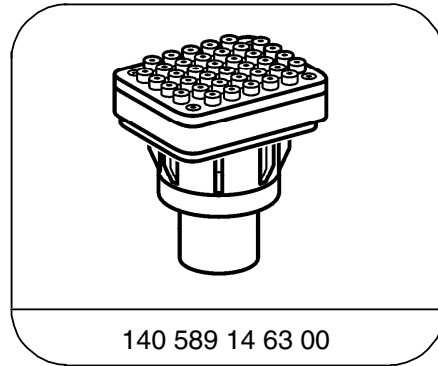
2. Ignition: **ON**.

Special Tools



124 589 19 21 00

Pulse counter



140 589 14 63 00



Adapter

Equipment

Hand-Held Tester (HHT)

see applicable Service Information in groups 58 and 99.

Diagnosis - Diagnostic Trouble Code (DTC) Memory

Diagnostic trouble code (DTC)  	Possible cause	Test step/Remedy ¹⁾
1 -	No faults recognized. In case of complaint:	23 (entire test)
2 002	Left front axle vehicle speed sensor (L6/1), open circuit	23 ⇒ 7.0
3 003	Right front axle vehicle speed sensor (L6/2), open circuit	23 ⇒ 9.0
4 004	Rear axle vehicle speed sensor (L6), open circuit	23 ⇒ 11.0
6 006	Left front axle solenoid valve (A7y1)	23 ⇒ 13.0
7 007	Right front axle solenoid valve (A7y2)	23 ⇒ 14.0
8 008	Rear axle solenoid valve (A7y3)	23 ⇒ 15.0
10 010	Return pump (A7m1) or return pump relay (A7k2)	23 ⇒ 6.0
11 011	Solenoid valve relay (A7k1)	23 ⇒ 5.0
15 015	ABS control module (N30)	Replace N30.
16 016	Implausible signal, vehicle speed sensors (L6/1, L6/2, L6) ²⁾	23 ⇒ 7.0, 9.0, 11.0, Visual inspection.
17 017	Low battery voltage	23 ⇒ 1.0
25 025	Implausible signal, left front vehicle speed sensor (L6/1) ²⁾	23 ⇒ 7.0
26 026	Implausible signal, right front vehicle speed sensor (L6/2) ²⁾	23 ⇒ 9.0
27 027	Implausible signal, rear axle vehicle speed sensor (L6) ²⁾	23 ⇒ 11.0

¹⁾ Observe Preparation for Test, see 22.

²⁾ Rotor tooth count wrong or dirty/damaged, or wrong rear axle ratio, tires or wheels.

Diagnosis - Complaint Related Diagnostic Chart

Complaint/Problem	Possible cause	Remedy/Test step ¹⁾
ABS malfunction indicator lamp (MIL) (A1e17) comes on with engine running.		Read DTC memory: 11.
ABS malfunction indicator lamp (MIL) (A1e17) comes on and stays on while driving.		Read DTC memory: 11.
ABS malfunction indicator lamp (MIL) (A1e17) comes on and goes out while driving.	Voltage supply < 11 V, too many electrical consumers in use.	Test generator (G2), Read DTC memory: 11.
ABS malfunction indicator lamp (MIL) (A1e17) does not come on with ignition ON .	Wiring, ABS malfunction indicator lamp (MIL) (A1e17)	23 ⇒ 2.0

¹⁾ Observe Preparation for Test, see 22.

Electrical Test Program - Component Locations

Electrical Components on Front Axle and in Engine Compartment

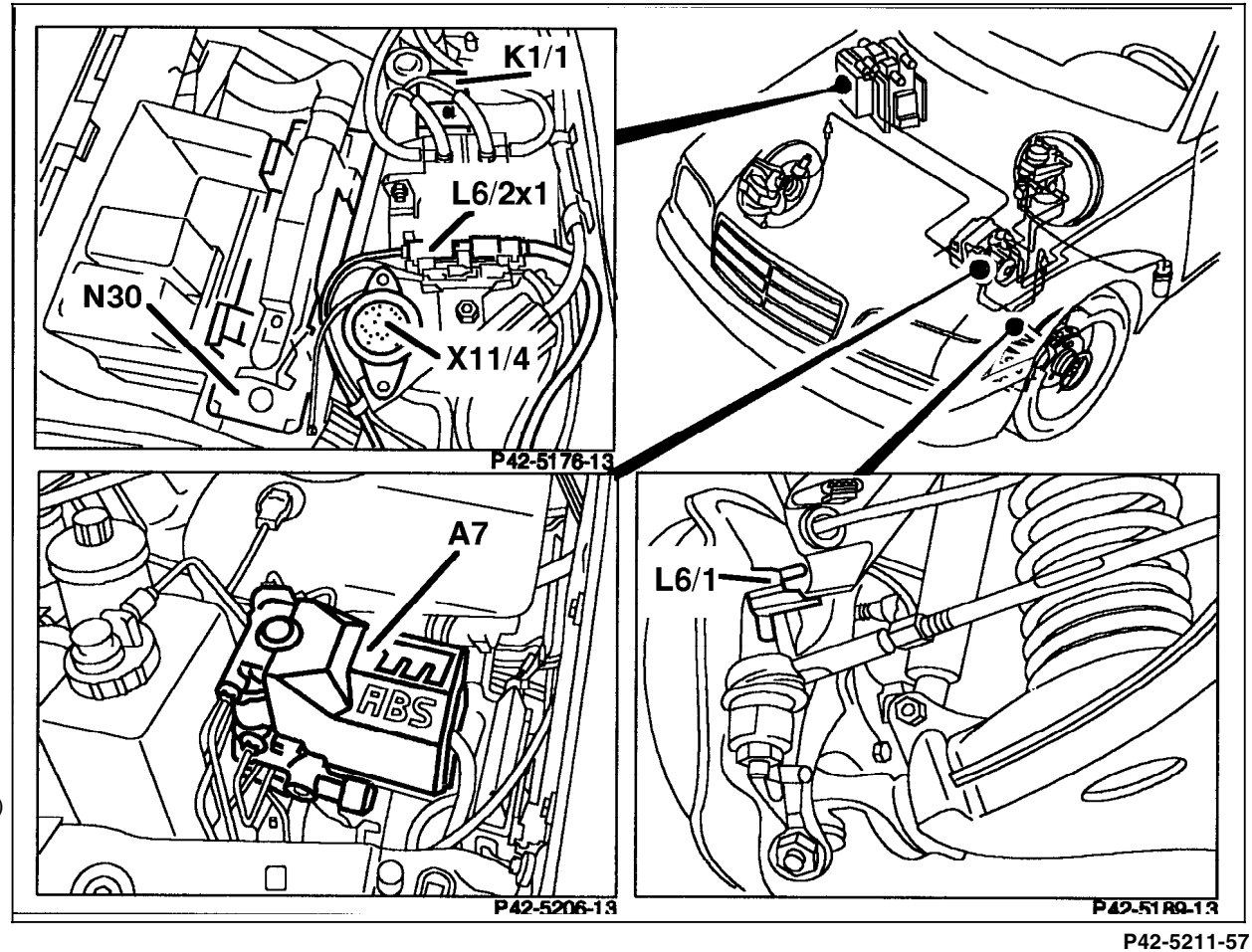


Figure 1

- A7 ABS hydraulic unit
- K1/1 Overvoltage protection relay module (87E 7-pole)
- L6/1 Left front axle vehicle speed sensor
- L6/2 Right front axle vehicle speed sensor
- N30 ABS control module
- X11/4 Data link connector (38-pole)

Electrical Test Program - Component Locations

Electrical Components on Rear Axle and in Passenger Compartment

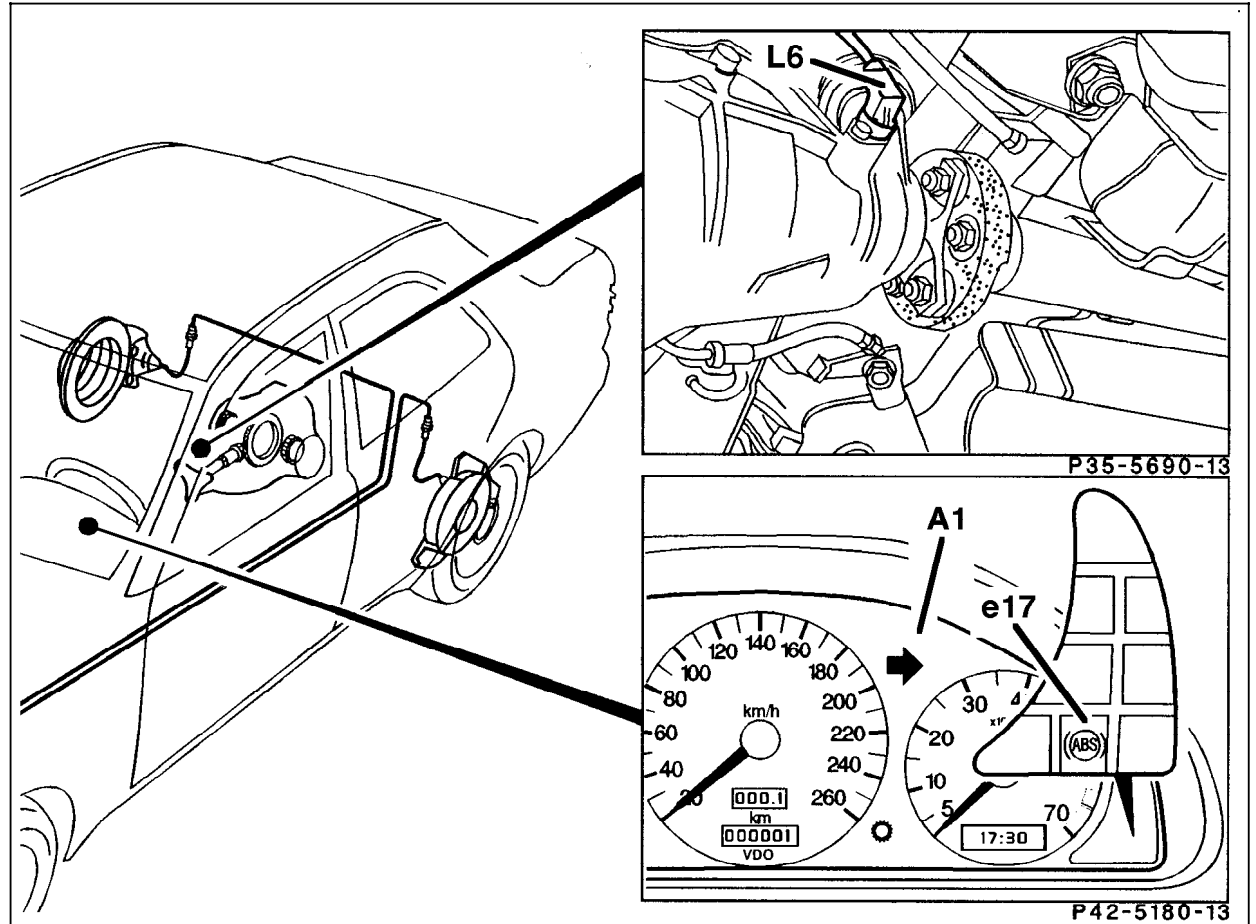


Figure 2

- A1 Instrument cluster
- A1e17 ABS malfunction indicator lamp
- L6 Rear axle vehicle speed sensor

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Electrical Test Program - Preparation for Test

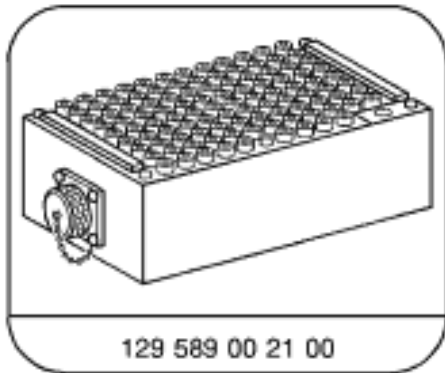
Preliminary work:
 Diagnosis - Diagnostic Trouble Code (DTC) Memory 11

1. Ignition: **OFF**.
2. Provide access to ABS control module (N30).
3. Connect socket box (126-pole) with test cable according to connection diagram (Figure 1).

Electrical Wiring Diagrams:

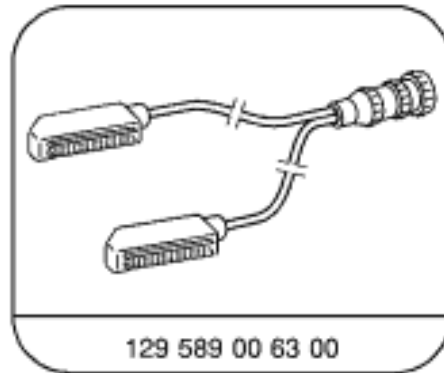
Electrical Troubleshooting Manual, Model 202, Volume 1, ABS, group 42.

Special Tools



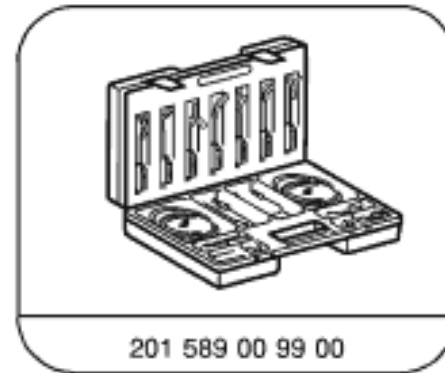
129 589 00 21 00

Connect socket box



129 589 00 63 00

35-pin test cable



201 589 00 99 00

Electrical connecting set

Equipment

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

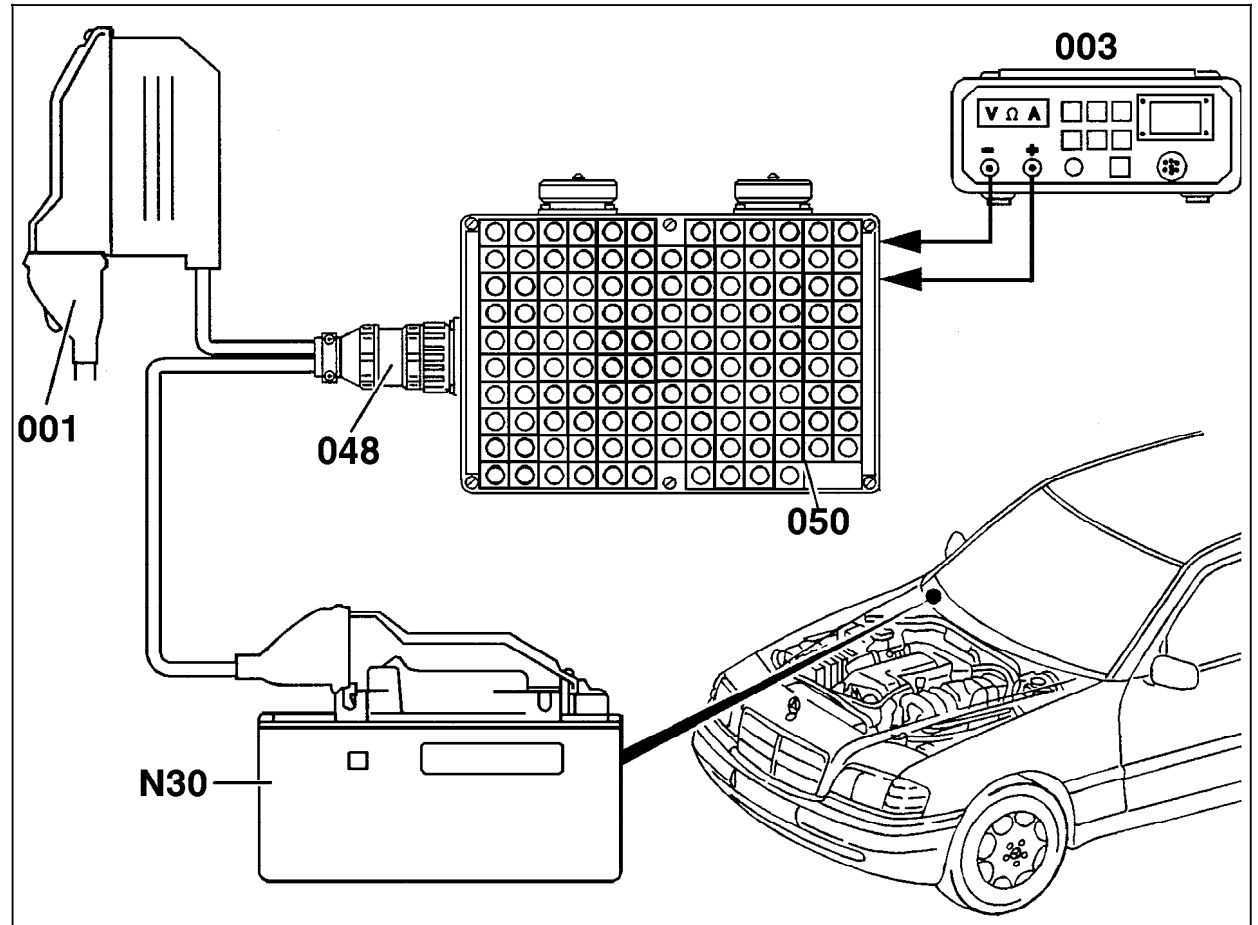


Figure 1

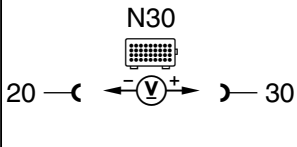
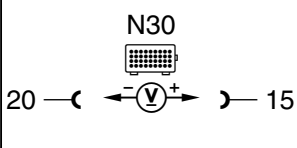
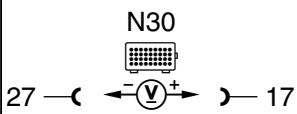
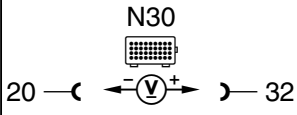
- 001 Connection from ABS control module
- 003 Multimeter
- 050 Socket box (126-pole)
- 048 Test cable
- N30 ABS control module

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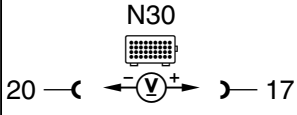
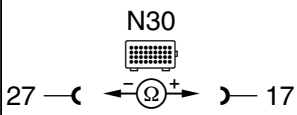
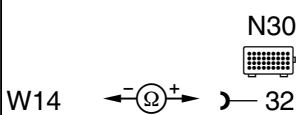

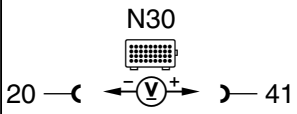
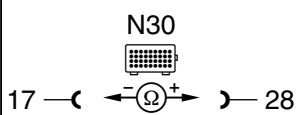
Electrical Test Program - Test

Test step DTC	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 1.0	ABS control module (N30) Voltage supply Circuit 87 E	<p>N30 20 —(V)— 1 34 —(V)— 1</p>	Ignition: ON	11 – 14 V	⇒ 1.1, Wiring, Ground, (component compartment, W16/4, Figure 5).
⇒ 1.1	Voltage supply from overvoltage protection relay module (K1/1)	<p>N30 W16/4 —(V)— 1 (Figure 5)</p>	Ignition: ON	11 – 14 V	Fuse at K1/1, Wiring, K1/1.
⇒ 2.0	ABS malfunction indicator lamp (MIL) (A1e17)	<p>N30 20 —(V)— 29</p>	Ignition: ON Engine: At idle	< 2 V A1e17: ON 10 – 14 V A1e17: OFF	Wiring, ABS MIL (A1e17), ⇒ 2.1 Fault stored, Read DTC memory: 11, Wiring, ABS control module (N30).

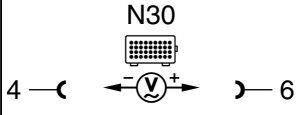
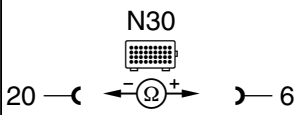
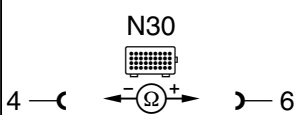
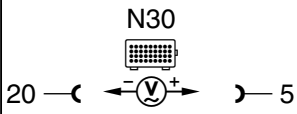
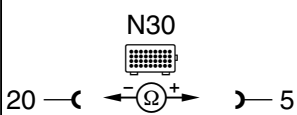
Electrical Test Program - Test

Test step DTC	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 2.1	Diode in solenoid valve (A7k1)		Engine: OFF Disconnect ABS control module (N30). Ignition: ON Engine: At idle	A1e17: ON A1e17: ON	Wiring, A7k1.
⇒ 3.0	Diagnosis output		Ignition: ON	10 – 14 V	Wiring, ABS control module (N30).
⇒ 4.0	Circuit 61 Voltage		Ignition: ON Engine: Start	< 1 V 11 – 14 V	Wiring, Generator (G2).
⇒ 5.0	Solenoid valve relay (A7k1)		Ignition: ON	10 – 14 V	DTC stored, see 11(clear DTC), ⇒ 5.1 to 5.3
	Control				
	Monitor			11 – 14 V	Wiring.

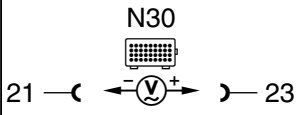
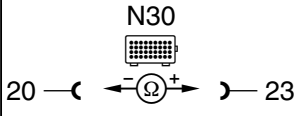
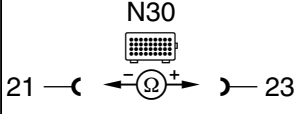
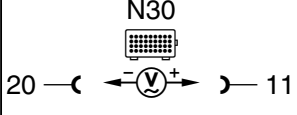
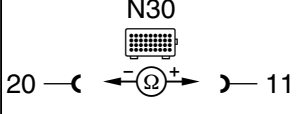
Electrical Test Program - Test

Test step DTC	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 5.1	Voltage supply		Ignition: ON	11 – 14 V	Wiring, ⇒ 1.0, ABS control module (N30).
⇒ 5.2	Coil resistance		Ignition: OFF Disconnect ABS control module (N30).	40 – 80 Ω	Wiring, Solenoid valve relay (A7k1).
⇒ 5.3	Operational contact		Ignition: OFF Disconnect N30.	< 1 Ω	Wiring, Solenoid valve relay (A7k1),
⇒ 6.0	 Return pump relay (A7k2) Voltage supply		Ignition: ON	11 – 14 V	Wiring, ⇒ 6.1, Return pump (A7m1).
⇒ 6.1	Coil resistance		Ignition: OFF Disconnect N30.	40 – 80 Ω	Wiring, Return pump (A7k2, Figure 1).

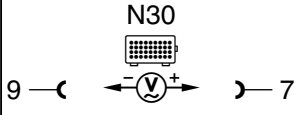
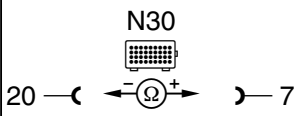
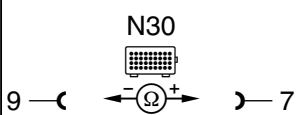
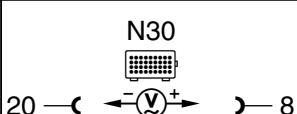
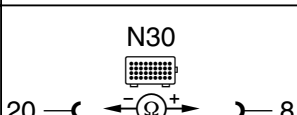
Electrical Test Program - Test

Test step DTC	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 7.0 2 16 25	Left front axle vehicle speed sensor (L6/1)	N30 	Lift front of vehicle. Ignition: ON Rotate left front wheel.	> 0.1 V~	⇒ 7.1, ⇒ 7.2
⇒ 7.1	Insulation resistance	N30 	Ignition: OFF Disconnect N30.	> 20 kΩ	Wiring.
⇒ 7.2	Internal resistance	N30 	Ignition: OFF Disconnect (N30) from socket box.	0.8 – 3.7 kΩ	Wiring, L6/1.
⇒ 8.0	Left front axle vehicle speed sensor output	N30 	Lift front of vehicle. Ignition: ON Rotate left front wheel.	> 3 V~	Wiring, ⇒ 7.0, ⇒ 8.1
⇒ 8.1	Circuit loading from connected control modules	N30 	Ignition: OFF Disconnect N30.	> 5 kΩ	Wiring, Connected control modules (A1, A2, N4/1, N4/2, N22).


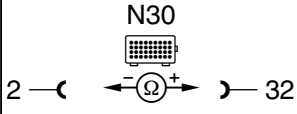

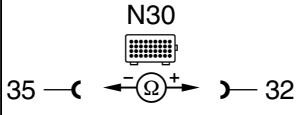

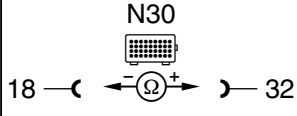
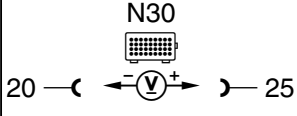
Electrical Test Program - Test

Test step DTC	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 9.0 3 16 26	Right front axle vehicle speed sensor (L6/2)	N30 	Lift front of vehicle. Ignition: ON Rotate right front wheel.	> 0.1 V	⇒ 9.1, ⇒ 9.2
⇒ 9.1	Insulation resistance	N30 	Ignition: OFF Disconnect N30.	> 20 kΩ	Wiring.
⇒ 9.2	Internal resistance	N30 	Ignition: OFF Disconnect N30.	0.8 – 3.7 kΩ	Wiring, L6/2.
⇒ 10.0	Right front axle vehicle speed sensor output	N30 	Lift front of vehicle. Ignition: ON Rotate right front wheel.	> 3 V~	Wiring, ⇒ 9.0, ⇒ 10.1
⇒ 10.1	Circuit loading from connected control modules	N30 	Ignition: OFF Disconnect N30.	> 5 kΩ	Wiring, Connected control modules (N30/2).

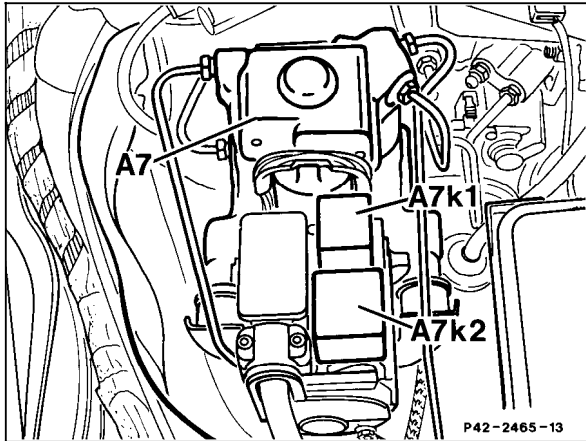
Electrical Test Program - Test

Test step DTC	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 11.0 4 16 27	Rear axle vehicle speed sensor (L6)	N30 	Lift rear of vehicle. Ignition: ON Rotate a rear wheel	> 0.1 V	⇒ 11.1, ⇒ 11.2
⇒ 11.1	Insulation resistance	N30 	Ignition: OFF Disconnect (N30).	>20 kΩ	Wiring.
⇒ 11.2	Internal resistance	N30 	Ignition: OFF Disconnect N30.	0.6 – 3.2 kΩ	Wiring, L6.
⇒ 12.0	Rear axle vehicle speed sensor output	N30 	Lift rear of vehicle. Ignition: ON Rotate a rear wheel.	> 3 V~	⇒ 11.0, ⇒ 12.1
⇒ 12.1	Circuit loading from connected control modules	N30 	Disconnect N30. Ignition: ON Rotate a rear wheel.	>5 kΩ	Wiring, Connected control modules (N3/4, N4/2, N30/2).

Electrical Test Program - Test

Test step DTC	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 13.0	 Left front axle solenoid valve (A7y1) Internal resistance		Ignition: OFF Disconnect N30.	0.7 – 2.2 kΩ	Wiring, ABS hydraulic unit (A7).
⇒ 14.0	 Right front axle solenoid valve (A7y2) Internal resistance		Ignition: OFF Disconnect N30.	0.7 – 2.2 kΩ	Wiring, ABS hydraulic unit (A7).
⇒ 15.0	 Rear axle vehicle solenoid valve (A7y3) Internal resistance		Ignition: OFF Disconnect N30.	0.7 – 2.2 kΩ	Wiring, ABS hydraulic unit (A7).
⇒ 16.0	Stop lamp switch (2-pole) (S9) N. O. contact		Ignition: ON Brake not applied. Brake applied.	< 1 V 11 – 14 V	Wiring, S9.

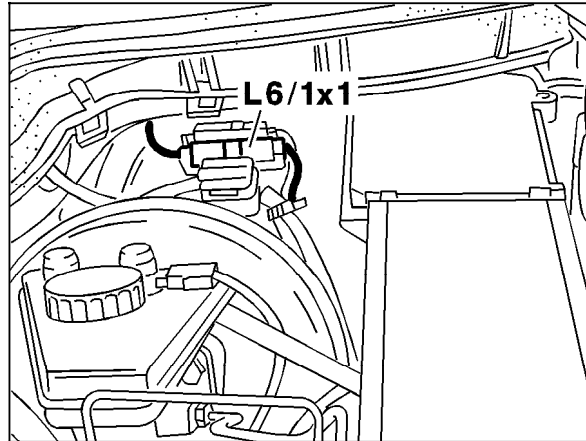
Electrical Test Program - Test



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P42-2465-13

Figure 1

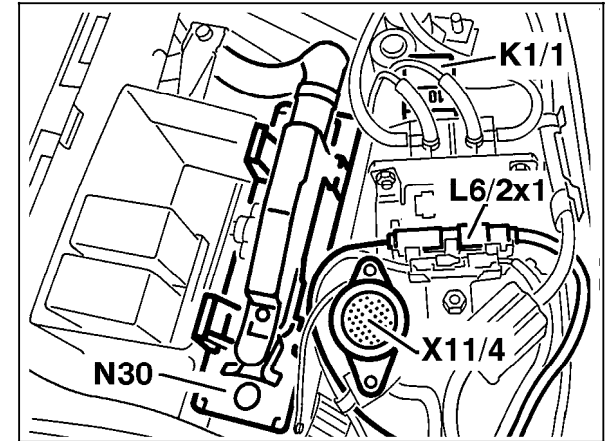
- A7k1 Solenoid valve relay
- A7k2 Return pump relay



P42-5179-13
P42-5179-13

Figure 2

- L6/1x1 Left front axle vehicle speed sensor harness connector

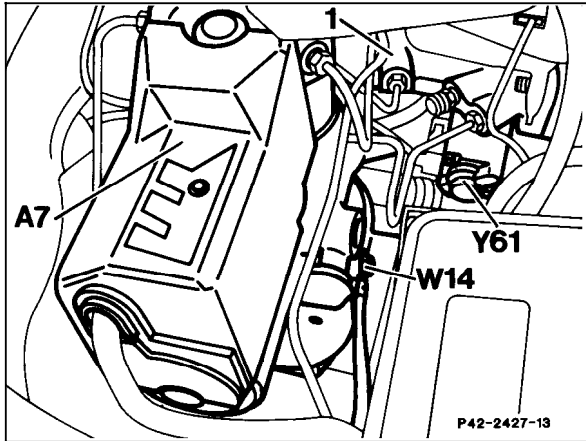


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P42-5176-13

Figure 3

- L6/2x1 Right front vehicle speed sensor harness connector

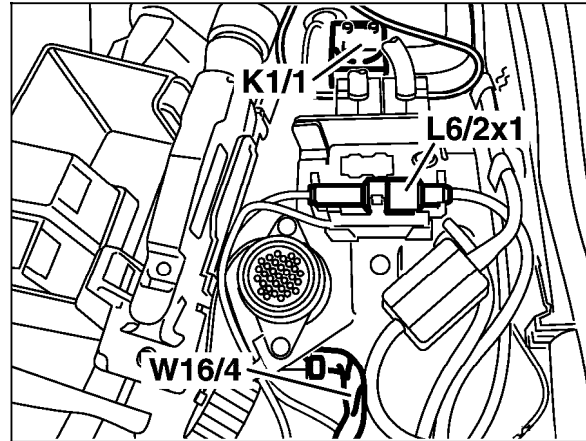
Electrical Test Program - Test



P42-2427-13

Figure 4

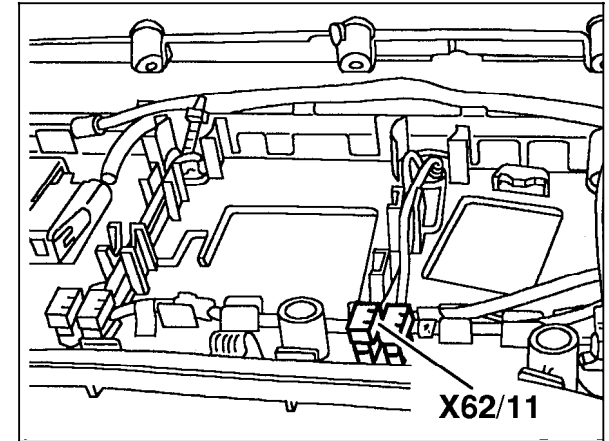
W14 Ground (ABS hydraulic unit bracket)



P42-5196-13

Figure 5

W16/4 Ground (component compartment - right)



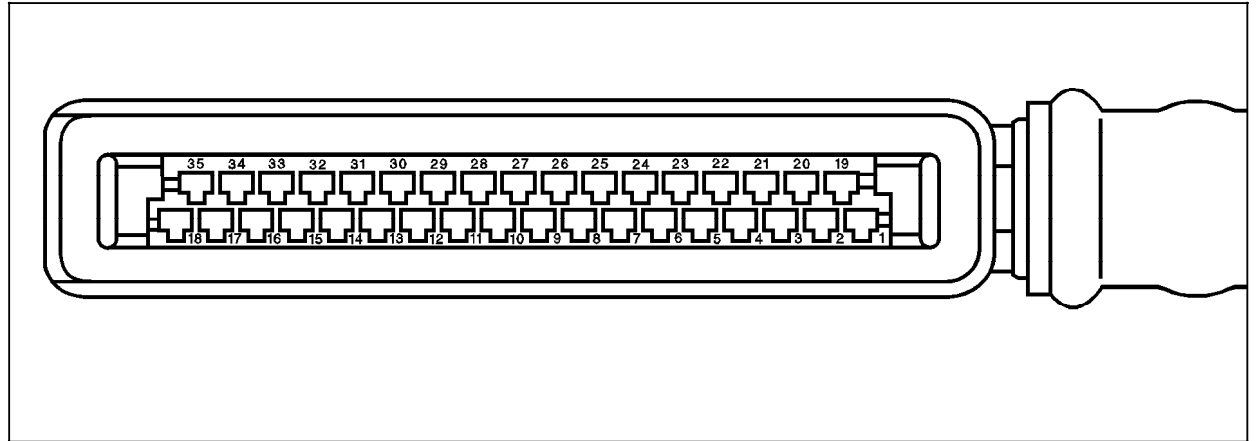
P42-5260-13

Figure 6

X62/1 Left rear axle vehicle speed sensor connector (2-pole)

Electrical Test Program - Test

Layout of connector for ABS control module (N30)



P42-5197-53

Figure 7

1	Circuit 87, voltage supply	18	Rear axle solenoid valve (A7y3) (–)
2	Left front axle solenoid valve (A7y1) (–)	19	–
3	–	20	Ground, (component compartment, right) (W16/4)
4	Left front axle vehicle speed sensor (L6/1) (–)	21	Right front axle vehicle speed sensor (L6/2) (–)
5	Left front vehicle speed sensor output	22	–
6	Left front axle vehicle speed sensor (L6/1) (+)	23	Right front axle vehicle speed sensor (L6/2) (+)
7	Rear axle vehicle speed sensor (L6) (+)	24-26	–
8	Rear axle vehicle speed sensor output	27	Solenoid valve relay (A7k1) (monitor)
9	Rear axle vehicle speed sensor (L6) (–)	28	–
10	–	29	ABS malfunction indicator lamp (A1e17)
11	Right front axle vehicle speed sensor output	30	Diagnosis output
12-13	–	31	–
14	Return pump relay (A7k2) (monitor)	32	Solenoid valve relay (A7k1) (+)
15	Circuit 61, voltage supply	33	–
16	–	34	Ground, (component compartment, right) (W16/4)
17	Return pump relay (A7k2) and solenoid valve relay (A7k1), voltage supply	35	Right front axle solenoid valve (A7y2) (–)