

Electrical Test Program – Preparation for Test

Preliminary work:
 Diagnosis - Malfunction Memory 11

⚠ WARNING!

Risk of severe injury when touching ignition parts which produce high voltages. Do not touch ignition components. Persons with heart pacemakers are not to perform repairs on this type of ignition system.

1. Review 11, 21, 22, 23, 24, 31, 33, 35, 36,
2. Review section 0,
3. Connect HHT and readout DTC memory, see 11,
4. Ignition: **OFF**
5. Connect test cable with socket box to engine control module (N3/11) or engine control module (N3/12), see 22/5



Connect interior harness connector to connection 1 on test cable. Connect engine harness connector to connection 2 on test cable.

Note:

The test program is divided into four sections:

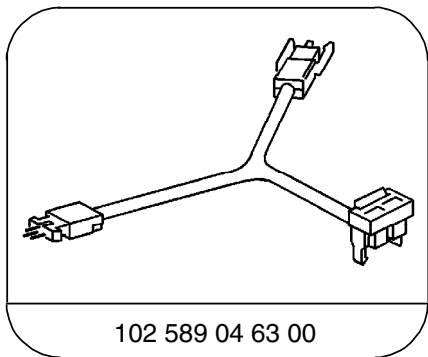
- 23 SFI Test
- 24 Ignition System Test
- 25 EA System Test
- 26 CC System Test

Note regarding “Test Connection” column:

The numbers indicated in parentheses, for example, ⇒ 1.0 (2A) signify:
 2 = Socket 2 on wiring diagram.
 A = Connector A on wiring diagram,

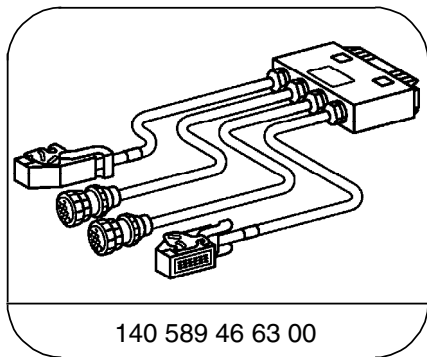
Electrical Test Program – Preparation for Test

Special Tools



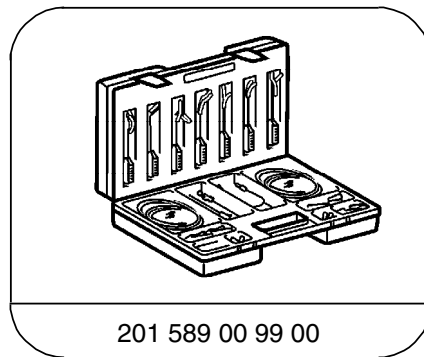
102 589 04 63 00

Test cable



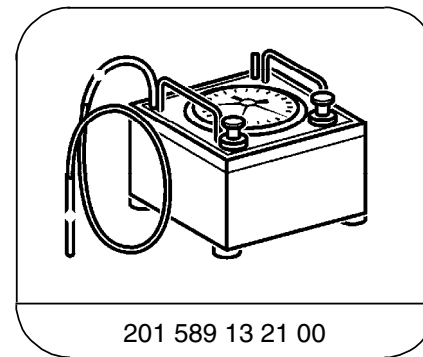
140 589 46 63 00

Test cable, 117-pin



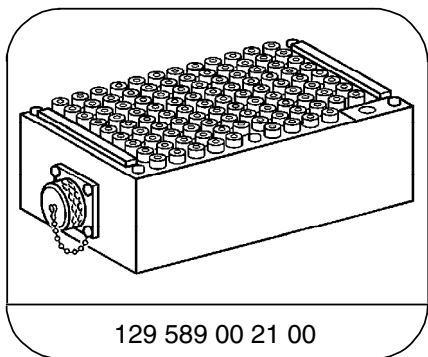
201 589 00 99 00

Electrical connecting set



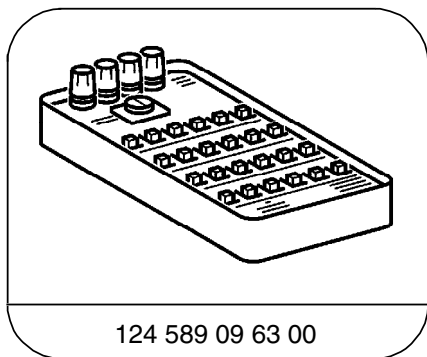
201 589 13 21 00

Tester



129 589 00 21 00

126-pin socket box



124 589 09 63 00

Ohm decade

Test Equipment; See MBUSA Standard Equipment Program

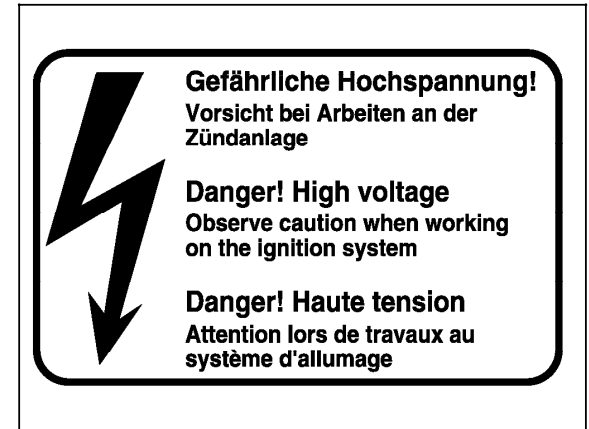
Description	Brand, model, etc.
Digital multimeter	Fluke models 23, 77 III, 83, 85, 87
Engine analyzer	Bear DACE Hermann Electronics

Electrical Test Program – Preparation for Test**⚠ WARNING!**

Persons with heart pacemakers are not to perform repairs on this type of ignition system.

Electronic ignition systems produce dangerous high voltages on both the primary circuit and the secondary (ignition) circuits. Due to the high voltages produced, contact with any of the voltage carrying components can be dangerous to your health (burns, heart palpitations, cardiac arrest etc).

- Ignition must be turned OFF prior to performing any repair work on the ignition system.
- Do not come in contact or remove with any of the ignition components while the engine is cranking or idling.
- Wear rubber soled shoes.
- Disconnect connectors for CKP sensor at sensor or control module.
- If repairs require that the ignition be turned on, then dangerous voltages will be present through out the entire ignition system.
- No exposed metal connectors or sending units may be installed in the ignition wires.



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Electrical Test Program – Preparation for Test


To Avoid Damage to the Ignition System

- To avoid damage to the engine control module, connect/disconnect the control module connectors only with the ignition: **OFF**.
- Circuit 1 of the ignition coil may not be shorted to ground, e.g. theft deterrence.
- Only original equipment should be installed in the ignition system.
- Do not operate the ignition system at cranking speed unless the entire ignition harness is connected.
- Do not perform any tests (grounding of ignition cable 4 disconnecting a spark plug connector or pulling cable 4 out of the ignition coil) at cranking or idle speed.
- The high output side of the ignition system must carry at least 2 kΩ of load (spark plug connector).

Using Test Equipment

- **Connect the secondary voltage measuring equipment on the corresponding secondary ignition lead only when engine is stopped and ignition is OFF.**
- **If the circuit breaker is activated (power balance test), and the engine stalls, then the test procedure with this tester cannot be performed.**
- **Do not connect a test lamp to circuit 1 or 15 of the ignition coil.**

- If assisting a disabled vehicle and it becomes necessary to perform an ignition spark test, perform this test only on one ignition/sark plug. Ensure a good ground connection to the spark plug.
- ME - SFI: the ignition system is to be turned OFF, when cranking engine to perform compression tests, additionally, it is necessary to disconnect connector 2 from the control module.

 Engine 120 has separate ignition and fuel injection system

Electrical Test Program – Preparation for Test

Connection Diagram - Socket Box



Connect interior harness connector to connection 1 on test cable.
 Connect engine harness connector to connection 2 on test cable.

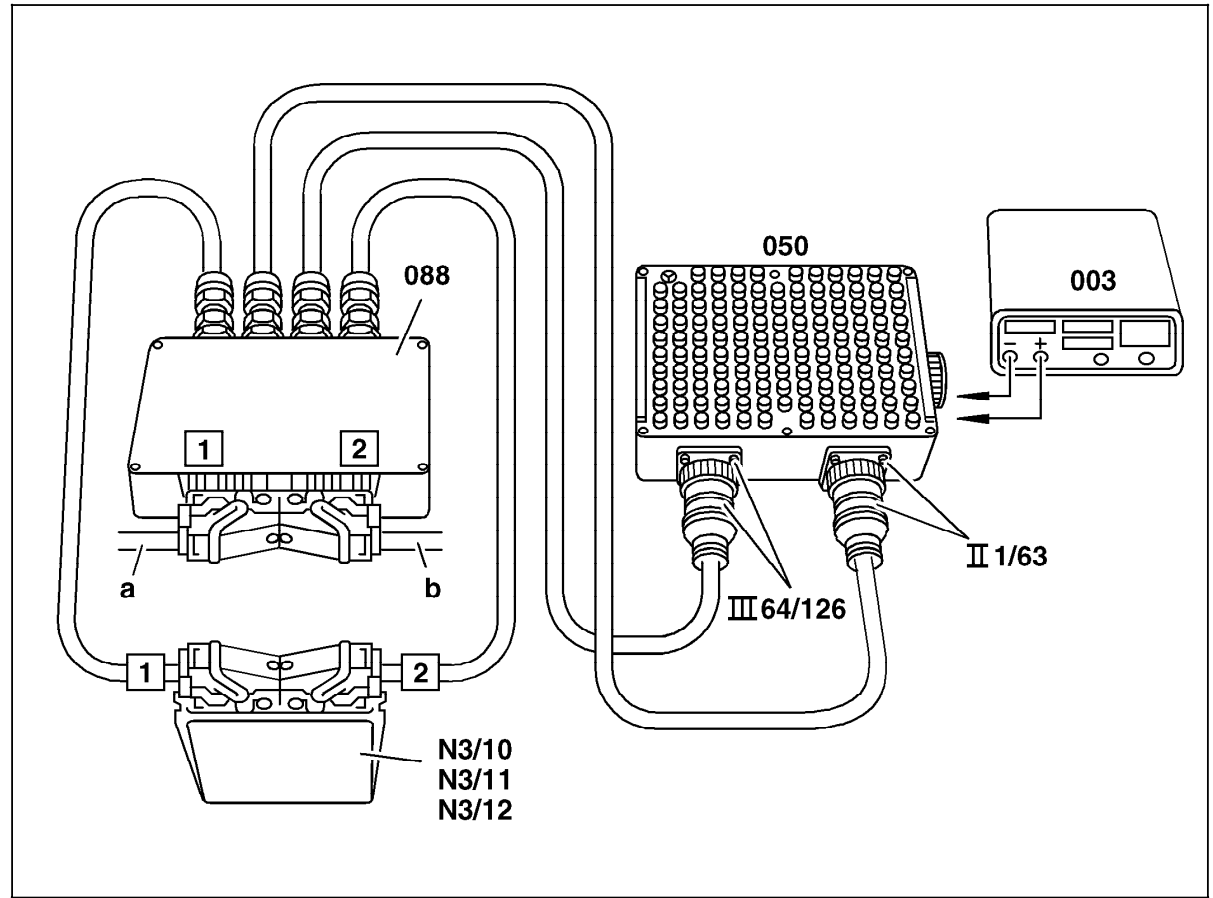


Figure 1

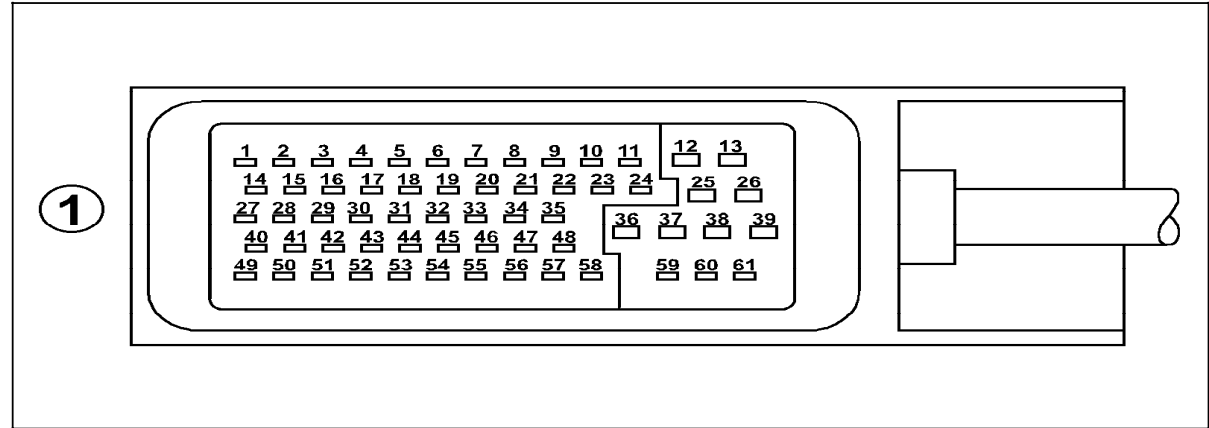
- 003 Digital multimeter
- 050 Socket box (126-pole)
- 088 Test cable
- a Interior compartment harness
- b Engine compartment harness
- N3/11 Left engine control module (ME-SFI)
- N3/12 Right engine control module (ME-SFI)
- III 64/126 Connectors, socket box and test cable
- II 1/63 Connectors, socket box and test cable

P07.61-2049-06

Electrical Test Program – Preparation for Test

Connector Layout - Engine Control Module
Connector 1 – Interior

- 1 Stop lamp switch (S9/1) N.C. contact ²⁾
- 2 CC switch (S40), accelerate/set ²⁾
- 3 Stop lamp switch (S9/1) N.O. contact ²⁾
- 4 Pedal value sensor (B37) nominal value potentiometer 2 (+) ¹⁾
- 5 –
- 6 Pedal value sensor (B37) nominal value potentiometer 2 (wiper) ¹⁾
- 7 –
- 8 A/C pushbutton control module (N22) ²⁾ (only until 05/96)
- 9 Left front axle VSS (L6/1) ²⁾
- 10 Purge control valve (Y58/3) ¹⁾ (Y58/2) ²⁾
- 11 “CHECK ENGINE” MIL (A1e26) (only **USA**) (only until 05/96, as of 06/96 via CAN)
- 12 O2S 2 (after TWC) heating (G3/5) ¹⁾ (G3/6) ²⁾ (only **USA**)
- 13 O2S 1 (before TWC) heating (G3/3) ¹⁾ (G3/4) ²⁾
- 14 Starter signal, circuit 50 (as of 06/98)
- 15 –
- 16 CTP (idle) signal
- 17 Pedal value sensor (B37) nominal value potentiometer 1 (+) ²⁾
- 18 Pedal value sensor (B37) nominal value potentiometer (-)
- 19 Pedal value sensor (B37) nominal value potentiometer 2 (wiper)
- 20 –
- 21 EPC MIL (A1e43) ²⁾
- 22 Left rear axle VSS (L6/3) ²⁾
- 23 Tank open signal ²⁾ (only until 05/96) (only **USA**)
- 24 FP relay module (K27) ²⁾



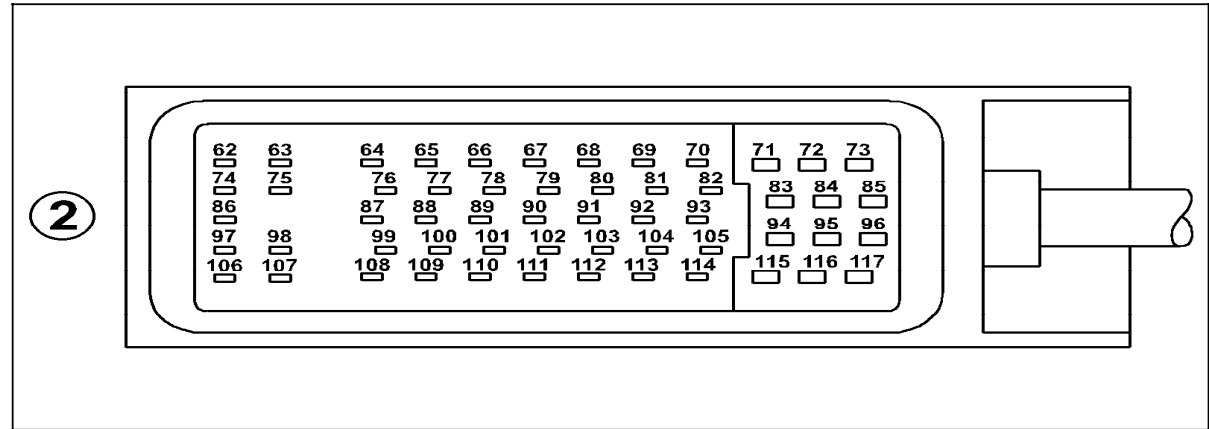
P07.61-0575-10

25	Voltage supply, circuit 87M)	43	–
26	Output ground (W15), right footwell	44	Body acceleration sensor (B24) and fuel tank pressure sensor (B4/3), 5V voltage supply Ground (W15/1) coding ¹⁾
27	CC switch (S40), control contact ²⁾	45	–
28	CC switch (S40), off ²⁾	46–47	–
29	–	48	Body acceleration sensor (B24), signal ²⁾
30	CC switch (S40), resume ²⁾	49–50	–
31	CC switch (S40), decelerate/set ²⁾	51	Purge monitoring pressure sensor (B4/4) ²⁾ , model 129 up to 08/97, (only USA)
32	Oil level switch (S43) ²⁾		Fuel tank pressure sensor (B4/3), model 140, model 129 as of 09/97, (only USA) ²⁾
33	Fuel reserve signal (only until 05/96, as of 06/96 via CAN)	52	–
34	Activated charcoal canister shut-off valve (Y58/4) (only USA) (model 140 and 129 as of 09/97)	53	Ground, sensors ²⁾
35	Voltage supply, circuit 30	54	–
36	Voltage supply, circuit 87E, for EA function	55	Diagnosis output (injection system), DLC (X11/4)
37	–	56	Diagnosis output, (engine speed) DLC (X11/4) ²⁾
38	Electronics ground (W15/1), right footwell	57	AIR relay module (K17) ²⁾
39	Output ground (W15), right footwell	58	Instrument cluster (fuel consumption signal) ²⁾
40	O2S 1 (before TWC) ground (G3/3) ¹⁾ (G3/4) ²⁾	59	–
41	O2S 1 (before TWC) signal (G3/3) ¹⁾ (G3/4) ²⁾	60	CAN data line “H”
42	O2S 2 (after TWC) signal (G3/5) ¹⁾ (G3/6) ²⁾ (only USA)	61	CAN data line “L”

¹⁾ Left engine control module (N3/11) only
²⁾ Right engine control module (N3/12) only

Electrical Test Program – Preparation for Test

Connector Layout - Engine Control Module
Connector 2 – Engine compartment



P07.61-2048-10

62 - 63	–	81	Oil temperature sensor (Model 129 only, as of 06/98)	97	EA/CC/ISC actuator, actual value potentiometer (wiper) (M16/4r1) ¹⁾ (M16/3r1) ²⁾
64	IAT sensor (+) (B17/6) ¹⁾ (B17/5) ²⁾	82	Injector (Y63y12) ¹⁾ (Y64y6) ²⁾	98	EA/CC/ISC actuator, actual value potentiometer (–) (M16/4r1–r2) ¹⁾ (M16/3r1–r2) ²⁾
65	Pressure sensor (B28/1) ¹⁾ (B28/2) ²⁾ (only USA)	83	Ignition coil (T1/7) ¹⁾ (T1/1) ²⁾	99 - 103	–
66	Camshaft Hall-effect sensor (B6/2) ¹⁾ (B6/3) ²⁾	84	Ignition coil (T1/11) ¹⁾ (T1/5) ²⁾	104	Starter relay module (as of 06/98)
67	Hot film MAF sensor (+) (B2/6) ¹⁾ (B2/7) ²⁾	85	Ignition coil (T1/9) ¹⁾ (T1/3) ²⁾	105	–
68	Hot film MAF sensor (–) (B2/6) ¹⁾ (B2/7) ²⁾	86	–	106	EA/CC/ISC actuator, actual value potentiometer (+) (M16/4r1–r2) ¹⁾ (M16/3r1–r2) ²⁾
69	Injector (Y63y10) ¹⁾ (Y64y4) ²⁾	87	Ground: IAT sensor, Intake MAP sensor, Camshaft Hall-effect sensor, ECT sensor (only USA)	107	EA/CC/ISC actuator, actual value potentiometer (wiper) (M16/4r2) ¹⁾ (M16/3r2) ²⁾
70	Injector (Y63y8) ¹⁾ (Y64y2) ²⁾	88	Pressure sensor, 5V voltage supply (B28/1) ¹⁾ (B28/2) ²⁾ (only USA)	108-112	–
71	Injector (Y63y11) ¹⁾ (Y64y5) ²⁾	89	CKP sensor (+) (L5/4) ¹⁾ (L5/5) ²⁾	113	Adjustable camshaft timing solenoid (Y49/1) ¹⁾ (Y49/2) ²⁾
72	Injector (Y63y7) ¹⁾ (Y64y1) ²⁾	90	Rear KS 2 (+) (A29g2) ¹⁾ (A30g2) ²⁾	114	AIR pump switchover valve (Y32)
73	Ground bridge to pin 96	91	Rear KS 2 (–) (A29g2) ¹⁾ (A30g2) ²⁾	115	Ignition coil (T1/10) ¹⁾ (T1/4) ²⁾ (–)
74	EA/CC/ISC actuator (–) (M16/4) ¹⁾ (M16/3) ²⁾	92	–	116-117	–
75	EA/CC/ISC actuator (+) (M16/4) ¹⁾ (M16/3) ²⁾	93	Injector (Y63y9) ¹⁾ (Y64y3) ²⁾		
76	ECT sensor (+) (B11/9) ¹⁾ (B11/10) ²⁾	94	Ignition coil (T1/8) ¹⁾ (T1/2) ²⁾ (–)		
77	–	95	Ignition coil (T1/12) ¹⁾ (T1/6) ²⁾ (–)		
78	CKP sensor (–) (L5/4) ¹⁾ (L5/5) ²⁾	96	Ground bridge to pin 73		
79	Front KS 1 (+) (A29g1) ¹⁾ (A30g1) ²⁾				
80	Front KS 1 (–) (A29g1) ¹⁾ (A30g1) ²⁾				

¹⁾ Left engine control module (N3/11) only
²⁾ Right engine control module (N3/12) only