5.3 Engine 120 with LH Gasoline Injection System (LH-SFI)

Diagnosis – Diagnostic Trouble Code (DTC) Memory

The individual test steps (e. g. ignition coils, distributor cap etc.) are organized into a test program.
If a complaint is determined through engine diagnosis in Engines, Volume 1, which refers to a specific test step, only the specific test step should be performed and not the entire test program.

Diagnostic Trouble Code (DTC) Readout with Impulse Counter Scan Tool
The ignition control modules (N1/4 and N1/5) are equipped with diagnostics, including DTC memory.
Malfunctions which occur with the engine running are counted by the respective malfunction counter. A DTC is recorded into the respective control unit‘s memory only if the same fault has occurred after 8 sequential engine starts.
This prevents a DTC from being recorded if, for example, it occurred only once. If, for example, a fault occurred only 7 times, then the DTC memory will be cleared again after a certain number of engine starts.
The DTC memory can be read with the impulse counter scan tool.
The memory remains active even if the vehicle‘s battery is disconnected.

The following malfunction is stored immediately:
– Crankshaft position sensor defective (DTC readout 17)

Malfunctions can be recalled from memory using the impulse counter scan tool with engine off and ignition “ON“. DTC‘s ranging from 1 to 39 may appear on the display of the impulse counter scan tool.

The DTC 1 indicates: No fault recognized in system.
All further DTC‘s refer to a particular malfunction source. If there are multiple system malfunctions, the malfunction assigned with the lowest DTC will be displayed first.
If the DTC indicated first reappears after more than two DTC readouts, then no further malfunctions are present in the system. After eliminating all faults, they must be **cleared individually**.

In case of engine complaints, the DTC memory must be read and the fault must be eliminated before proceeding with any additional repairs.

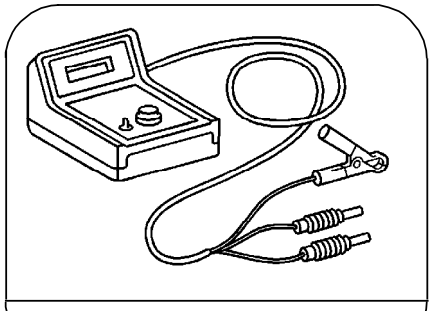
⚠
The DTC readout must be performed on both ignition control modules (N1/4 and N1/5).
Possible indicated faults of the left or right control module must be checked with the socket box tester.
If the engine does not run, both ignition systems must be checked, one after another, with the socket box tester.

Diagnosis – Diagnostic Trouble Code (DTC) Memory

Preparation for Test with Impulse Counter Scan Tool

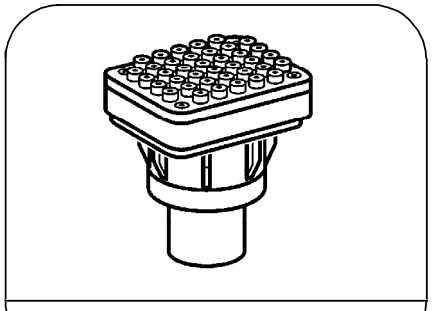
- Connect impulse counter scan tool according to connection diagram (see section 0),
- Perform DTC readout (see section 0).

Special Tools



124 589 19 21 00

Pulse counter



140 589 14 63 00

Adapter

Diagnosis – Diagnostic Trouble Code (DTC) Memory

DTC	Possible cause	Test step/Remedy [1]
1	No fault in system	–
2	Maximum retard setting on at least one cylinder has been reached.	Increased knock tendency, i.e. due to poor fuel quality, carbon build-up, mechanical damage.
3	Not used	–
4	Load sensor in ignition control module (N1/4 or N1/5) defective.	Check vacuum supply to ignition control module (N1/4 or N1/5), Ignition control module (N1/4 or N1/5).
5	Knock sensors (A16) 1 and/or 2 defective.	Knock sensor not plugged in at ignition control module (N1/4 or N1/5), Knock sensor (A16).
6	Camshaft position sensor (L5/2 or L5/3) defective	24 ⇒ 1.0
7	Knock control–output switch in ignition control module (N1/4 or N1/5) defective.	Ignition control module (N1/4 or N1/5).
8	Transmission overload protection switch, brake band B1 (S65) and/or B2 (S65/1) does not close	24 ⇒ 4.0
9	Transmission overload protection switch, brake band B1 (S65) and/or B2 (S65/1) does not open	24 ⇒ 5.0
10	Not used	–
11	Left or right reference resistor (DI) (R16/3 or R16/4) defective	24 ⇒ 3.0
12	TN engine speed signal is outside the tolerance range	24 ⇒ 7.0
13	Not used	–

[1] Observe Preparation for Test, see 22.

Diagnosis – Diagnostic Trouble Code (DTC) Memory

DTC	Possible cause	Test step/Remedy [1]
14	Not used	–
15	Ignition coil output from left or right ignition control module (N1/4 or N1/5) defective or primary winding of ignition coil has open circui	23 ⇒ 7.0
16	Not used	–
17	Left or right crankshaft position sensor (L5/4 or L5/5) defective	23 ⇒ 4.0
18	Not used	–
19	Ground, coding from left ignition control module (N1/4) not present	24 ⇒ 8.0
20	Left or right ignition control module (N1/4 or N1/5) DTC memory defective	Ignition control module (N1/4 or N1/5).
21	Load sensor in left or right ignition control module (N1/4 or N1/5) defective (recognized with engine running)	Ignition control module (N1/4 or N1/5).
22	Not used	–
23	Not used	–
24	Not used	–
25	Not used	–

[1] Observe Preparation for Test, see 22.

Diagnosis – Diagnostic Trouble Code (DTC) Memory

DTC	Possible cause	Test step/Remedy [1]
26	Left or right ignition control module (N1/4 or N1/5) data exchange malfunction	24 ⇒ 9.0 - 10.0
27	Left or right LH-SFI control module (N3/2 or N3/3) data exchange malfunction	24 ⇒ 9.0
28	EA/CC/ISC control module (N4/1) data exchange malfunction	24 ⇒ 9.0
29 – 33	Not used	–
34	Ignition misfire, cylinder 7 (left cylinder bank) or 1 (right cylinder bank)	2)
35	Ignition misfire, cylinder 11 (left cylinder bank) or 5 (right cylinder bank)	2)
36	Ignition misfire, cylinder 9 (left cylinder bank) or 3 (right cylinder bank)	2)
37	Ignition misfire, cylinder 12 (left cylinder bank) or 6 (right cylinder bank)	2)
38	Ignition misfire, cylinder 8 (left cylinder bank) or 2 (right cylinder bank)	2)
39	Ignition misfire, cylinder 10 (left cylinder bank) or 4 (right cylinder bank)	2)
40 – 41	Not used	–

1) Observe Preparation for Test, see 22.

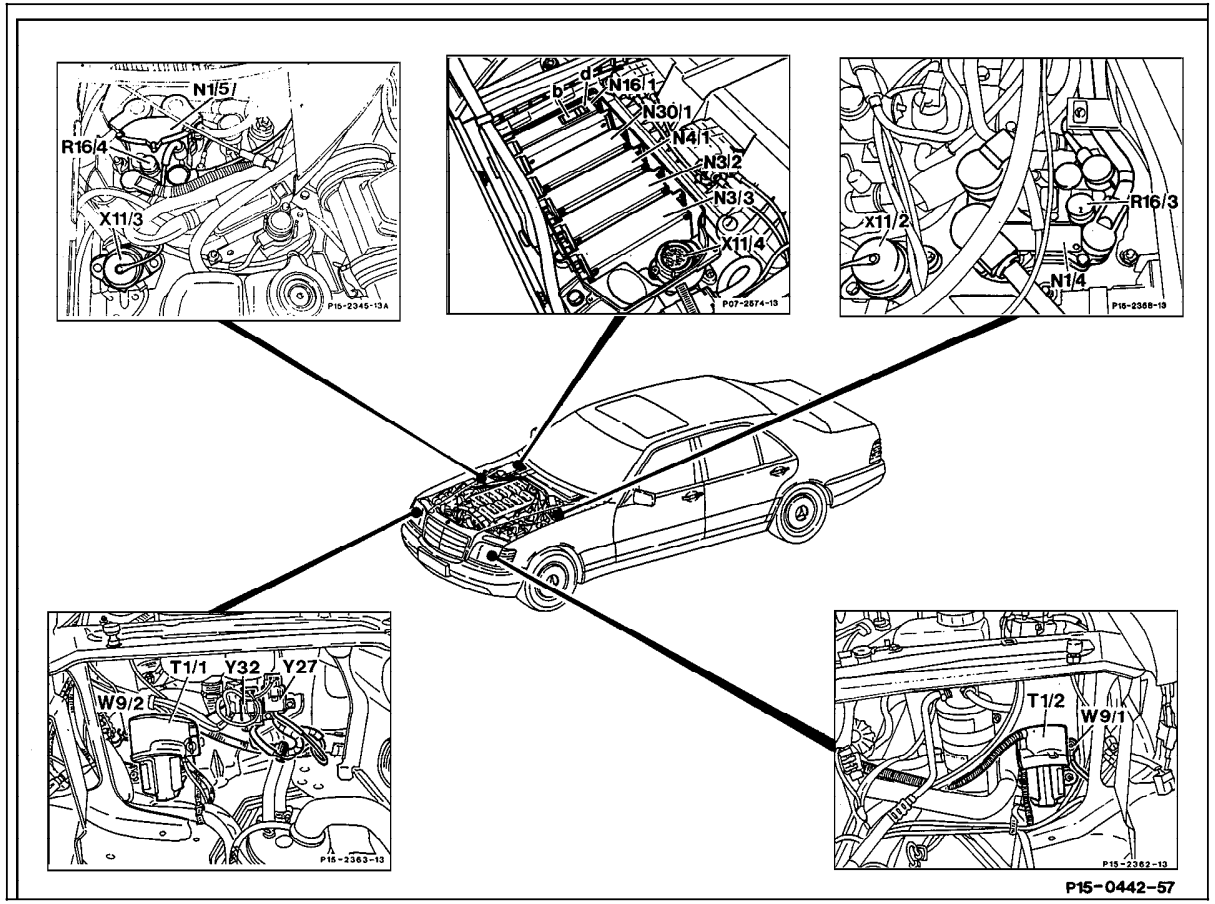
Diagnosis - Complaint Related Diagnostic Chart

Complaint/problem	Possible cause	Remedy/test step [1]
Engine has insufficient output or does not run	Voltage supply for left or right ignition control module (N1/4 or N1/5) Left or right crankshaft position sensor (L5/4 or L5/5) Left or right ignition control module (N1/4 or N1/5))	 23 ⇒ 1.0 and 2.0 23 ⇒ 4.0

[1] Observe Preparation for Test, see 22.

Electrical Test Program - Component Locations

Engine Compartment,
Model 140 with Engine 120 LH-SFI



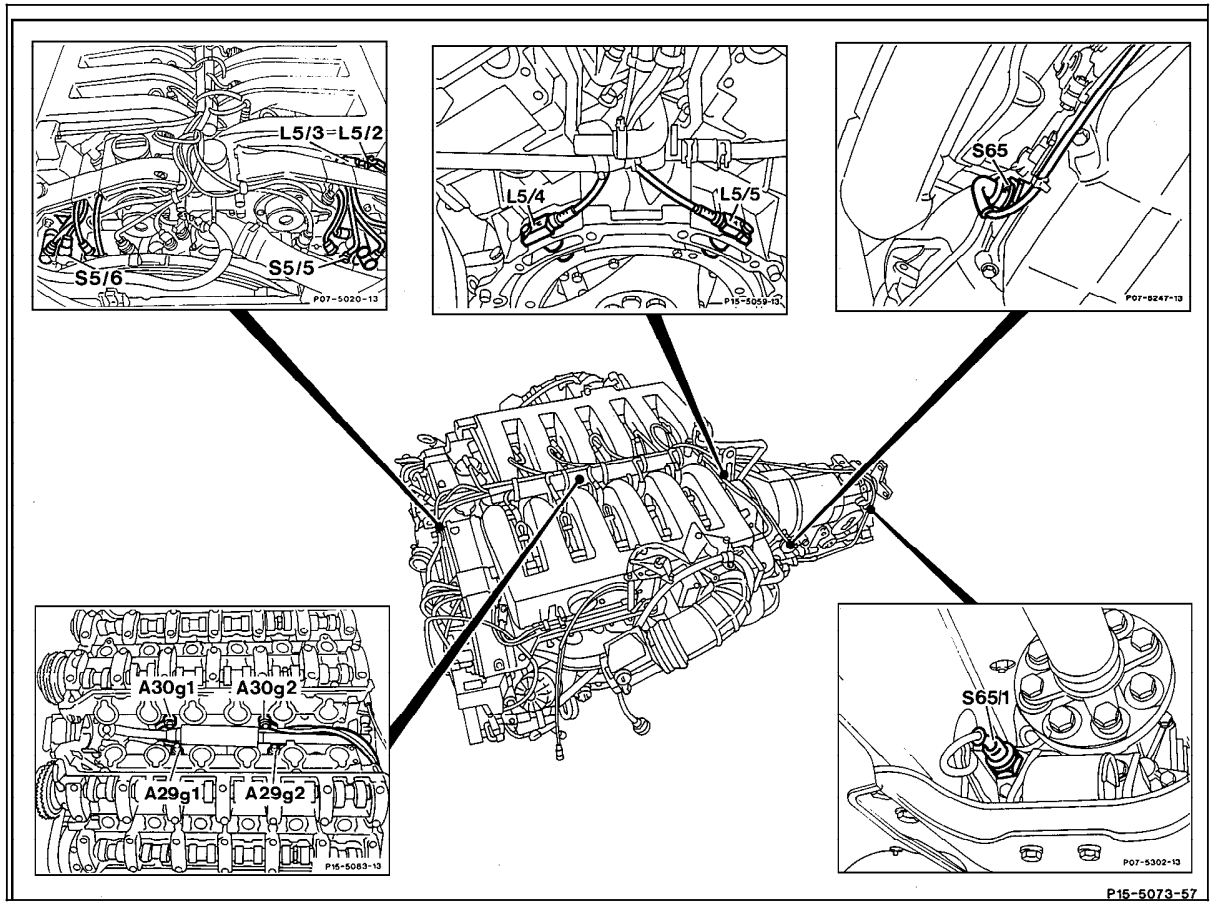
P15-0442-57

Figure 1

N1/4	Left ignition control module
N1/5	Right ignition control module
N3/2	Left LH-SFI control module
N3/3	Right LH-SFI control module
R16/3	Left reference resistor
R16/4	Right reference resistor
T1/1	Ignition coil 1 (right cylinder bank)
T1/2	Ignition coil 2 (left cylinder bank)
X11/4	Data link connector (DTC readout) (38-pole)

Electrical Test Program - Component Locations

Engine 120 LH-SFI



P15-5073-57

Figure 2

A29	Left knock sensors
A29g1	Left knock sensor 1
A29g2	Left knock sensor 2
A30	Right knock sensors
A30g1	Right knock sensor 1
A30g2	Right knock sensor 2
L5/2	Left camshaft position sensor
L5/3	Right camshaft position sensor
L5/4	Left crankshaft position sensor
L5/5	Right crankshaft position sensor
S5/5	Left high-voltage distributor
S5/6	Right high-voltage distributor
S65	Transmission overload protection switch (brake band B1)
S65/1	Transmission overload protection switch (brake band B2)

Electrical Test Program - Preparation for Test

Preparation for Test

1. Ignition: **OFF**
2. After determining which ignition control module (N1/4) and/or (N1/5) is indicating a malfunction, connect socket box to respective ignition control module (left, right or both one after another) according to connection diagram.

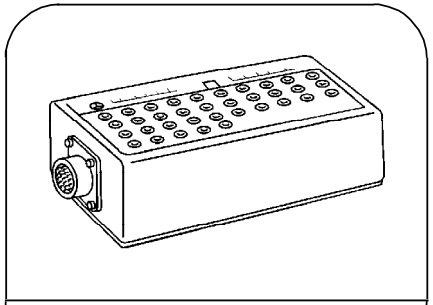
⚠
- When performing test and adjustment work, the engine rpm should only be raised using the accelerator pedal.
  If the engine speed is raised via the control linkage in the engine compartment, the “limp-home“ mode will become active and will be registered in the electronic accelerator DTC memory as a fault. The ASR malfunction indicator lamp will also come on.

Electrical wiring diagrams :
Electrical Troubleshooting Manual, Model 129
Electrical Troubleshooting Manual, Model 140

Note regarding “Test Connection“ column:
The numbers indicated in parentheses, for example, ⇒ 1.0 (A.2) signify:
A = Connector A in wiring diagram
2 = Socket 2 in wiring diagram.

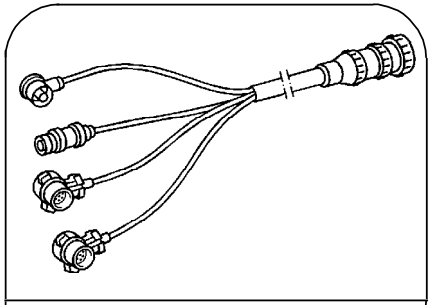
Electrical Test Program - Preparation for Test

Special Tools



124 589 00 21 00

35-pin socket box



140 589 10 63 00

Test cable

Equipment

Digital multimeter [1]	Fluke models 23, 83, 85, 87
Engine analyzer [1]	Bear DACE (Model 40–960) Sun EMT–1019/Master 3 Sun MCM–2110 Sun MEA–1500MB

[1] Available through the MBUSA Standard Equipment Program.

Electrical Test Program - Preparation for Test

Safety Precautions
The increased demands on the ignition systems of modern engines and the desire for maintenance-free operation have lead to the introduction of electronic ignition systems.
As a rule, the sparking power of an electronic system is higher than a conventional system; additional increases in performance are characteristic of this type of system.

⚠ **DANGER!** Contact with high-voltage components or connectors can be fatal.

⚠**WARNING!**
Therefore, when working on the distributor ignition system (DI), the following safety precautions must be observed:

- Before performing work that requires cranking the engine (e. g. compression test) turn off ignition and disconnect connectors 2 (see 24, Figure 4) on the ignition control modules (N1/4 and N1/5) or connect safety plug, part no. 102 589 02 21 00 to diagnostic connector.
- Persons with pacemakers should not work on this type of ignition system.
- At cranking or idle speed, do not touch or disconnect any components of the ignition system.
- Perform installation work on the ignition system or ignition wires only when the engine/ignition is turned off (as well as connecting/ disconnecting sensors only with the ignition switched off).
- No exposed metal connectors or sending units may be installed in the ignition wires (e.g. ignition wire, cylinder 1).

Electrical Test Program - Preparation for Test

To Avoid Damage to the Ignition System

- To avoid damage to the ignition control module (N1/4 or N1/5), connect/disconnect the control module connectors only when the ignition is turned off.
- Do not connect a test lamp to circuit 1 of the ignition coil.
- Circuit 1 of the ignition coil may not be shorted to ground, e.g. theft deterrence.
- To avoid reversing polarity, the threads on the ignition coil have different diameters (M5 and M6).
- Only original equipment components should be installed in the ignition system.
- Do not operate the ignition system at cranking speed unless the ignition harness is completely connected.
- To avoid damage to the ignition control module (N1/4 or N1/5), the high output side of the respective ignition system must carry at least 2 kΩ of load (distributor rotor 1 kΩ , each connection on the distributor cap 1 kΩ). Do not install a 5 kΩ distributor rotor for noise suppression.
- Do not perform any tests (grounding ignition cable 4, disconnecting a spark plug connector or pulling cable 4 out of the ignition coil) at cranking or idle speed.
- To better dissipate heat, the ignition control module (N1/4 or N1/5) is installed with thermal paste on the wheel well. When exchanging the control module, do not remove the foil shield, it does not influence heat dissipation.
- If the circuit breaker is activated (power balance test), and the engine stalls, then the test procedure with this tester cannot be performed.
- When testing the ignition coil separately, do not load the coil with more than 28 kV in order to avoid damage to the coil.
- If assisting a disabled vehicle and it becomes necessary to perform an ignition spark test, perform this test only with a spark plug on one ignition cable/spark plug. Ensure good ground connection to the spark plug.

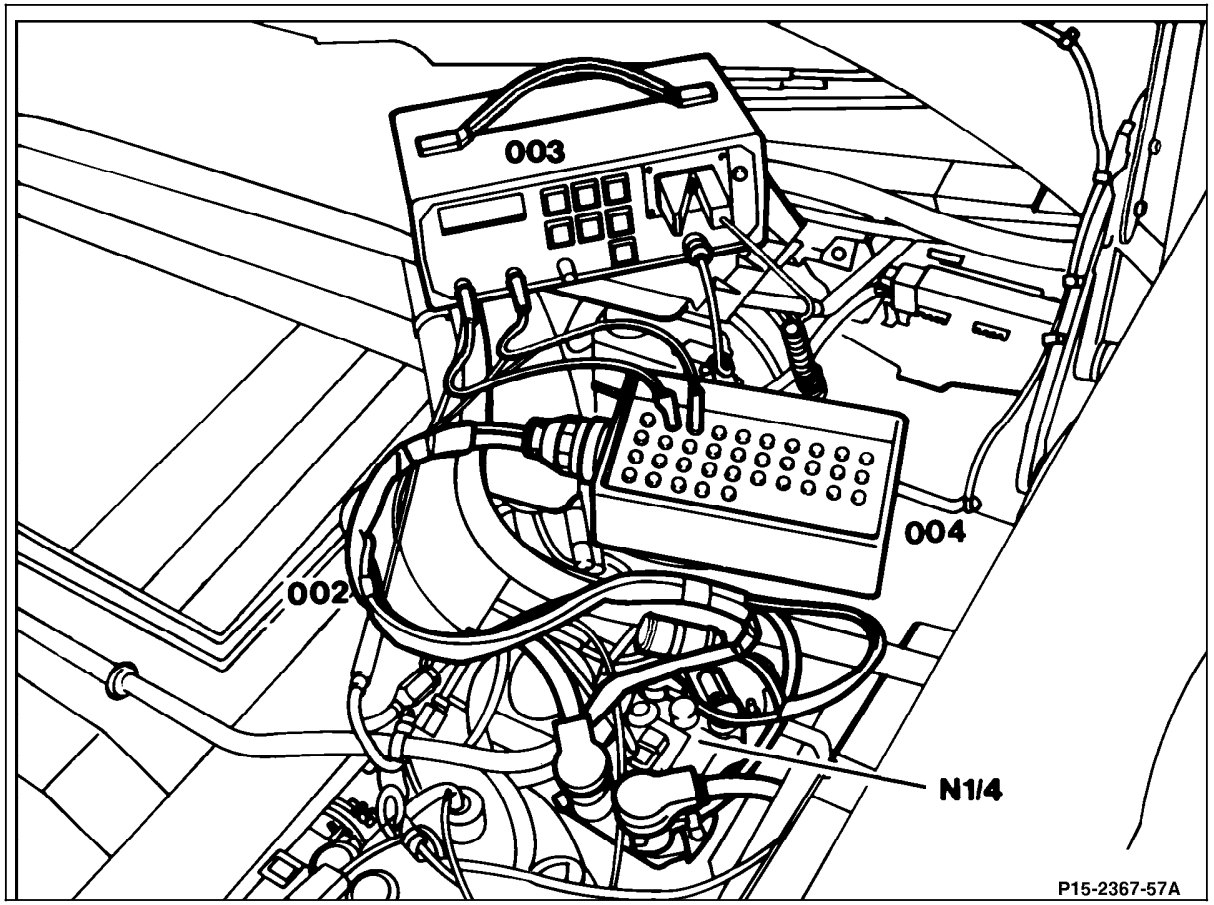
⚠WARNING!
High Voltage!

Using Test Equipment

- **Ensure that the engine and ignition are turned off when connecting/ disconnecting equipment such as voltage signal pick–up on ignition cable 4 and trigger pick–up on cylinder 1 or 7.**

Electrical Test Program - Preparation for Test

Connection Diagram – Socket Box, Ignition Control Module (N1/4)

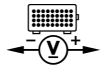
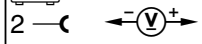
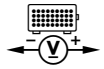


P15-2367-57A

Figure 1

002	Test cable 140 589 10 63 00
003	Digital multimeter
004	Socket box (35-pole)
N1/4	Left ignition control module

Electrical Test Program - Test (Engine Does Not Run)

Test step DTC	Scope of test	Test connection	Test condition	Nominal value	Possible cause/remedy
⇒ 1.0	**Ignition control module (N1/4 or N1/5)** Voltage supply Circuit 15	N1/4 or N1/5  2 (A.2) — 3 (A.3)	Connect socket box to N1/4 or N1/5. Ignition: **ON**	11 – 14 V	Open circuit in wire to ground, left or right front wheelhousing (W3/2 or W3/3), Open circuit in wire to base module (N16/1).
⇒ 1.1	Ground connection at W3/2 or W3/3	N1/4 or N1/5 — X11/4  2 (A.2) — 2	Ignition: **ON**	11 – 14 V	Ground (W3/2 or W3/3)
⇒ 2.0	**Ignition control module (N1/4 or N1/5)** Voltage supply Circuit 30	N1/4 or N1/5  2 (A.2) — 16 (B.8)	Ignition: **ON**	11 – 14 V	Wiring to ignition/starter switch (S2/1).

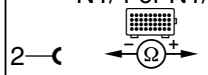
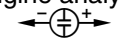
Electrical Test Program - Test (Engine Does Not Run)

Test step / DTC	Scope of test	Test connection	Test condition	Nominal value	Possible cause/remedy
⇒ 3.0	**Ignition coil (T1/1 or T1/2)** Voltage supply	T1/1 or T1/2 — W3 — V — Cir. 15	Ignition: **ON**	11 – 14 V	Wire from T1/1 or T1/2 to ignition/starter switch (S2/1).
⇒ 4.0	**Left or right crankshaft position sensor (L5/4 or L5/5)**	N1/4 or N1/5 [1] 18 — ± — 17	Engine: **Crank**	Signal, see 24, Figure 1 and 2.	⇒ 4.1, ⇒ 4.2, Segments on starter ring gear.
		N1/4 or N1/5 [2] 18 — V — 17	Engine: **Crank**	> 0.35 V	
⇒ 4.1	Resistance from crankshaft position sensor (L5/4 or L5/5)	N1/4 or N1/5 18 — Ω — 17	Ignition: **OFF** Unplug connector (2) for L5/4 or L5/5 at ignition control module (N1/4 or N1/5) (see 24, Figure 4).	680 – 1300 Ω	⇒ 4.2

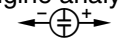
1) Test with oscilloscope.

2) Test with multimeter only if oscilloscope is unavailable.

Electrical Test Program - Test (Engine Does Not Run)

Test step / DTC	Scope of test	Test connection	Test condition	Nominal value	Possible cause/remedy
⇒ 4.2 17	Insulation of L5/4 or L5/5	N1/4 or N1/5  2 — 17 (A.2)		>200 kΩ	Crankshaft position sensor (L5/4 or L5/5).
⇒ 5.0	**Dwell angle**	Engine analyzer 	Engine: **Start**	1 – 30° or 1 – 50 %	⇒ 4.0, ⇒ 5.1, Ignition control module (N1/4 or N1/5).
⇒ 5.1	Rest current shut–off	T1/1 or T1/2 Cir. 1 — Cir. 15 	Ignition: **ON**	0 V	Ignition control module (N1/4 or N1/5) and ignition coil (T1/1 or T1/2)
		T1/1 or T1/2 Cir. 1 — Cir. 15 	Engine: **Start**	0.3 – 0.5 V	**< 0.3 V:** Open circuit in wire from ignition coil (T1/1 or T1/2) to N1/4 or N1/5, **> 0.5 V:** Ignition coil T1/1 or T1/2.

Electrical Test Program - Test (Engine Does Not Run)

Test step **DTC**	Scope of test	Test connection	Test condition	Nominal value	Possible cause/remedy
⇒ 6.0	**Ignition coil (T1/1 or T1/2)** Primary voltage	Engine analyzer  Primary pattern measurement range 400 V, duration 100%, voltage signal pick-up connected to ignition coil (T1/1 or T1/2).	Engine: **Start**	200 – 350 V	Ignition control module (N1/4 or N1/5), Ignition coil (T1/1 or T1/2).

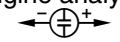
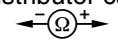
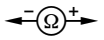
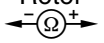
Electrical Test Program - Test (Engine Does Not Run)

Test step	DTC	Scope of test	Test connection	Test condition	Nominal value	Possible cause/remedy
⇒ 7.0	15	**Ignition coil (T1/1 or T1/2)** Firing voltage	Engine analyzer Secondary pattern measurement range 10 kV, duration 100%, voltage signal pick-up connected to ignition coil (T1/1 or T1/2).	Engine: **Start**	8 – 20 kV	⇒ 7.1, ⇒ 7.2, Ignition control module (N1/4 or N1/5).
⇒ 7.1	15	Primary winding of ignition coil (T1/1 or T1/2)	T1/1 or T1/2 Cir. 1 – Ω + Cir. 15	Ignition: **OFF** Disconnect wires of circuit 1 and 15 at ignition coil (T1/1 or T1/2).	0.3 – 0.6 Ω	Ignition coil (T1/1 or T1/2).
⇒ 7.2	15	Secondary winding of ignition coil (T1/1 or T1/2)	T1/1 or T1/2 Cir. 1 – Ω + Cir. 4	Ignition: **OFF** Disconnect wire of circuit 4 from ignition coil (T1/1 or T1/2).	8 – 13 kΩ	Ignition coil (T1/1 or T1/2).

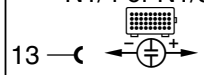
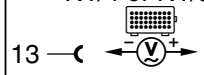
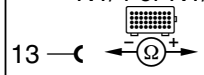
Electrical Test Program - Test (Engine Does Not Run)

Test step **DTC**	Scope of test	Test connection	Test condition	Nominal value	Possible cause/remedy
⇒ 8.0	**Left high voltage distributor (S5/5)** Firing voltage	Engine analyzer Secondary Parade, measurement range 20 kV, voltage signal pick-up connected to ignition cable for cylinder 7.	Engine: **Start**	8 – 20 kV	⇒ 8.1, ⇒ 8.2,
⇒ 8.1	Distributor cap (individual terminals)	Distributor cap inside outside center center outside electrode	Ignition: **OFF** Remove distributor cap. Unplug ignition cables (Disconnect cables one at a time).	700 – 1300 Ω at each connection	Distributor cap,
⇒ 8.2	Rotor	Rotor center point	Distributor cap removed.	700 – 1300 Ω and visual inspection	Rotor.

Electrical Test Program - Test (Engine Does Not Run)

Test step **DTC**	Scope of test	Test connection	Test condition	Nominal value	Possible cause/remedy
⇒ 9.0	**Right high voltage distributor (S5/6)** Firing voltage	Engine analyzer  Secondary Parade, measurement range 20 kV, voltage signal pick–up connected to ignition cable for cylinder 1.	Engine: **Start**	8 – 20 kV	⇒ 9.1, ⇒ 9.2,
⇒ 9.1	Distributor cap (individual terminals)	Distributor cap inside  outside center  center outside electrode	Ignition: **OFF** Remove distributor cap. Unplug ignition cables (Disconnect cables one at a time).	700 – 1300 Ω at each connection	Distributor cap,
⇒ 9.2	Rotor	Rotor center  point	Distributor cap removed.	700 – 1300 Ω and visual inspection.	Rotor.

Electrical Test Program - Test (Engine Runs)

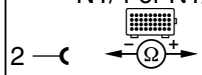
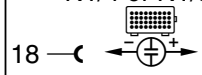
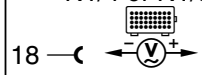
Test step	DTC	Scope of test	Test connection	Test condition	Nominal value	Possible cause/remedy
⇒ 1.0	Б	**Left or right camshaft position sensor (L5/2 or L5/3)**	N1/4 or N1/5 [1]  13 (B.5) — 9 (B.1)	Engine: **at Idle**	Signal, see Figure 2.	Wiring ⇒ 1.1, ⇒ 1.2,
			N1/4 or N1/5 [2]  13 (B.5) — 9 (B.1)	Engine: **at Idle**	>0.3 V [3]	
⇒ 1.1	Б	Resistance of camshaft position sensor (L5/2 or L5/3)	N1/4 or N1/5  13 (B.5) — 9 (B.1)	Ignition: **OFF** Unplug test cable with connector (B) on ignition control module (N1/4 or N1/5) (see Figure 4).	900 – 1600 Ω	Camshaft position sensor (L5/2 or L5/3).

1) Test with oscilloscope.

2) Test with multimeter only if oscilloscope is unavailable.

3) Voltage increases with increasing rpm.

Electrical Test Program - Test (Engine Runs)

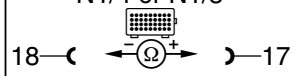
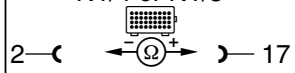
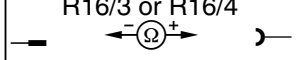
Test step / DTC	Scope of test	Test connection	Test condition	Nominal value	Possible cause/remedy
⇒ 1.2 **6**	Insulation of camshaft position sensor (L5/2 or L5/3)	N1/4 or N1/5  2 (A.2) — 9 (B.1)	Ignition: **OFF** Unplug test cable with connector (B) on ignition control module (N1/4 or N1/5) (see Figure 4).	> 200 kΩ	Camshaft position sensor (L5/2 or L5/3).
⇒ 2.0 **17**	**Left or right crankshaft position sensor (L5/4 or L5/5)**	N1/4 or N1/5 [1]  18 — 17	Engine: **at Idle**	Signal, see Figures 1.	Wiring ⇒ 2.1, ⇒ 2.2, Starter ring gear segments.
		N1/4 or N1/5 [2]  18 — 17	Engine: **at Idle**	> 1 V [3]	

1) Test with oscilloscope.

2) Test with multimeter only if oscilloscope is unavailable.

3) Voltage increases with increasing rpm.

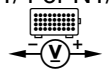
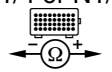
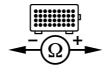
Electrical Test Program - Test (Engine Runs)

Test step / DTC	Scope of test	Test connection	Test condition	Nominal value	Possible cause/remedy
⇒ 2.1	Resistance from crankshaft position sensor (L5/4 or L5/5)	N1/4 or N1/5  18 — 17	Ignition: **OFF** Unplug connector (2) for crankshaft position sensor at ignition control module (N1/4 or N1/5) (see Figure 4).	680 – 1300 Ω	⇒ 2.2.
⇒ 2.2	Insulation of crankshaft position sensor (L5/4 or L5/5)	N1/4 or N1/5  2 (A.2) — 17		> 200 kΩ	Crankshaft position sensor (L5/4 or L5/5),
⇒ 3.0	**Left or right reference resistor (DI) (R16/3 or R16/4)**	R16/3 or R16/4 	Ignition: **OFF** Unplug R16/3 or R16/4 from ignition control module (N1/4 or N1/5) (see Figure 3 and 4).	2.4 kΩ	Reference resistor (R16/3 or R16/4),

Electrical Test Program - Test (Engine Runs)

Test step / DTC	Scope of test	Test connection	Test condition	Nominal value	Possible cause/remedy
⇒ 4.0 8	**Transmission overload protection switch, brake band B1 (S65) and transmission overload protection switch, brake band B2 (S65/1)**	N1/4 or N1/5 2 (A.2) — V — 10 (B.2)	Parking brake set. Engine: **at Idle** Selector lever in transmission range: **"D"**	After approx. 10 seconds < 1.5 – 1.7 V	Wires, S65 and/or S65/1 does not close.
⇒ 5.0 8	**Transmission overload protection switch, brake band B1 (S65) and transmission overload protection switch, brake band B2 (S65/1)**	N1/4 or N1/5 2 (A.2) — V — 10 (B.2)	Parking brake set. Engine: **at Idle** Selector lever in:: **"P/N"**	> 4 V	Wires, S65 and/or S65/1 does not open.
⇒ 6.0 9	**Transmission overload protection switch, brake band B1 (S65)**	N1/4 or N1/5 2 (A.2) — V — 10 (B.2)	Parking brake set. Engine: **at Idle** Selector lever in transmission range: **"2"**	2.4 – 2.7 V	S65 does not open.

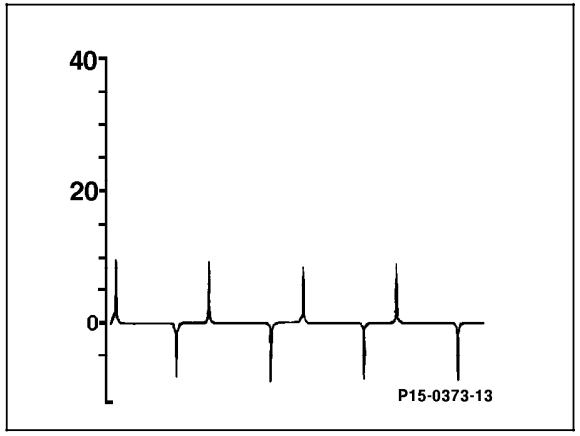
Electrical Test Program - Test (Engine Runs)

Test step / DTC	Scope of test	Test connection	Test condition	Nominal value	Possible cause/remedy
⇒ 7.0 12	**TN-signal**	N1/4 or N1/5  2 (A.2) — 4 (A.4)	Engine: **at Idle**	5 – 7 V	⇒ 7.1, Ignition control module (N1/4 or N1/5), LH control module (N3/2 or N3/3).
⇒ 7.1 12	TN wire to LH control module (N3/2 or N3/3)	N1/4 or N1/5  2 (A.2) — 4 (A.4)	Unplug N3/2 or N3/3. Unplug test cable with connector (A) on ignition control module (N1/4 or N1/5) (see Figure 4)	> 200 kΩ	Wire.
⇒ 8.0 19	**Left ignition control module (N1/4)** Coding	N1/4  6 (A.6) — 3 (A.3)	Ignition: **ON**	11 – 14 V	Open circuit in ground wire (W25/1) of left ignition control module.

Electrical Test Program - Test (Engine Runs)

Test step / DTC	Scope of test	Test connection	Test condition	Nominal value	Possible cause/remedy
⇒ 9.0 DTC 26, 27, 28	**CAN databus**	N1/4 (B) 3 — Ω — 4	Ignition: **OFF** Unplug connector (B) at left ignition control module (N1/4) and test directly at connector (B) (Figure 7)	115 – 125 Ω	⇒ 9.1, Databus.
⇒ 9.1 DTC 26	**CAN element in right ignition control module (N1/5)**	N1/5 (B) 3 — Ω — 4	Ignition: **OFF** Unplug connector (B) at right ignition control module (N1/5) and test directly at ignition control module (N1/5) (Figure 8)	115 – 125 Ω	Right ignition control module (N1/5)
⇒ 10.0 DTC 26	**CAN element in left ignition control module (N1/4)**	N1/4 (B) 3 — Ω — 4	Ignition: **OFF** Unplug connector (B) at left ignition control module (N1/4) and test directly at ignition control module (N1/4) (Figure 8)	115 – 125 Ω	Left ignition control module (N1/4)

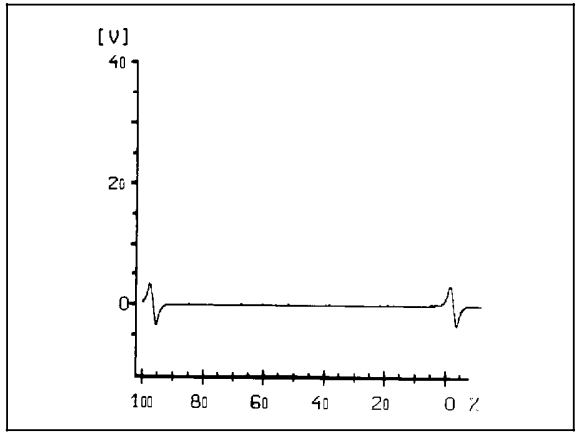
Electrical Test Program - Illustrations



P15-0373-13

Figure 1

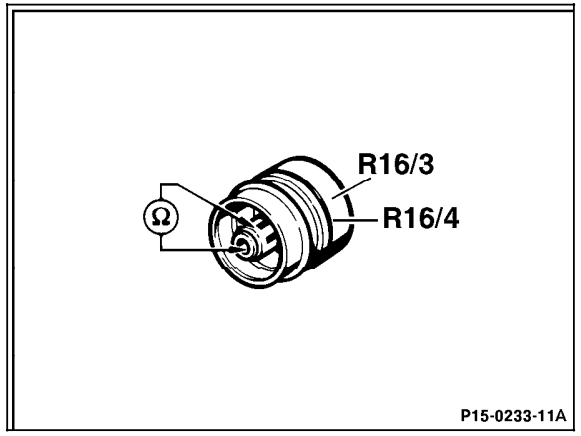
L5/4 or L5/5 — Left or right crankshaft position sensor signal



P15-5093-13

Figure 2

L5/2 or L5/3 — Left or right camshaft position sensor signal

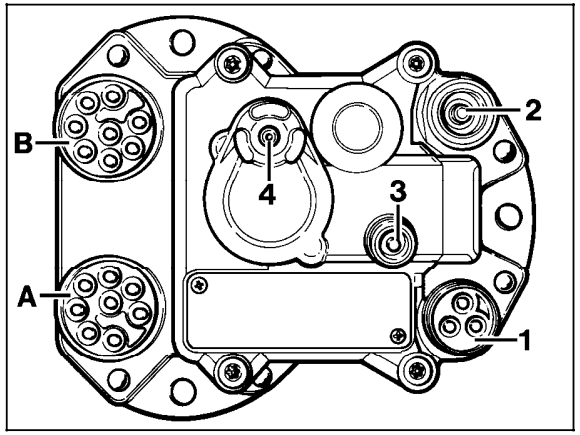


P15-0233-11A

Figure 3

R16/3 — Left reference resistor
R16/4 — Right reference resistor

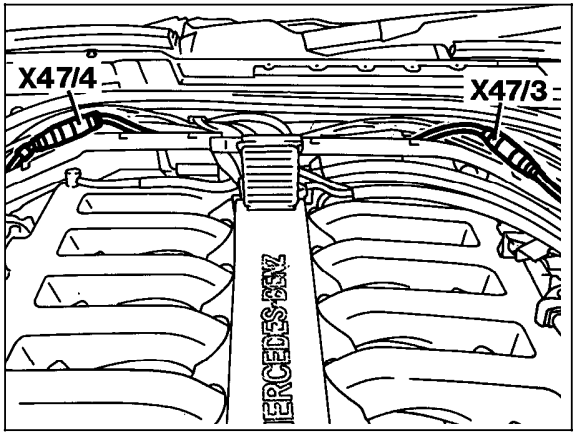
Electrical Test Program - Illustrations



P15-2030-13A

Figure 4

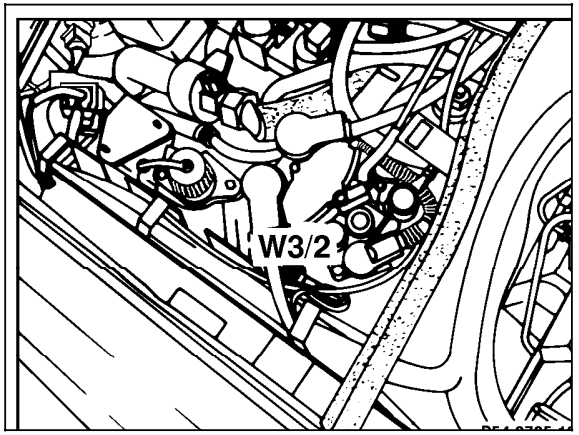
1	Connection for left or right knock sensors (A29 or A30)
2	Connection for left or right crankshaft position sensor (L5/4 or L5/5)
3	Connection for left or right reference resistor (R16/3 or R16/4)
4	Vacuum connection
A	8-pole plug connection
B	8-pole plug connection



P07-5219-13

Figure 5

X47/3	Connector, left camshaft position sensor (identified with “2“)
X47/4	Connector, right camshaft position sensor (identified with “1“)

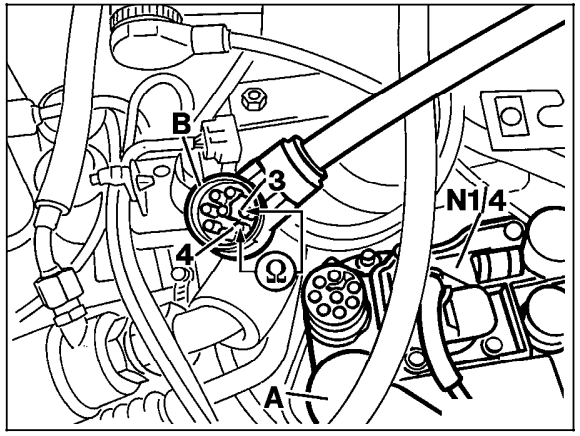


P54-2785-13

Figure 6

W3/2	Ground, left front wheelhousing

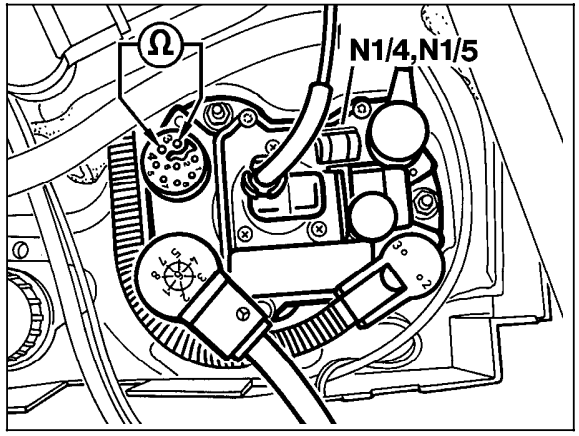
Electrical Test Program - Illustrations



P07-5250-13

Figure 7

N1/4 Left ignition control module



P15-5058-13

Figure 8

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