

8.2 Engines 104, 119 LH-SFI in Model 140

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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:

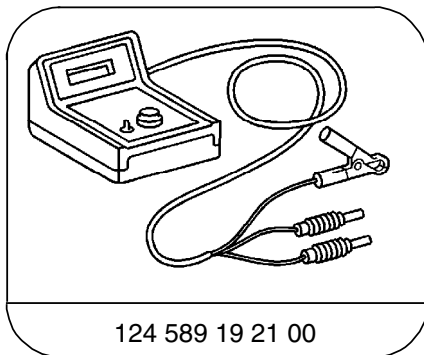
red wire to socket 3,
black wire to socket 1 and
yellow wire to:

Diagnostic module	socket 19
Base module	socket 8

LH-SFI control module	socket 4
Ignition control module	socket 17
EA/CC/ISC control module	socket 7

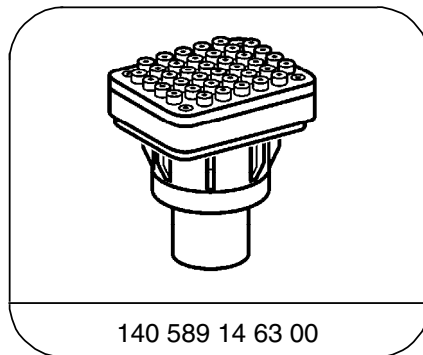
2. Recall control modules' diagnostic trouble code memory and clear stored trouble codes (see section 0).

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) Readout, Diagnostic Module

Diagnostic Trouble Code (DTC)	Possible Cause	Remedy/Test Step ¹⁾
1	No malfunction in systems monitored	–
2	Heated oxygen sensor inoperative	Test LH-SFI, section 3.1.
3	Lambda control inoperative	Test LH-SFI, section 3.1.
4	Air injection inoperative	Test LH-SFI, section 3.1.
5	Exhaust gas recirculation inoperative	Test LH-SFI, section 3.1.
6	Idle speed control inoperative	Test electronic accelerator, section 6.2.
7	Ignition system defective	Test distributor ignition system, section 5.2.
8	Engine coolant temperature sensor, open/short circuit	Test LH-SFI, section 3.1.
9	Intake air temperature sensor, open/short circuit	Test LH-SFI, section 3.1.
10	Voltage at mass air flow sensor too high/low	Test LH-SFI, section 3.1.
11	TN-signal (rpm) at LH-SFI control module (N3/1) defective	Test LH-SFI, section 3.1.
12	Heated oxygen sensor heater, open/short circuit	Test LH-SFI, section 3.1.
13	Camshaft position sensor signal of ignition control module defective.	Test LH-SFI, section 3.1.
14	Intake manifold pressure at start (in ignition control module - N1/3) too low/high	Vacuum supply to N1/3, test distributor ignition system, 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	Wide open throttle information defective	Test electronic accelerator, section 6.2.
16	Closed throttle position information defective	Test electronic accelerator, section 6.2.
17	Data exchange malfunction between individual control modules	23 ⇒ 7.0.
18	Adjustable camshaft timing solenoid, open/short circuit	Test LH-SFI, section 3.1.
19	Fuel injectors open/short circuit or emission control system adaptation in LH-SFI control module (N3/1) at limit	Test LH-SFI and reset LH-SFI control module adaptation to mean value, section 3.1.
20	Speed signal not present	Test electronic accelerator, section 6.2.
21	Purge switchover valve, open/short circuit	Test LH-SFI, section 3.1.
22	Camshaft position sensor signal defective	Test distributor ignition system, section 5.2.
23	Intake manifold pressure (in ignition control module - N1/3) with engine running too low/high	Vacuum supply to N1/3, test distributor ignition system, section 5.2.
24	Starter ring gear segments and/or crankshaft position sensor defective	Test distributor ignition system, section 5.2.
25	Knock sensors or ignition control module defective	Test distributor ignition system, section 5.2.
26	Upshift delay switchover valve, open/short circuit	Test LH-SFI, section 3.1.
27	Engine coolant temperature sensor deviation between sensor circuit 1 and sensor circuit 2	Test LH-SFI, section 3.1.
28	Engine coolant temperature sensor (engine coolant temperature change monitor)	Test LH-SFI, section 3.1.

1) Observe Preparation for Test, see 22.

Electrical Test Program - Component Locations

Model 140

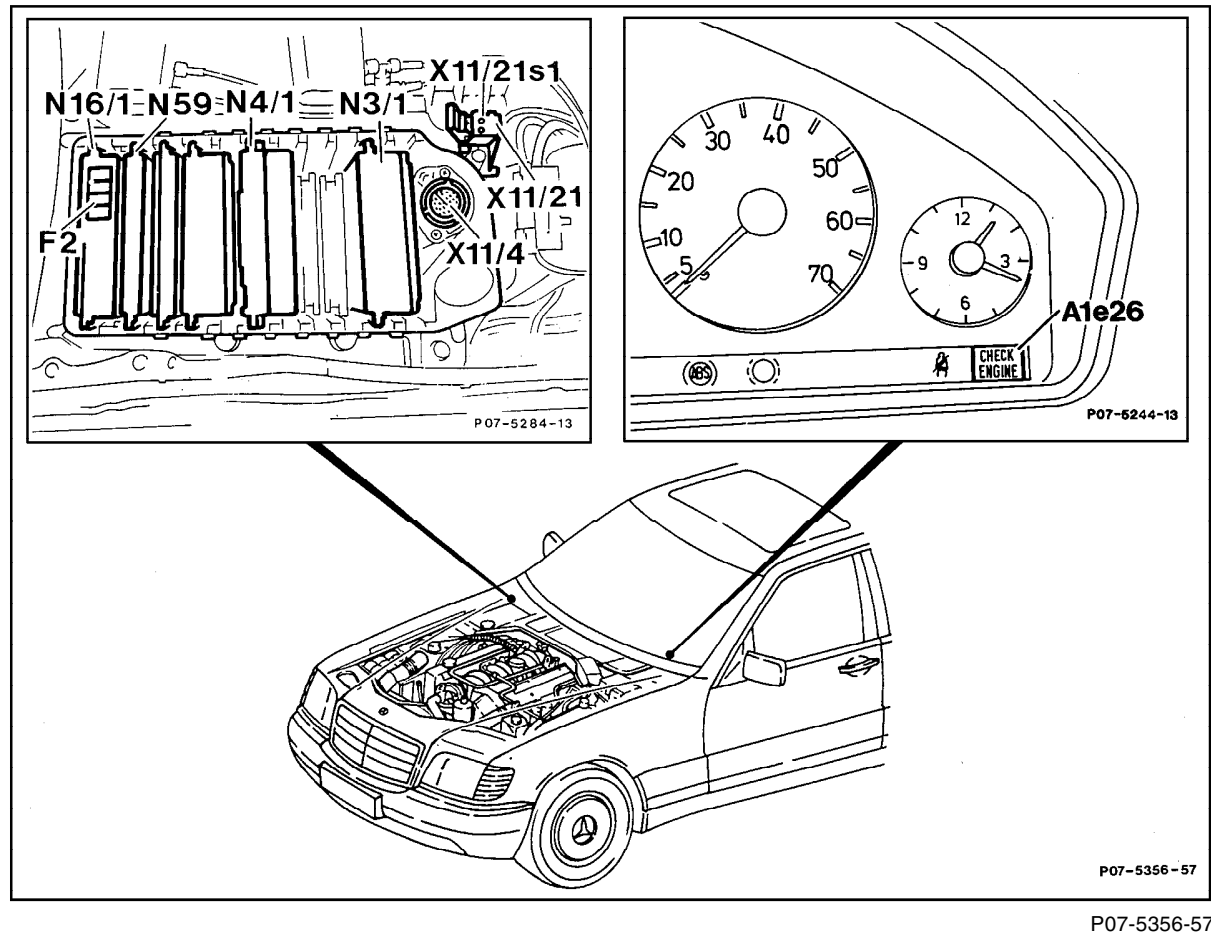


Figure 1

- A1e26 "CHECK ENGINE" malfunction indicator lamp
- F2 Maxi-fuse box (6-fuse, in fuse and relay box F1)
- N3/1 LH-SFI control module
- N4/1 Electronic accelerator/cruise control/idle speed control module
- N16/1 Base module
- N30/1 ABS/ASR control module
- N59 Diagnostic module
- X11/4 Diagnostic connector (diagnostic trouble code, 38-pole)
- X11/21 Diagnostic module test connection (3-pole)
- X11/21s1 Pushbutton (with LED) - California

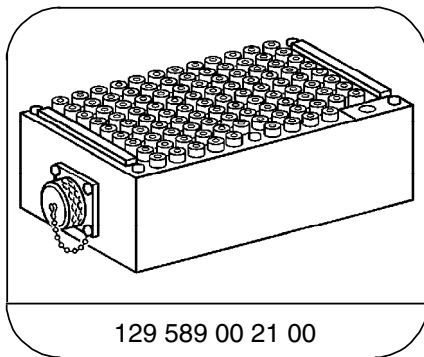
Electrical Test Program - Preparation for Test

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).

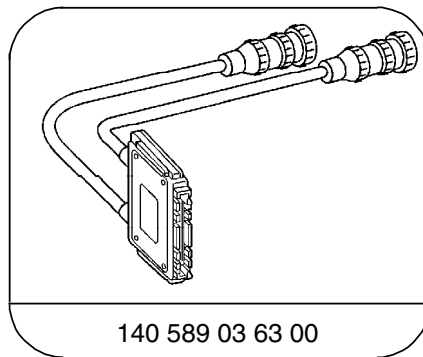
Electrical wiring diagrams, see Electrical Troubleshooting Manual.

Special Tools



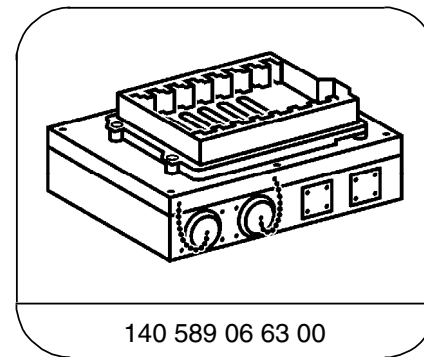
129 589 00 21 00

126-pin socket box



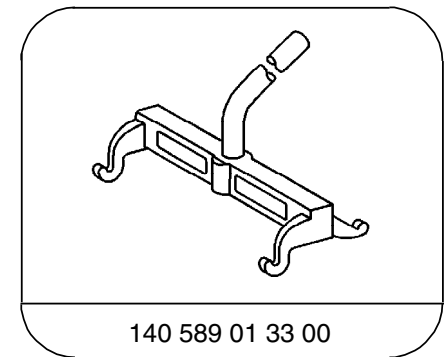
140 589 03 63 00

Contacting module 3



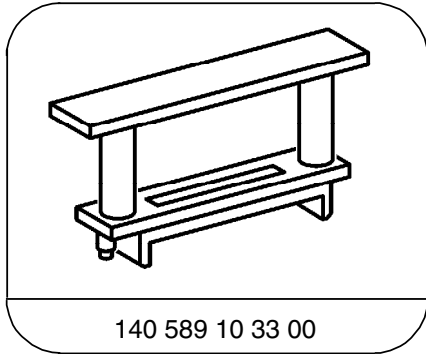
140 589 06 63 00

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

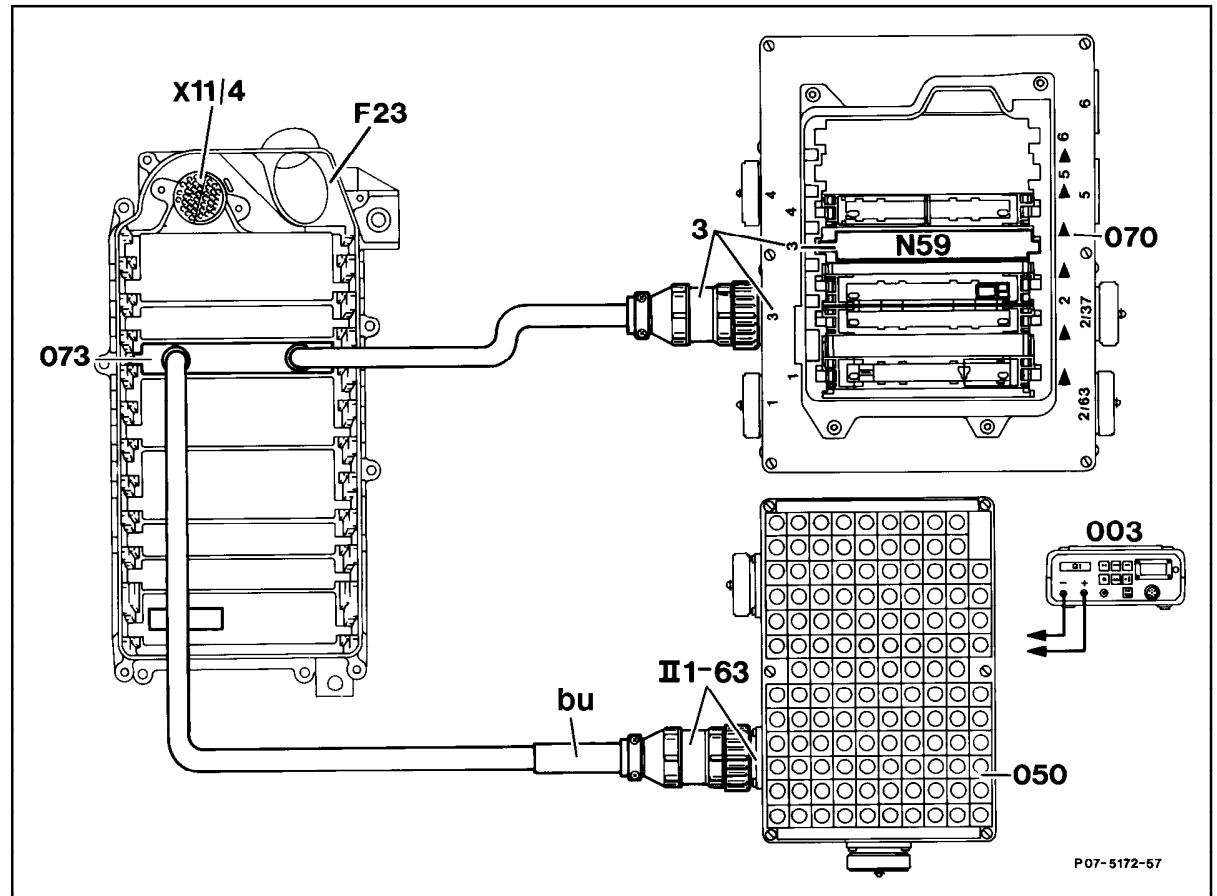


Figure 1

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

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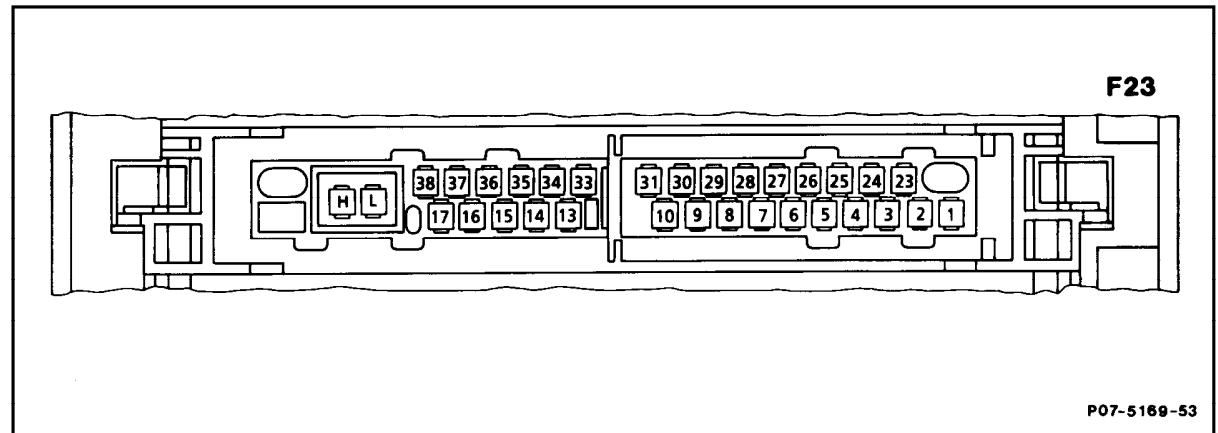
Electrical Test Program - Preparation for Test

Terminal Layout of Diagnostic Module Model 140

Figure 2

- 1 – 4 Not used
- 5 Voltage supply, circuit 30
- 6 – 8 Not used
- 9 Coding
- 10 – 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 Coding
- 30 Coding
- 31 – 32 Not used
- 33 Diagnostic wire at test connection X11/21
- 34 – 38 Not used

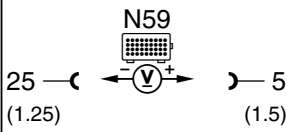
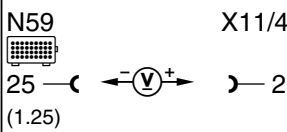
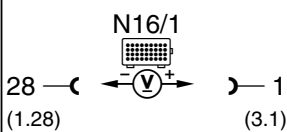

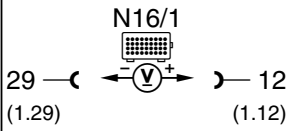
- L Data line (-)
Controller Area Network
(LH-SFI control module, ignition control module, electronic accelerator/cruise control/idle speed control module, ABS/ASR control module)
- H Data line (+)
Controller Area Network
(LH-SFI control module, ignition control module, electronic accelerator/cruise 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	9  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	<p>N59 25 —(1.25) — V —(1.26)— 26</p>	Ignition: ON	11 – 14 V	⇒ 2.1 – 2.2.
⇒ 2.1	Base module (N16/1) Voltage supply Circuit 15, unfused	<p>N16/1 28 —(1.28) — V —(1.34)— 34</p>	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 10	Diagnostic Trouble Code from base module (N16/1) Voltage supply (fused) for LH-SFI control module (N3/1)	<p>N16/1 28 —(1.28) — V —(1.7)— 7</p>	Ignition: ON Ignition: OFF	11 – 14 V <1 V	Fuse (F2) at N16/1, N16/1.

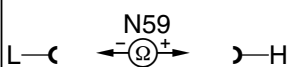
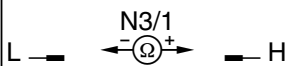
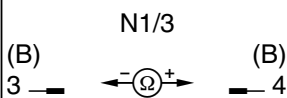
Electrical Test Program - Test

Test step DTC	Scope of test	Test connection	Test condition	Nominal value	Possible cause/remedy
⇒ 3.0	Control of "CHECK ENGINE" malfunction indicator lamp	<p>28 —((1.28) ← (V) → (1.26) 26</p>	Ignition: ON	11 – 14 V	N59.
⇒ 4.0	Control of diagnostic wire	<p>25 —((1.25) ← (V) → (1.27) 27</p>	Ignition: ON	11 – 14 V	Open circuit, N59.
⇒ 5.0	Control of pushbutton (X11/21)	<p>33 —((2.33) ← (V) → (1.26) 26</p>	Ignition: ON Press pushbutton (X11/21).	11 – 14 V	Open circuit, Pushbutton (X11/21), N59.

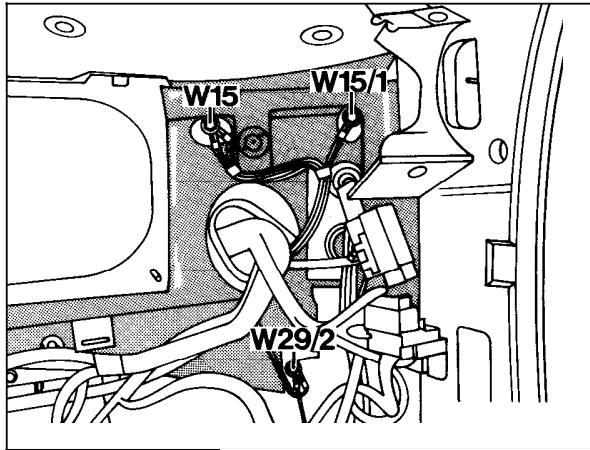
Electrical Test Program - Test

Test step DTC	Scope of test	Test connection	Test condition	Nominal value	Possible cause/remedy
⇒ 6.0	Diagnostic module coding Engine 104	<p>29 —()— (1.29) ← (V) → (1.26) —()— 26</p> <p>30 —()— (1.30) ← (V) → (1.26) —()— 26</p>	Ignition: ON	11 – 14 V	Open circuit.
	Engine 119 (4.2 liter)	<p>9 —()— (1.9) ← (V) → (1.26) —()— 26</p>	Ignition: ON	11 – 14 V	Open circuit.
	Engine 119 (5.0 liter)	<p>29 —()— (1.29) ← (V) → (1.26) —()— 26</p>	Ignition: ON	11 – 14 V	Open circuit.

Electrical Test Program - Test

Test step DTC	Scope of test	Test connection	Test condition	Nominal value	Possible cause/remedy
⇒ 7.0	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 (see Figure 2).	55 – 65 Ω	Data line, ⇒ 8.1, ⇒ 8.2.
⇒ 7.1	CAN Interface in LH-SFI control module (N3/1) Resistance		Pull out LH-SFI control module (N3/1) and test directly at LH-SFI control module (see Figure 3).	115 – 125 Ω	N3/1.
⇒ 7.2	CAN Interface in ignition control module (N1/3) Resistance		Unplug connector "B" at ignition control module and test directly at control module (see Figure 4).	115 – 125 Ω	Ignition control module.

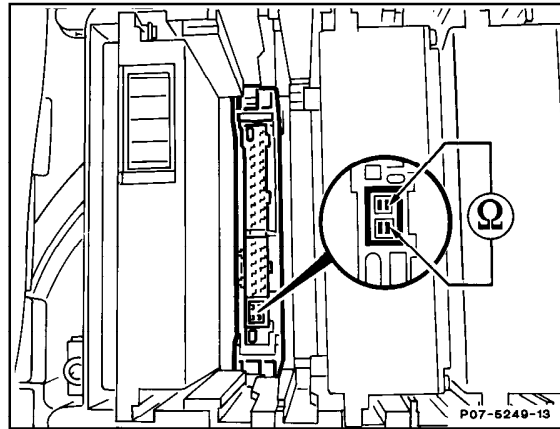
Electrical Test Program - Test



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Figure 1

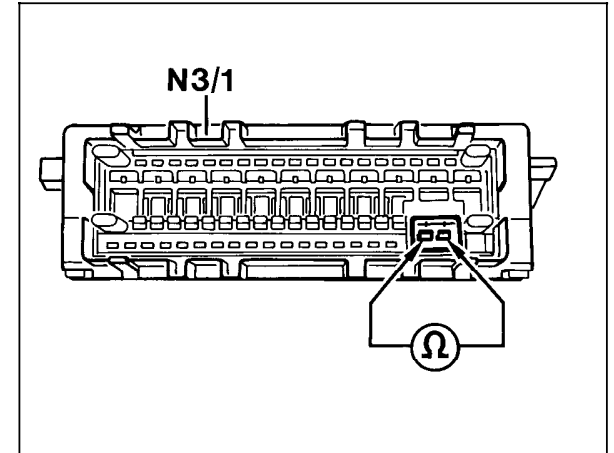
W15 Ground (electronics output ground -right footwell)
 W15/1 Ground (electronics - right footwell)
 W29/2 Ground (right A-pillar)



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Figure 2

N59x Diagnostic module connector



P07-5159-13A

Figure 3

N3/1 LH-SFI control module

Electrical Test Program - Test

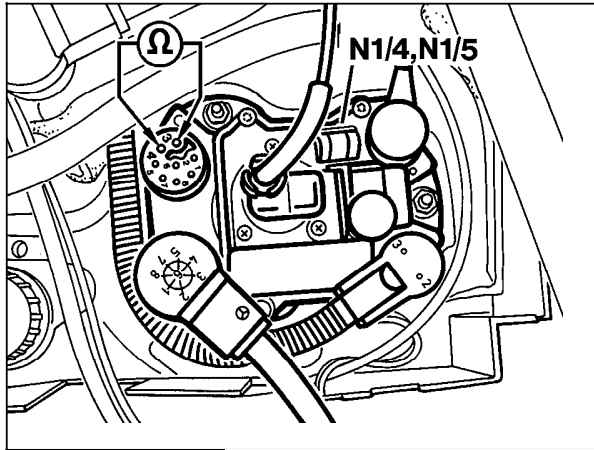


Figure 4

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N1/3 Ignition control module