

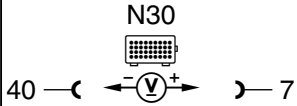
## 6.2 Anti-lock Brake System (ABS)

Models 124.034, 129 (HFM-SFI only), 140

### Electrical Test Program - Test

Test step DTC	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 1.0	<b>ABS control module (N30)</b> Voltage supply Circuit 87 ABS	<p>N30 40 —(V)— 24 21 —(V)— 24</p>	Ignition: <b>ON</b>	11 – 14 V	⇒ 1.1
⇒ 1.1	Voltage supply from base module (N16/1)	<p>N30 W16/1 —(V)— 24</p>	Ignition: <b>ON</b>	11 – 14 V	Fuse (F1) at base module, N16/1), Volume 1, 1.1 or 1.2 23, respectively, Wiring, ⇒ 1.2.
⇒ 1.2	Ground wire	<p><b>Model 124.034, 129</b></p> <p>N30 W27 —(Ω)— 40 W27 —(Ω)— 21</p> <p><b>Model 140</b></p> <p>N30 W15 —(Ω)— 40 W15 —(Ω)— 21</p>	Ignition: <b>ON</b> Pull out ABS control module out of contact box	< 1 Ω	Wiring, <b>Model 124.034, 129</b> Ground (module box bracket) (W27), <b>Model 140</b> Ground (electronics output ground - right footwell) (W15).

Electrical Test Program - Test

Test step DTC	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 2.0	<b>ABS malfunction indicator lamp (MIL) (A1e17)</b>	 <p>N30 40 —( —( ← ⊖ ⊕ → —( —( ) — 7</p>	Ignition: <b>ON</b>  Engine: <b>At idle</b>	< 2 V A1e17: <b>ON</b>  10 – 14 V A1e17: <b>OFF</b>	Wiring, A1e17, ⇒ 2.1.  DTC memory 11, Wiring, ABS control module (N30).
⇒ 2.1	Diode in solenoid valve relay (A7k1)		Engine: <b>OFF</b> Pull ABS control module (N30) out of contact box.  Ignition: <b>ON</b>  Engine: <b>At idle</b>	A1e17: <b>ON</b>  A1e17: <b>ON</b>	Wiring, A7k1.

Electrical Test Program - Test

Test step DTC	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 3.0	<b>Diagnosis output</b>	<p>N30 40 —( ←(V)→ )— 26</p>	Ignition: <b>ON</b>	10 – 14 V	Wiring, ABS control module (N30).
⇒ 4.0	<b>Circuit 61 voltage</b>	<p>N30 40 —( ←(V)→ )— 4</p>	Ignition: <b>ON</b>  Engine: <b>At idle</b>	< 1 V  11 – 14 V	Wiring, Generator (G2)
⇒ 5.0	<b>Solenoid valve relay (A7k1)</b>	<p>N30 36 —( ←(V)→ )— 15</p>	Ignition: <b>ON</b>	10 – 14 V	DTC memory 11, readout DTC's, clear DTC's, ⇒ 5.1.
	Monitoring	<p>40 —( ←(V)→ )— 41</p>		11 – 14 V	
⇒ 5.1	Voltage supply	<p>N30 40 —( ←(V)→ )— 15</p>	Ignition: <b>ON</b>	11 – 14 V	⇒ 1.0, Wiring, ABS control module (N30), ⇒ 5.2.

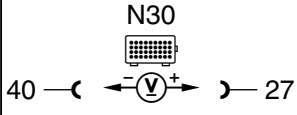
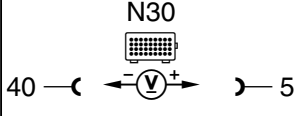
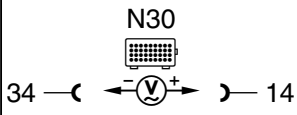
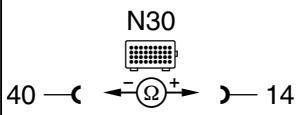
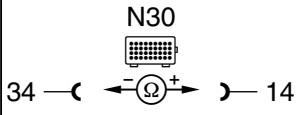
Electrical Test Program - Test

Test step DTC	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 5.2	Coil resistance		Ignition: <b>OFF</b> Pull ABS control module (N30) out of contact box.	40 – 80 Ω	Wiring, Solenoid valve relay (A7k1), ⇒ 5.3.
⇒ 5.3	Operational contact		Ignition: <b>OFF</b> Pull ABS control module (N30) out of contact box.	< 1 Ω	Wiring, Solenoid valve relay (A7k1).
⇒ 6.0	<b>Return pump relay (A7k2)</b> Voltage supply		Ignition: <b>ON</b>	11 – 14 V	Wiring, ⇒ 6.1, Return pump (A7m1).
⇒ 6.1	Coil resistance		Ignition: <b>OFF</b> Pull ABS control module (N30) out of contact box.	40 – 80 Ω	Wiring, Return pump relay (A7k2).
⇒ 7.0 (Models 140.04/05 only)	<b>Master cylinder switchover valve (ABS) (Y61)</b> Internal resistance		Ignition: <b>OFF</b> Pull ABS control module (N30) out of contact box.	7 – 8 Ω	Wiring, Y61.

Electrical Test Program - Test

Test step DTC	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 8.0 14 29 (Models 140.04/05 only )	Lateral acceleration sensor (B24/2) Voltage supply		Ignition: <b>ON</b>	4.75 – 5.25 V	Wiring, B24/2, ⇒ 8.1
	Sensor signal in rest position			2.35 – 2.65 V	
	Sensor signal		<b>Vigorously</b> shake vehicle sideways.	> 0.01 V <b>Note:</b> Value varies with movement.	
⇒ 8.1	Voltage supply at sensor input		Ignition: <b>OFF</b> Unplug connector from lateral acceleration sensor (B24/2).	4.75 – 5.25 V	Wiring, ABS control module (N30).

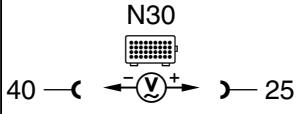
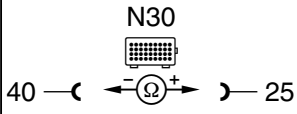
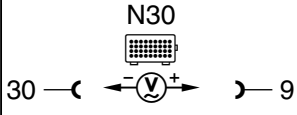
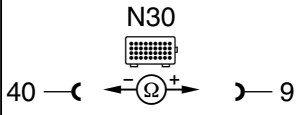
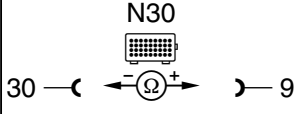
Electrical Test Program - Test

Test step DTC	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 9.0	<b>Stop lamp switch (S9/1)</b>  N. O. contact  N. C. contact	 N30 40 —( —( ←(V)→ —( —( )— 27	Ignition: <b>ON</b>  Brakes <b>not</b> applied  Brakes applied	< 1 V  11 – 14 V	Wiring, S9/1.
		 N30 40 —( —( ←(V)→ —( —( )— 5	Brakes <b>not</b> applied  Brakes applied	11 – 14 V  < 1 V	
⇒ 10.0	<b>Left front axle vehicle speed sensor (L6/1)</b>	 N30 34 —( —( ←(Ω)→ —( —( )— 14	Lift front of vehicle. Ignition: <b>ON</b> Turn left front wheel by hand.	> 0.1 V	⇒ 10.1, ⇒ 10.2.
⇒ 10.1	Insulation resistance	 N30 40 —( —( ←(Ω)→ —( —( )— 14	Ignition: <b>OFF</b> Pull ABS control module (N30) out of contact box.	>20 kΩ	Wiring.
⇒ 10.2	Internal resistance	 N30 34 —( —( ←(Ω)→ —( —( )— 14	Ignition: <b>OFF</b> Pull ABS control module (N30) out of contact box.	0.8 – 3.7 kΩ	Wiring, L6/1.

Electrical Test Program - Test

Test step DTC	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 11.0	<b>Left front axle vehicle speed sensor output</b>	<p>N30 40 —(V)— 3</p>	Lift front of vehicle. Ignition: <b>ON</b> Turn left front wheel by hand.	> 3 V	Wiring, ⇒ 10.0, ⇒ 11.1.
⇒ 11.1	Circuit loading from connected control modules	<p>N30 40 —(Ω)— 3</p>	Ignition: <b>OFF</b> Pull ABS control module (N30) out of contact box.	>5 k Ω	Wiring, Connected control modules (N4/3, N10/2, N22 or A1, A2, A2/3).
⇒ 12.0	<b>Right front axle vehicle speed sensor (L6/2)</b>	<p>N30 13 —(V)— 33</p>	Lift front of vehicle. Ignition: <b>ON</b> Turn right front wheel by hand.	> 0.1 V	⇒ 12.1, ⇒ 12.2.
⇒ 12.1	Insulation resistance	<p>N30 40 —(Ω)— 33</p>	Ignition: <b>OFF</b> Pull ABS control module (N30) out of contact box.	>20 kΩ	Wiring.
⇒ 12.2	Internal resistance	<p>N30 13 —(Ω)— 33</p>	Ignition: <b>OFF</b> Pull ABS control module (N30) out of contact box.	0.8 – 3.7 kΩ	Wiring, L6/2.

Electrical Test Program - Test


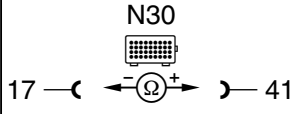
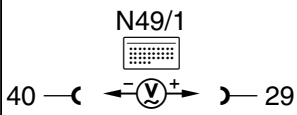

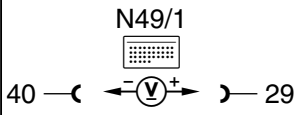
Test step DTC	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 13.0	<b>Right front axle vehicle speed sensor output</b>	 <p>N30 40 —( —( ←(V)→ —( —( )— 25</p>	Lift front of vehicle. Ignition: <b>ON</b> Turn right front wheel by hand.	> 3 V	Wiring, ⇒ 12.0, ⇒ 13.1.
⇒ 13.1	Circuit loading from connected control modules	 <p>N30 40 —( ←(Ω)→ —( —( )— 25</p>	Ignition: <b>OFF</b> Pull ABS control module (N30) out of contact box.	>5 k Ω	Wiring, Connected control modules, (N16/1, N30/2, N51).
⇒ 14.0	<b>Rear axle vehicle speed sensor (L6)</b>	 <p>N30 30 —( ←(V)→ —( —( )— 9</p>	Lift rear of vehicle. Ignition: <b>ON</b> Turn one rear wheel by hand.	> 0.1 V	⇒ 14.1, ⇒ 14.2.
⇒ 14.1	Insulation resistance	 <p>N30 40 —( ←(Ω)→ —( —( )— 9</p>	Ignition: <b>OFF</b> Pull ABS control module (N30) out of contact box.	>20 kΩ	Wiring,
⇒ 14.2	Internal resistance	 <p>N30 30 —( ←(Ω)→ —( —( )— 9</p>	Ignition: <b>OFF</b> Pull ABS control module (N30) out of contact box.	0.6 – 3.2 kΩ	Wiring, Rear axle vehicle speed sensor (L6).



Electrical Test Program - Test

Test step DTC	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 15.0	<b>Rear axle vehicle speed sensor output</b>		Lift front of vehicle. Ignition: <b>ON</b> Turn one rear wheel by hand.	> 3 V	⇒ 14.0, ⇒ 15.1.
⇒ 15.1	Circuit loading from connected control modules		Pull ABS control module (N30) out of contact box. Ignition: <b>ON</b> Turn one rear wheel by hand.	>5 k Ω	Wiring, Connected control modules, (N4/3, N30/2, N49/1).
⇒ 16.0	<b>Left front axle solenoid valve (A7y1)</b> Internal resistance		Ignition: <b>OFF</b> Pull ABS control module (N30) out of contact box.	0.7 – 2.2 kΩ	Wiring, ABS hydraulic unit (A7).
⇒ 17.0	<b>Right front axle solenoid valve (A7y2)</b> Internal resistance		Ignition: <b>OFF</b> Pull ABS control module (N30) out of contact box.	0.7 – 2.2 kΩ	Wiring, ABS hydraulic unit (A7).

Electrical Test Program - Test

Test step DTC	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
⇒ 18.0	 <b>Rear axle solenoid valve (A7y3)</b> Internal resistance	N30 	Ignition: <b>OFF</b> Pull ABS control module (N30) out of contact box.	0.7 – 2.2 kΩ	Wiring, ABS hydraulic unit (A7).
⇒ 19.0  (Model 140.0 LH-SFI starting 06/93, HFM-SFI, 140.1 starting 02/93)	<b>Speed signal output status</b> Signal: Vehicle stationary	N49/1 	Ignition: <b>ON</b>	> 3 V	⇒ 19.1
⇒ 19.1	 Signal: fault	N49/1 	Ignition: <b>ON</b>	< 10 V	⇒ 10.0, ABS control module (N30).

Electrical Test Program - Test

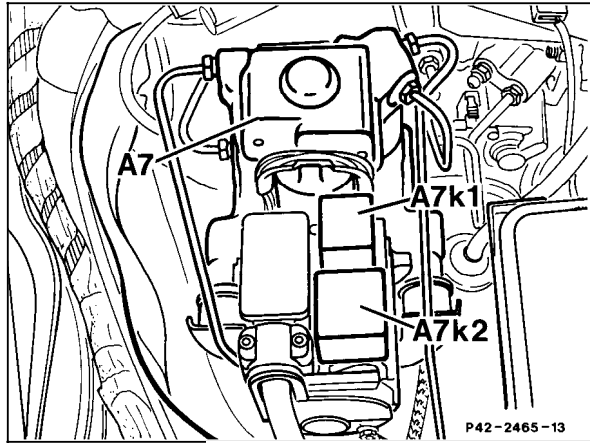


Figure 1

A7k1 Solenoid valve relay  
A7k2 Return pump relay

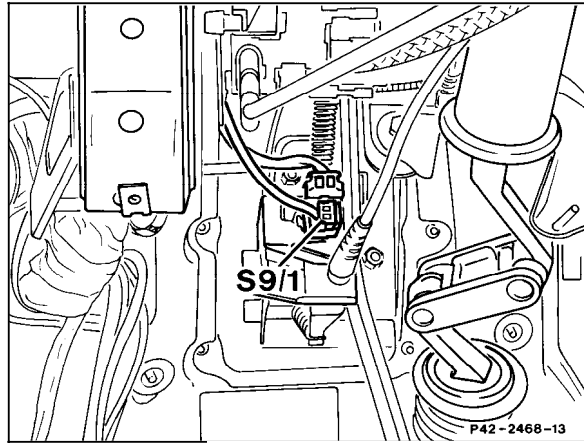


Figure 2

S9/1 Stop lamp switch

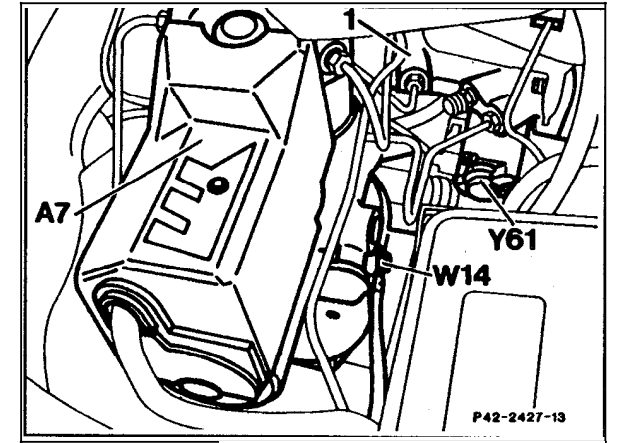
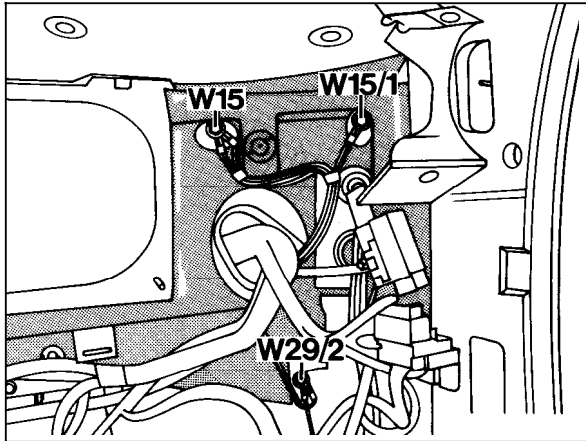


Figure 3

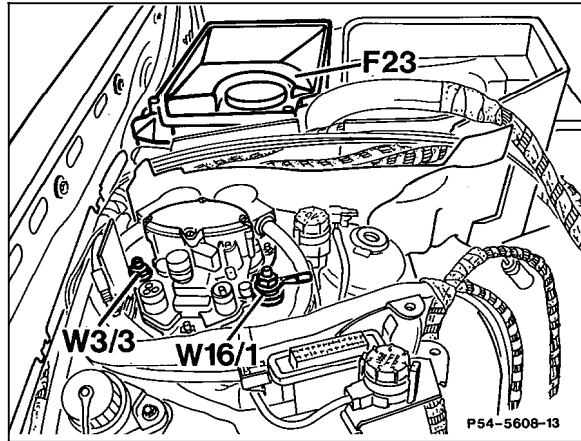
W14 Ground (ABS hydraulic unit bracket)

Electrical Test Program - Test



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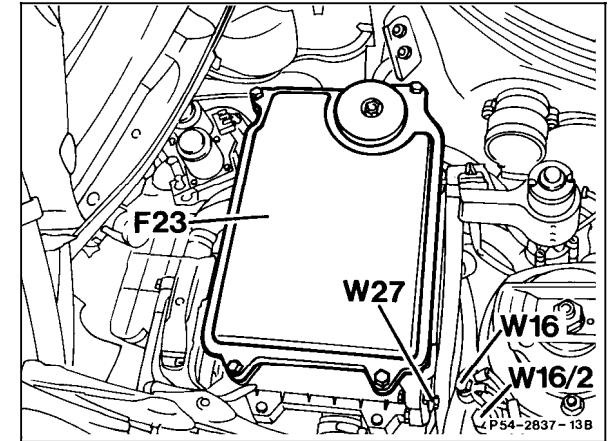
Figure 4  
Model 140  
W15 Ground (electronics output ground - right footwell)



P54-5608-13

P54-5608-13

Figure 5  
W16/1 Ground (right front spring tower)



P54-2837-13B

P54-2837-13B

Figure 6  
Model 124  
W16 Ground (component compartment)  
W27 Ground (module box bracket)

Electrical Test Program - Test

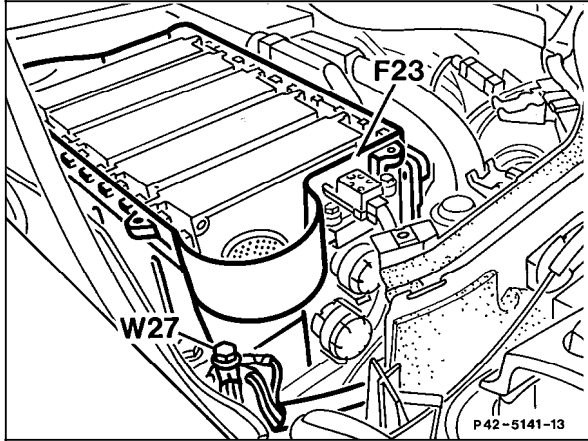


Figure 7  
Model 129  
W27 Ground (module box bracket)

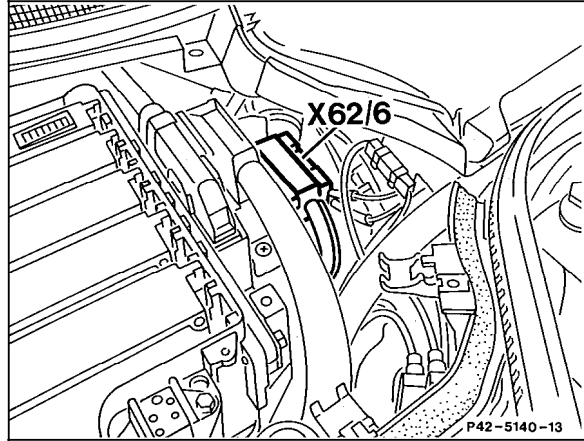


Figure 8  
Model 129  
X62/6 Right front axle vehicle speed sensor connector (component compartment)

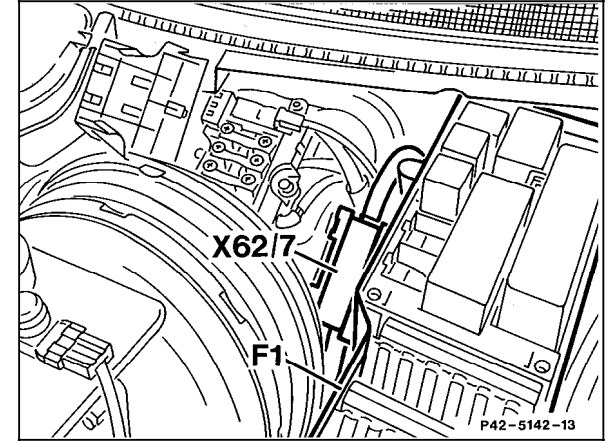


Figure 9  
Model 129  
X62/7 Left front axle vehicle speed sensor connector (component compartment)

Electrical Test Program - Test

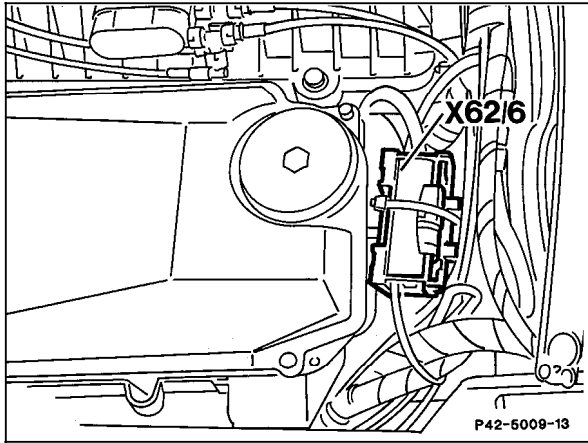


Figure 10  
Model 140  
X62/6 Right front axle vehicle speed sensor connector (component compartment)

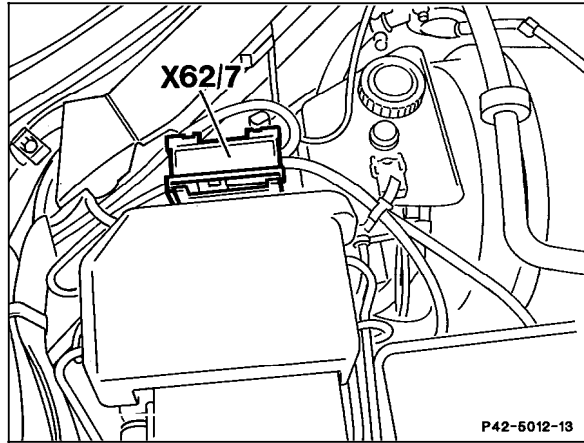


Figure 11  
Model 140  
X62/7 Left front axle vehicle speed sensor connector (component compartment)

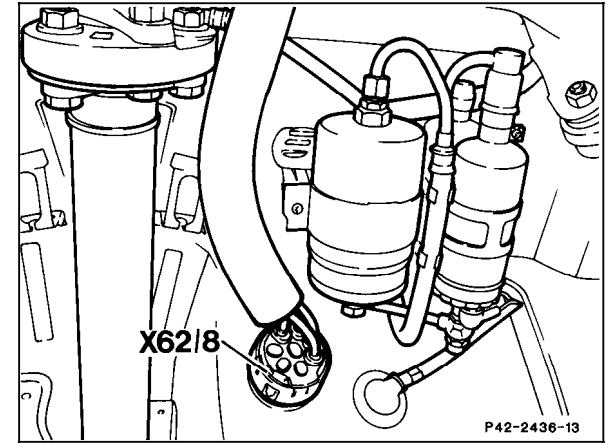


Figure 12  
X62/8 Rear axle multiple circuit junction connector

Electrical Test Program - Test

Layout of connector for ABS Control Module (N30)

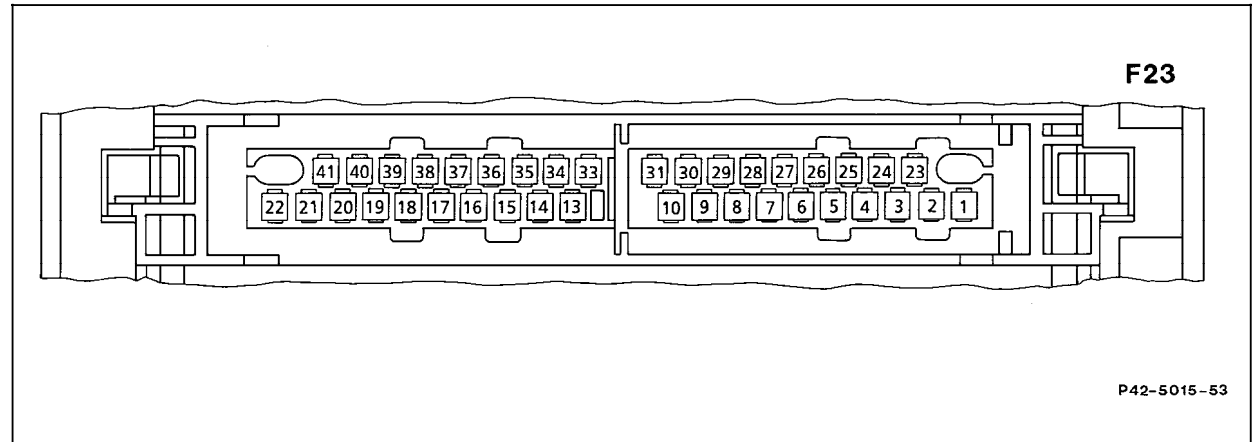


Figure 13

- F23 Module box
- 1 **Model 140.04/05** Voltage supply for lateral acceleration sensor (B24/2)
- 2 **Model 140.04/05** Signal from lateral acceleration sensor (B24/2)
- 3 Left front axle vehicle speed sensor output
- 4 Circuit 61 voltage
- 5 Stop lamp switch (S9/1) N. C. circuit
- 6 Rear axle vehicle speed sensor output
- 7 ABS malfunction indicator lamp (A1e17)
- 8 Not used
- 9 Rear axle vehicle speed sensor (L6) (+)
- 10-12 Not used
- 13 Right front axle vehicle speed sensor (L6/2) (-)
- 14 Left front axle vehicle speed sensor (L6/1) (+)
- 15 Voltage supply for return pump relay (A7k2)  
Solenoid valve relay (A7k1)
- 16 Not used
- 17 Rear axle solenoid valve (A7y3) (-)
- 19 Not used
- 20 Right front axle solenoid valve (A7y2) (-)
- 21 Ground (electronics output ground - right footwell) (W15)
- 22 Left front axle solenoid valve (A7y1) (-)
- 23 **Model 140.04/05** Ground for lateral acceleration sensor (B24/2)

- 24 Voltage supply from base module circuit 87 ABS
- 25 Right front axle vehicle speed sensor output
- 26 Diagnostic output
- 27 Stop lamp switch
- 28 Not used
- 29 Vehicle speed sensor output status
- 30 Rear axle vehicle speed sensor (L6) (-)
- 31-32 Not used
- 33 Right front axle vehicle speed sensor (L6/2) (+)
- 34 Left front axle vehicle speed sensor (L6/1) (-)
- 35 Ground for return pump relay (A7k2)
- 36 Ground for solenoid valve relay (A7k1)
- 37 Monitoring of return pump relay (A7k2)
- 38 **Model 140.04/05** activation of master cylinder switchover valve (ABS) (Y61)
- 40 Ground (electronics output ground - right footwell) (W15)
- 41 Monitoring of solenoid valve relay (A7k1)

P42-5015-53

P42-5015-53