

8.3 Engine 120 LH-SFI in Model 140

Diagnosis	Page
Diagnostic Trouble Code (DTC) Memory	11/1
 Electrical Test Program	
Component Locations	21/1
Preparation for Test	22/1
Test	23/1

Diagnosis - Diagnostic Trouble Code (DTC) Memory

Preparation for recalling diagnostic trouble code (DTC) memory

- 1. Connect impulse counter scan tool and adaptor for impulse counter scan tool to diagnostic connector (X11/4) according to connection diagram (see section 0).

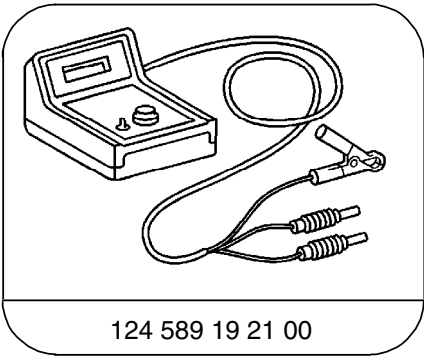
Note:
Connect impulse counter scan tool as follows:
red wire to socket 3,
black wire to socket 1 and
yellow wire to:

Diagnostic module	socket 19
Base module	socket 8

Left LH-SFI control module	socket 5
Right LH-SFI control module	socket 4
Left ignition control module	socket 18
Right ignition control module	socket 17
EA/CC/ISC control module	socket 7

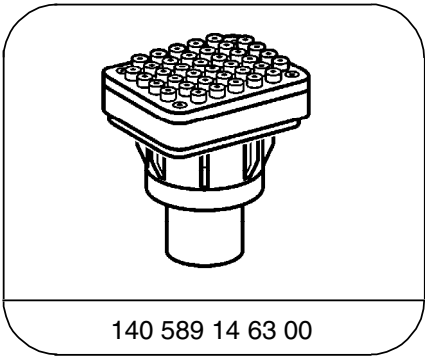
- 2. Recall control modules' DTC memory and clear stored codes (see section 0).

Special Tools



124 589 19 21 00

Pulse counter



140 589 14 63 00

Adapter

Diagnosis - Diagnostic Trouble Code (DTC) Memory

Diagnostic Trouble Code (DTC)	Possible Cause	Remedy/Test Step ¹⁾
1	No malfunction in systems monitored	—
2	Right heated O2S (G3/4) inoperative	DM, Engines, Vol. 2, section 3.2.
3	Right LH-SFI control module (N3/3), lambda control inoperative	DM, Engines, Vol. 2, section 3.2.
4	Air injection at right cylinder bank inoperative	DM, Engines, Vol. 2, section 3.2.
5	Right LH-SFI control module (N3/3), EGR inoperative	DM, Engines, Vol. 2, section 3.2.
6	Idle speed control inoperative	DM, Engines, Vol. 3, section 6.2.
7	Ignition system for right cylinder bank defective	DM, Engines, Vol. 2, section 5.3.
8	Right ECT sensor (B11/10), open/short circuit	DM, Engines, Vol. 2, section 3.2.
9	Right IAT sensor (B17/6), open/short circuit	DM, Engines, Vol. 2, section 3.2.
10	Voltage at right hot wire MAF sensor (B2/4) too high/low	DM, Engines, Vol. 2, section 3.2.
11	Right LH-SFI control module (N3/3), TN-signal (rpm) defective	DM, Engines, Vol. 2, section 3.2.
12	O2s heater of right heated O2s (G3/2), open/short circuit	DM, Engines, Vol. 2, section 3.2.
13	Right ignition control module (N1/5), CMP sensor signal defective.	DM, Engines, Vol. 2, section 3.2.
14	Intake manifold pressure at start (in right ignition control module - N1/5) too low/high	Vacuum supply to N1/5, DM, Engines, Vol. 2, section 5.2.

¹⁾ Observe Preparation for Test, see 22.

Diagnosis - Diagnostic Trouble Code (DTC) Memory

Diagnostic Trouble Code (DTC)	Possible Cause	Remedy/Test Step ¹⁾
15	WOT information defective	DM, Engines, Vol. 3, section 6.2.
16	CTP information defective	DM, Engines, Vol. 3, section 6.2.
17	Data exchange malfunction between right LH-SFI control module (N3/3), right DI control module (N1/5) and EA/CC/ISC control module (N4/1)	23 ⇒ 6.0.
18	Right adjustable camshaft timing solenoid (Y49/2), open/short circuit	DM, Engines, Vol. 2, section 3.2.
19	Right fuel injectors (Y64) open/short circuit or self-adaptation in right LH-SFI control module (N3/3) at limit	Test LH-SFI and reset right LH-SFI control module adaptation to mean value, see DM, Engines, Vol. 2, section 3.2.
20	Speed signal missing	DM, Engines, Vol. 3, section 6.2.
21	Right purge control valve (Y58/3), open/short circuit	DM, Engines, Vol. 2, section 3.2.
22	Right CMP sensor (L5/3) signal defective	DM, Engines, Vol. 2, section 5.3.
23	Intake manifold pressure (in right ignition control module - N1/5) with engine running too low/high	Vacuum supply to N1/5, DM, Engines, Vol. 2, section 5.3.
24	Starter ring gear segments and/or right CKP sensor (L5/5) defective	DM, Engines, Vol. 2, section 5.3.
25	Knock sensors (A30) or right ignition control module (N1/5) defective	DM, Engines, Vol. 2, section 5.3.
26	Upshift delay switchover valve (Y3/3) , open/short circuit	DM, Engines, Vol. 2, section 3.2.
27	Right ECT sensor (B11/10) deviation between sensor circuit 1 and sensor circuit 2	DM, Engines, Vol. 2, section 3.2.
28	Right ECT sensor (B11/10) (coolant temperature change monitor)	DM, Engines, Vol. 2, section 3.2.

¹⁾ Observe Preparation for Test, see 22.

Diagnosis - Diagnostic Trouble Code (DTC) Memory

Diagnostic Trouble Code (DTC)	Possible Cause	Remedy/Test Step ¹⁾
34	Left heated O2S (G3/3) inoperative	DM, Engines, Vol. 2, section 3.2.
35	Left LH-SFI control module (N3/2), lambda control inoperative	DM, Engines, Vol. 2, section 3.2.
36	Air injection at left cylinder bank inoperative	DM, Engines, Vol. 2, section 3.2.
37	Left LH-SFI control module (N3/2), EGR inoperative	DM, Engines, Vol. 2, section 3.2.
38	Not used	–
39	Ignition system for left cylinder bank defective	DM, Engines, Vol. 2, section 5.3.
40	Left ECT sensor (B11/9), open/short circuit	DM, Engines, Vol. 2, section 3.2.
41	Left IAT sensor (B17/5), open/short circuit	DM, Engines, Vol. 2, section 3.2.
42	Voltage at left hot wire MAF sensor (B2/3) too high/low	DM, Engines, Vol. 2, section 3.2.
43	Left LH-SFI control module (N3/2), TN-signal (rpm) defective	DM, Engines, Vol. 2, section 3.2.
44	O2S heater of left heated O2S (G3/3), open/short circuit	DM, Engines, Vol. 2, section 3.2.
45	CMP sensor signal of left ignition control module (N1/4) defective.	DM, Engines, Vol. 2, section 3.2.
46	Intake manifold pressure at start (in left ignition control module - N1/4) too low/high	Vacuum supply to N1/4, DM, Engines, Vol. 2, section 5.3.

¹⁾ Observe Preparation for Test, see 22.

Diagnosis - Diagnostic Trouble Code (DTC) Memory

Diagnostic Trouble Code (DTC)	Possible Cause	Remedy/Test Step ¹⁾
47	Not used	–
48	Not used	–
49	Data exchange malfunction between left LH-SFI control module (N3/2) and left DI control module (N1/4)	23 ⇒ 6.0.
50	Left adjustable camshaft timing solenoid (Y49/1), open/short circuit	DM, Engines, Vol. 2, section 3.2.
51	Left fuel injectors (Y63) open/short circuit or emission control system adaptation in left LH-SFI control module (N3/2) at limit	Test LH-SFI and reset left LH-SFI control module adaptation to mean value, see DM, Engines, Vol. 2, section 3.2.
52	Not used	–
53	Left purge control valve (Y58/2), open/short circuit	DM, Engines, Vol. 2, section 3.2.
54	Left CMP sensor (L5/2) signal defective	DM, Engines, Vol. 2, section 5.3.
55	Intake manifold pressure (in left ignition control module - N1/4) with engine running too low/high	Vacuum supply to N1/4, DM, Engines, Vol. 2, section 5.3.
56	Starter ring gear segments and/or left CKP sensor (L5/4) defective	DM, Engines, Vol. 2, section 5.3.
57	Knock sensors (A29) or left ignition control module (N1/4) defective	DM, Engines, Vol. 2, section 5.3.
58	Not used	–
59	Left ECT sensor (B11/9) deviation between sensor circuit 1 and sensor circuit 2	DM, Engines, Vol. 2, section 3.2.
60	Left ECT sensor (B11/9) (coolant temperature change monitor)	DM, Engines, Vol. 2, section 3.2.

¹⁾ Observe Preparation for Test, see 22.

Electrical Test Program - Component Locations

Model 140

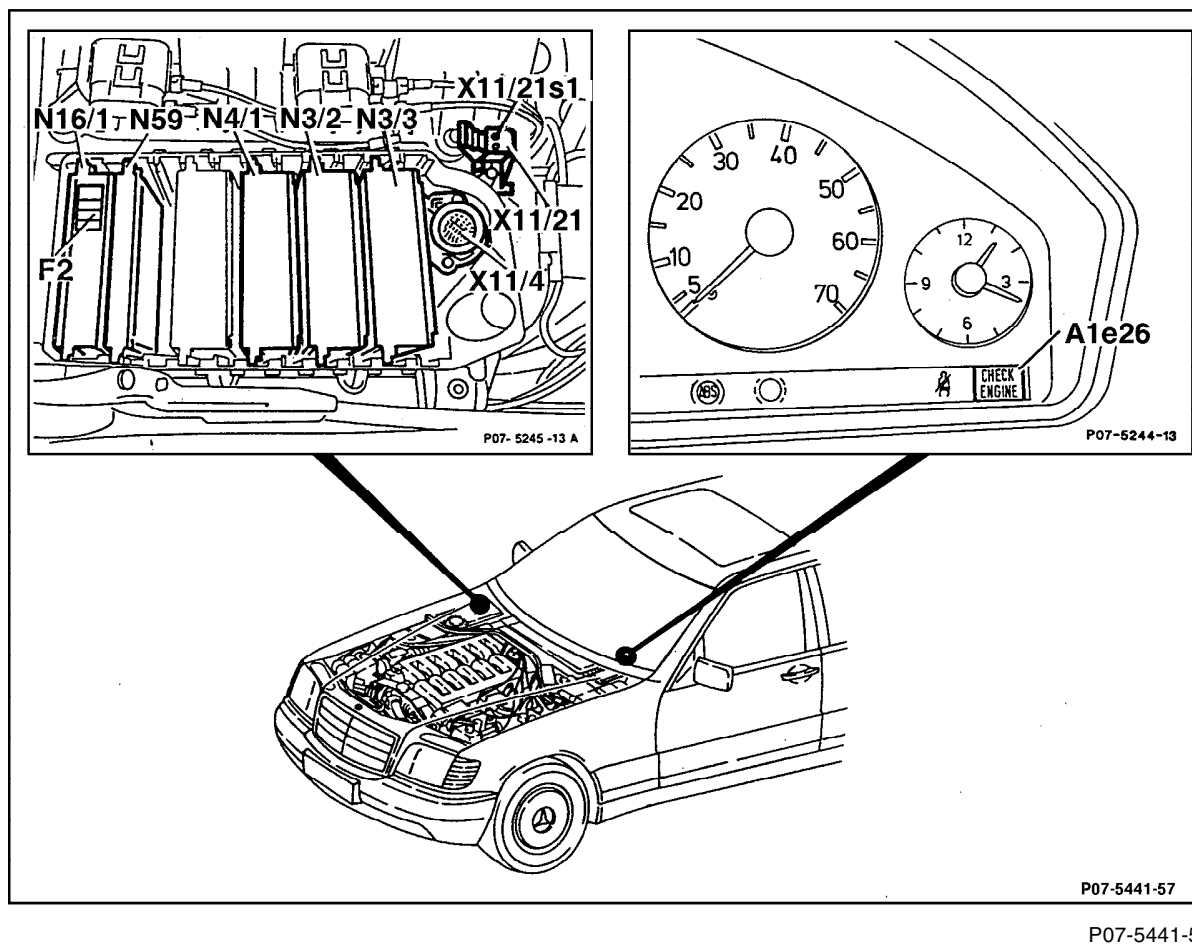


Figure 1

- A1e26 "CHECK ENGINE" malfunction indicator lamp
- N3/2 Left LH-SFI control module
- N3/3 Right LH-SFI control module
- N4/1 Electronic accelerator/cruise control/idle speed control module
- N16/1 Base module
- N59 Diagnostic module
- X11/4 Diagnostic connector (diagnostic trouble code, 38-pole)
- X11/21 Diagnostic module test connection
- X11/21s1 Pushbutton (with LED)

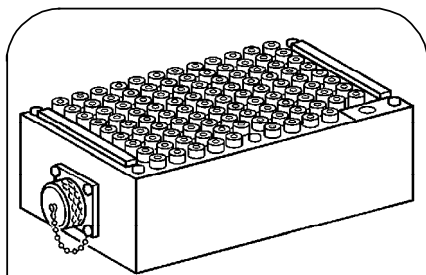
Electrical Test Program - Preparation for Test

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

1. Ignition: **OFF**
2. Remove diagnostic module (N59).
3. Connect socket box with contact module 3 and contact box (according to connection diagram on next page).
4. **Test steps 1.2 – 1.3 and 2.1 – 2.2 only:** Ignition: **OFF**, remove base module (N16/1) and connect socket box with contact module 1 and contact box (see Diagnostic Manual, Chassis and Drivetrain, Volume 1, section 1 22).

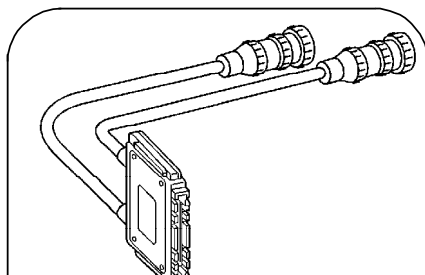
Electrical wiring diagrams, see Electrical Troubleshooting Manual.

Special Tools



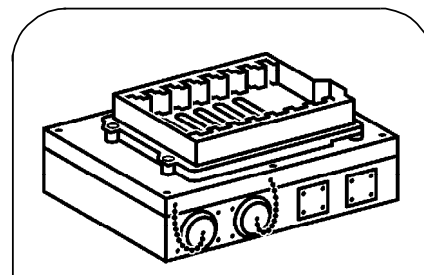
129 589 00 21 00

126-pin socket box



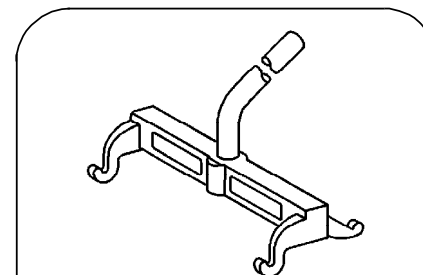
140 589 03 63 00

Contacting module 3



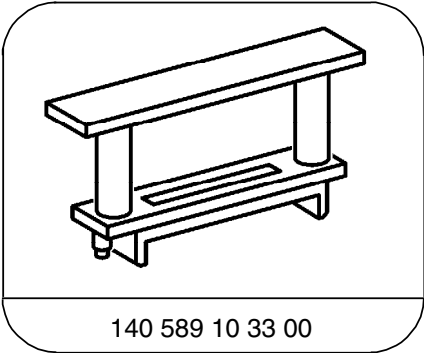
140 589 06 63 00

Contacting box



140 589 01 33 00

Mounting lever



Spacer

Equipment

Digital multimeter ¹⁾	Sun DMM-5 Fluke models 23, 83, 85, 87
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¹⁾ Available through the MBUSA Standard Equipment Program.

Electrical Test Program - Preparation for Test

Connection Diagram – Socket Box
Model 140

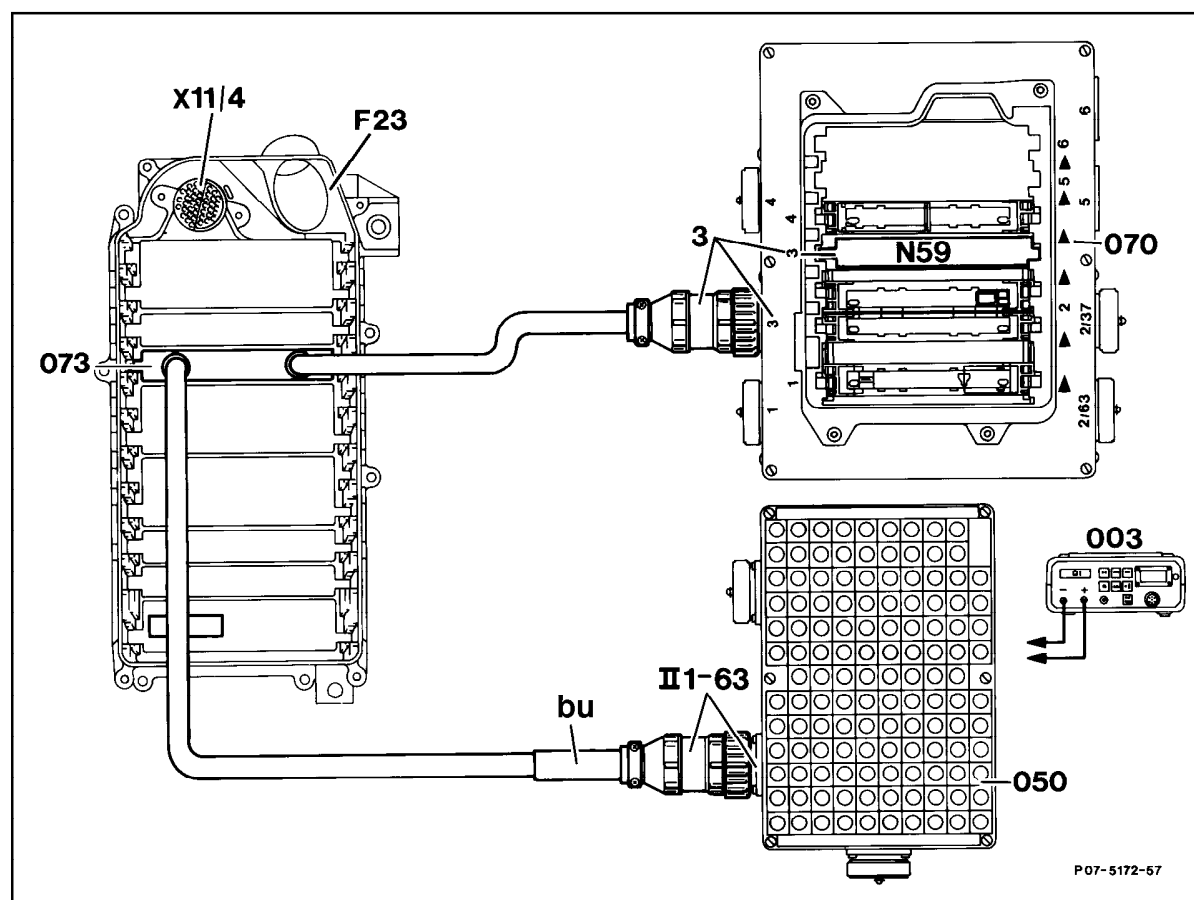


Figure 1

- 003 Multimeter
- 050 Socket box (126-pole)
- 070 Contact box
- 073 Contact module 3
- F23 Module box
- N59 Diagnostic module
- X11/4 Diagnostic connector
(diagnostic trouble code, 38-pole)
- bu blue

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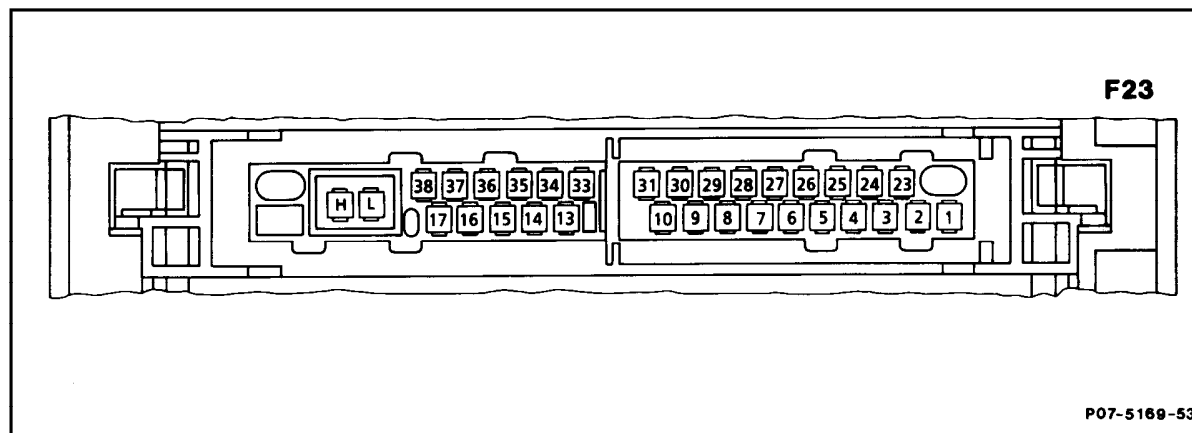
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Electrical Test Program - Preparation for Test

Terminal Layout of Diagnostic Module

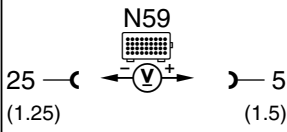
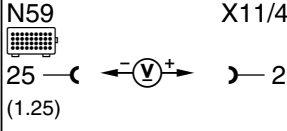
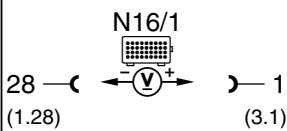
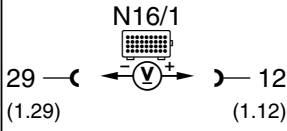
Figure 2

- | | |
|---------|---|
| 1 – 4 | Not used |
| 5 | Voltage supply, circuit 30 |
| 6 – 24 | Not used |
| 25 | Ground (W15) |
| 26 | Voltage supply, circuit 87 |
| 27 | Diagnostic wire at test connection X11/4 |
| 28 | "CHECK ENGINE" malfunction indicator lamp |
| 29 – 32 | Not used |
| 33 | Diagnostic wire at test connection X11/21 |
| L | Data line (–)
Controller Area Network
(left/right LH-SFI control module, left/right ignition control module, electronic accelerator/cruise control/idle speed control module, ABS/ASR control module) |
| H | Data line (+)
Controller Area Network
(left/right LH-SFI control module, left/right ignition control module, electronic accelerator/cruise control/idle speed control module, ABS/ASR control module) |



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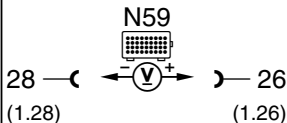
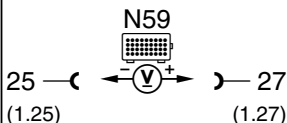
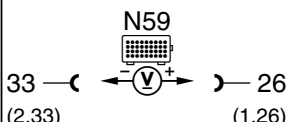
Electrical Test Program - Test

Test step DTC	Scope of test	Test connection	Test condition	Nominal value	Possible cause/remedy
⇒ 1.0	Diagnostic module (N59) Voltage supply Circuit 30		Ignition: ON	11 – 14 V	⇒ 1.1 – 1.3.
⇒ 1.1	Ground, output ground, electronics (W15) (right footwell)		Ignition: ON	11 – 14 V	Ground wire at W15.
⇒ 1.2	Base module (N16/1) Voltage supply Circuit 30		Connect socket box to N16/1. Ignition: ON	11 – 14 V	Wire to terminal block (X4/10).
⇒ 1.3	 Diagnostic trouble code from base module (N16/1) Voltage supply from N16/1 to diagnostic module (N59) Circuit 30		Ignition: ON	11 – 14 V	N16/1.

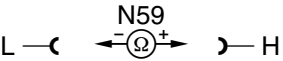
Electrical Test Program - Test

Test step DTC	Scope of test	Test connection	Test condition	Nominal value	Possible cause/remedy
⇒ 2.0	Diagnostic module (N59) Voltage supply Circuit 87L		Ignition: ON	11 – 14 V	⇒ 2.1 – 2.2.
⇒ 2.1	Base module (N16/1) Voltage supply Circuit 15, unfused		Connect socket box to N16/1. Ignition: ON Ignition: OFF	11 – 14 V <1 V	Open circuit, Ignition/starter switch (S2/1). Open circuit, S2/1.
⇒ 2.2	 Diagnostic trouble code from base module (N16/1) Voltage supply (fused) for right LH-SFI control module (N3/3)		Ignition: ON Ignition: OFF	11 – 14 V <1 V	Fuse (F2) at N16/1, N16/1.

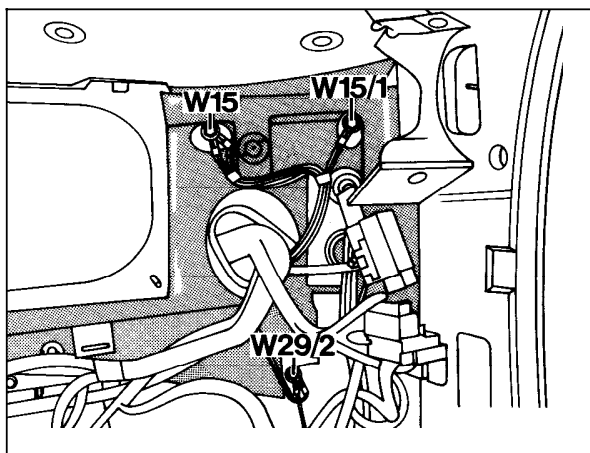
Electrical Test Program - Test

Test step DTC	Scope of test	Test connection	Test condition	Nominal value	Possible cause/remedy
⇒ 3.0	Control of "CHECK ENGINE" MIL		Ignition: ON	11 – 14 V	N59.
⇒ 4.0	Control of diagnostic wire		Ignition: ON	11 – 14 V	Open circuit, N59.
⇒ 5.0	Control of DM test connector pushbutton (X11/21s1)		Ignition: ON Press pushbutton (X11/21s1).	11 – 14 V	Open circuit, DM test connector (X11/21), N59.

Electrical Test Program - Test

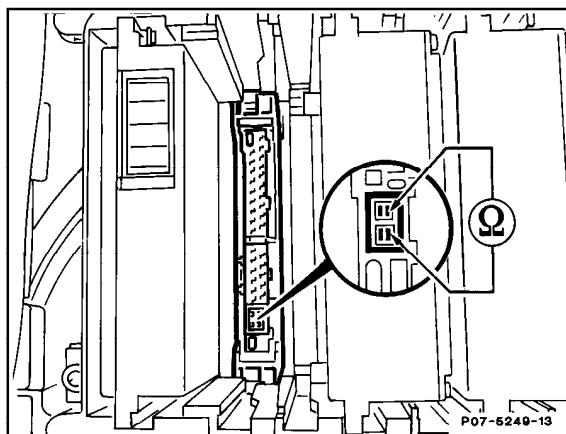
Test step DTC	Scope of test	Test connection	Test condition	Nominal value	Possible cause/remedy
⇒ 6.0	CAN data bus		Ignition: OFF Pull out contact module or diagnostic module. Test with ohmmeter directly at the the two wide connections of the diagnostic module test connector (see Figure 2).	55 – 65 Ω	Data line, ⇒ 6.1.
⇒ 6.1	CAN interface in left and right DI control modules (N1/4 and N1/5) Resistance		Unplug connector “B” at left/right DI control module. Test directly at left/right DI control module (see Figure 3).	115 – 125 Ω	Left/right DI control module.

Electrical Test Program - Test



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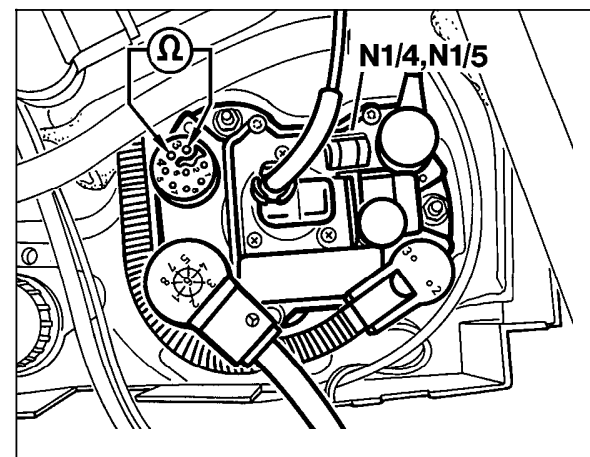
W15 Ground (electronics output ground right footwell)
 W15/1 Ground (electronics right footwell)
 W29/2 Ground (right A-pillar)



P07-5249-13

Figure 2

N59x Diagnostic module connector



P15-5058-13

Figure 3

N1/4 Left DI control module
 N1/5 Right DI control module