Electrical Test Program – Preparation for Test

⚠ **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 (N3/10).

Connector with red marking is not required at this time since the engine control module has presently no function installed for it. When disconnecting the connectors on the engine control module remove center connector (D) first, when reconnecting connectors install center connector (D) last.

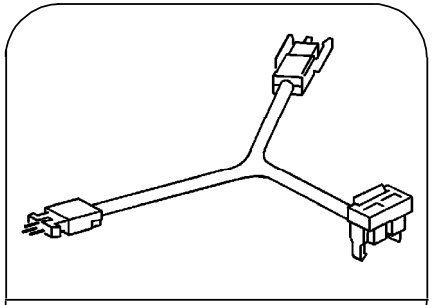
Note:
The test program is divided into four sections:
23 SFI Test
24 Ignition System Test
25 EA System Test
26 CC System Test

New Model designation:
Model 463 = G-Wagen

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,

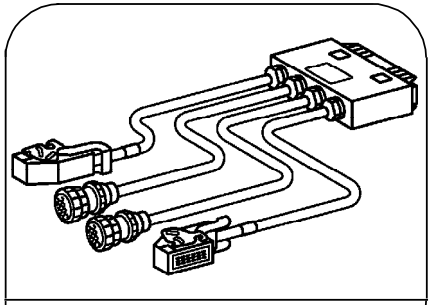
Electrical Test Program – Preparation for Test

Special Tools



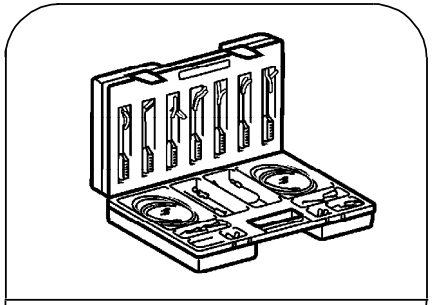
102 589 04 63 00

Test cable



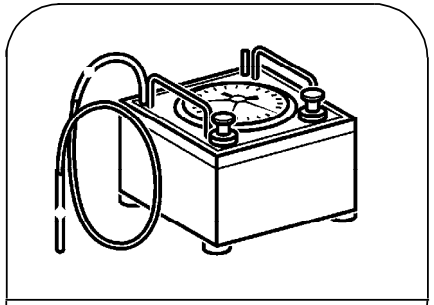
140 589 46 63 00

Test cable, 117-pin



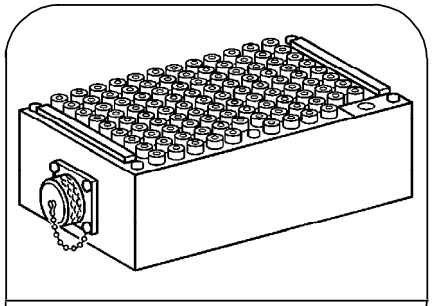
201 589 00 99 00

Electrical connecting set



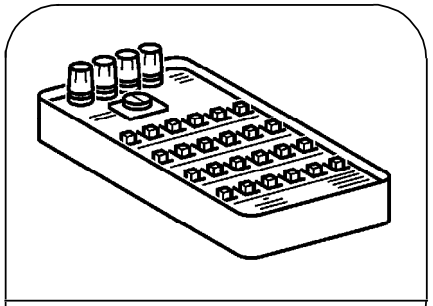
201 589 13 21 00

Tester



129 589 00 21 00

126-pin socket box



124 589 09 63 00

Ohm decade

Test equipment; See MBUSA Standard Service Equipment Program

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

Electrical Test Program – Preparation for Test

⚠ **WARNING!**
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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 palpatations, cardiac arrest etc).

- Igntion must be turned OFF prior to performing any repair work on the igntion 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.

P15.11-0001-01

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 deterence.
- Only original equipment should be installed in the ignition system.
- Do not operate the ignition system at cranking speed unless the entire igntion 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).
- To avoid damaging the ignition coils during individual testing, do not load the coil with more than 28 kV.
- If assisting a disabled vehicle and it becomes necessary to perform an igntion 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.
- CFI/LH-SFI: disconnect connector(s) on DI control module for CKP sensor (L5).
- CFI/LH-SFI: The DI control module, which is mounted on the wheel arch, is coated with a heat absorbing paste to enhance the transfer of heat, therefore do not remove the foil strip, since this has no effect on the heat transfer.

i Engine 120 has separate ignition and fuel injection system

Using Test Equipment

- **Ensure that the engine and ignition are OFF when connecting/ disconnecting test equipment to a coil.**
- **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.**

Electrical Test Program – Preparation for Test

Connection Diagram - Socket Box

Note:
When disconnecting the connectors on the engine control module remove center connector (D) first, when reconnecting connectors install center connector (D) last.

⚠
Connector with red marking is not required at this time since the engine control module has presently no function installed for it.

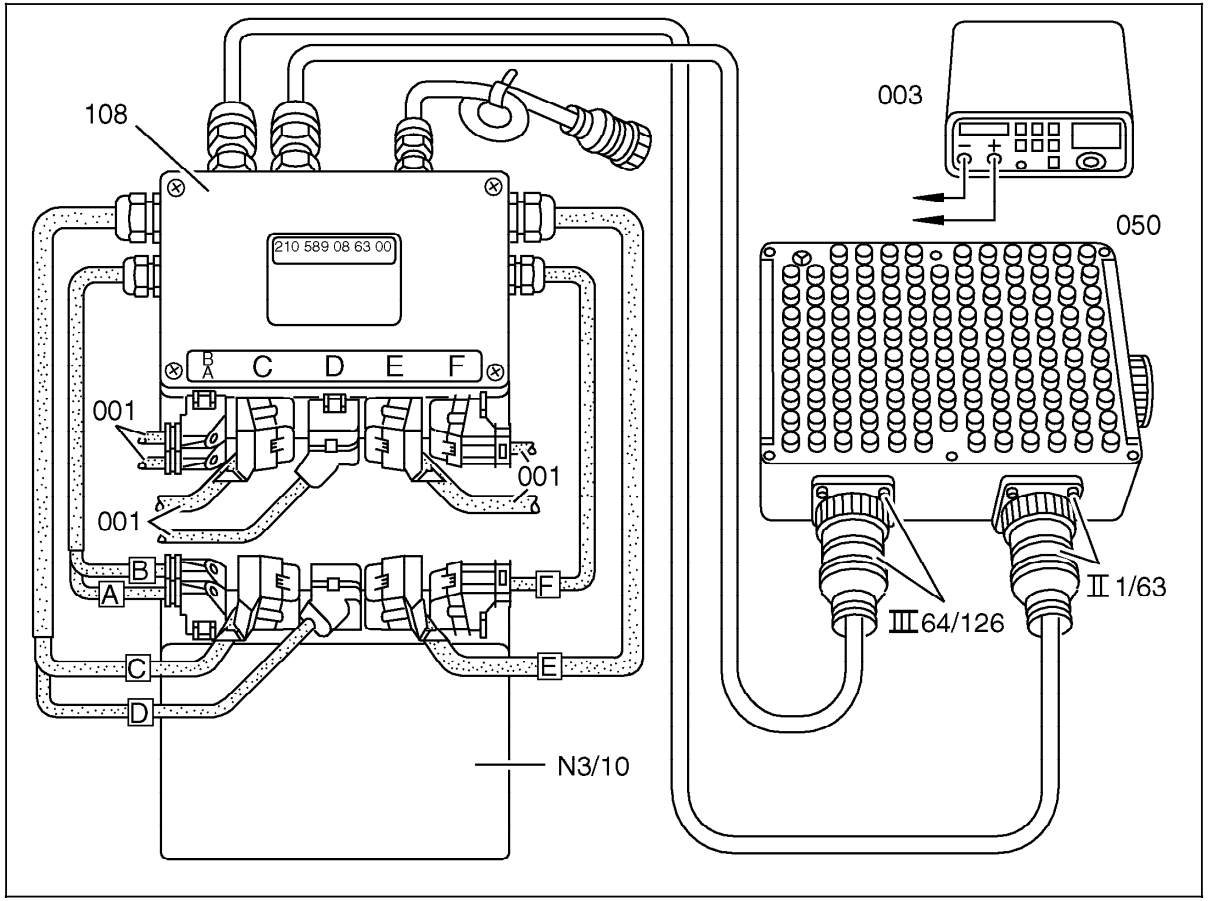

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Figure 1

001	Engine control module connectors
003	Digital multimeter
050	Socket box (126-pole)
108	Test cable
N3/10	Engine control module (ME-SFI)
A-F	Connectors
II1/63	Connectors, socket box
III63/126	Connectors, socket box

Electrical Test Program – Preparation for Test

Connector Layout - Engine Control Module

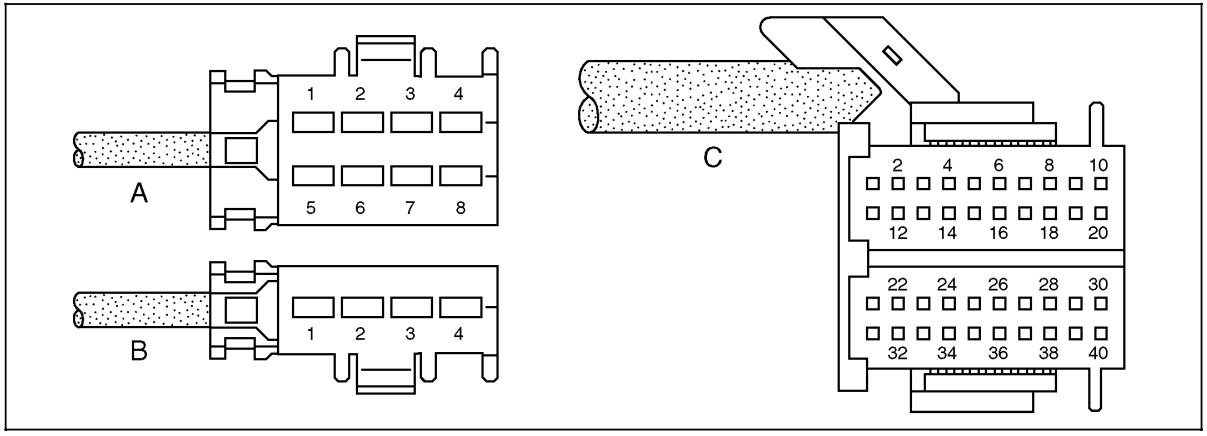

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Figure 2

1A	Left O2S 1 heater (before TWC)
2A	Voltage supply (circuit 87), fused
3A	Ground Model 129: (control module box/module box) (W27) Model 163: (component compartment) (W16) Model 208/210: (electronics ground - component compartment - right) (W16/6)
4A	–
5A	Right O2S 1 heater (right, before TWC)
6A	Engine/climate control electric cooling fan control
7A	Ground Model 129: (control module box/module box) (W27) Model 208/210: (electronics ground - component compartment - right) (W16/6)
8A	Ground Model 129: (control module box/module box) (W27) Model 208/210: (electronics ground - component compartment - right) (W16/6)
1B	Right O2S 2 heater (right, after TWC) (only USA)
2B	Left O2S 2 heater (left, after TWC) (only USA)
3B	Diagnosis connection (data link connector)
4B	Voltage supply (circuit 30)
1C – 20C	–
21C	Purge control valve
22C	Pedal value sensor (+ nominal value potentiometer 1)
23C	Pedal value sensor (– nominal value potentiometer 1)
24C	Pedal value sensor (nominal value potentiometer 1 wiper)
25C	Pedal value sensor (nominal value potentiometer 2 wiper)
26C	Pedal value sensor (– nominal value potentiometer 2)
27C	Pedal value sensor (+ nominal value potentiometer 2)
28C	AIR pump relay module (only USA)
29C	FP relay module (K27)
30C	–
31C	Right O2S 1 ground (right, before TWC)
32C	Right O2S 1 signal (right, before TWC)
33C	Left O2S 1 signal (left, before TWC)
34C	Left O2S 1 ground (left, before TWC)
35C-37C	–

Electrical Test Program – Preparation for Test

Connector Layout - Engine Control Module

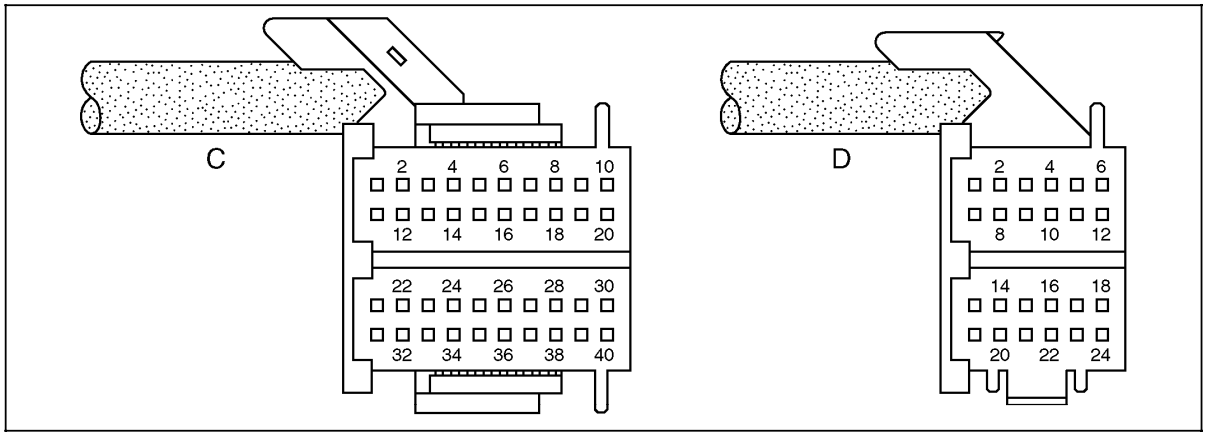

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Figure 3

38C	Datalink connector (engine rpm signal)
39C	Data link connector (ME-SFI DTC's)
40C	Signal (circuit 50)
1D	FP relay module (K27)
2D	Activated charcoal canister shut-off valve (only USA)
3D	Starter relay
4D	Ground, fuel tank pressure sensor (only USA)
5D	Signal, fuel tank pressure sensor (only USA)
6D	Voltage supply 5 V for fuel tank pressure sensor (only USA)
7D	Right O2S 2 ground (right, after TWC) (only USA)
8D	Right O2S 2 signal (right, after TWC) (only USA)
9D	Left O2S 2 signal (left, after TWC) (only USA)
10D	Left O2S 2 ground (left, after TWC) (only USA)
11D	CAN data bus "H"
12D	CAN data bus "L"
13D	Variable speed limit regulation (without DAS 3 only)
14D-15D	–
16D	Crash-Signal (as of 06/98)
17D-18D	–
19D	P/N recognition with AT
20D	CC switch (accelerate/set) (without DAS 3 only)
21D	CC switch (decelerate/set) (without DAS 3 only)
22D	CC switch (resume) (without DAS 3 only)
23D	CC switch (control contact) (without DAS 3 only)
24D	CC switch (off) (without DAS 3 only)

Electrical Test Program – Preparation for Test

Connector Layout - Connector 1, interior for ME-SFI control module

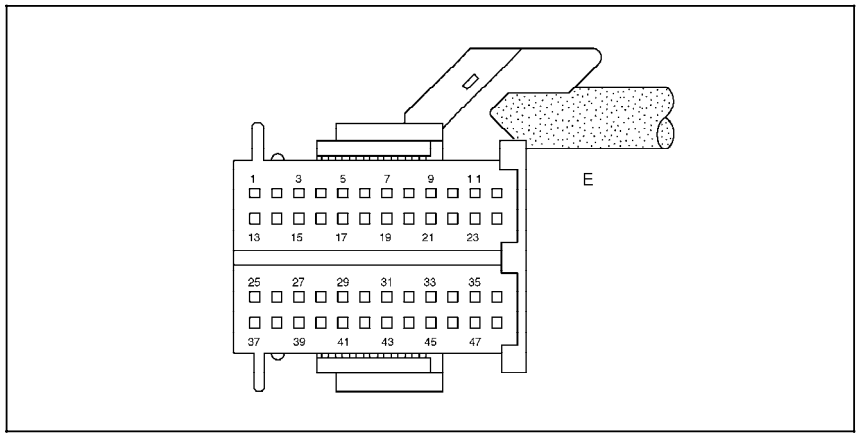

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Figure 4

1E	Injector cyl. 6
2E	Injector cyl. 3
3E	Injector cyl. 7
4E	Injector cyl. 8
5E	EGR switchover valve
6E – 9E	–
10E	AIR pump switchover valve (only USA)
11E	–
12E	Resonance intake manifold switchover valve
13E	Injector cyl. 4
14E	Injector cyl. 2
15E	Voltage supply 5 V, oil sensor (level/temperature/quality)
16E	Ground for oil sensor (level/temperature/quality)
17E	Signal for oil sensor (level/temperature/quality)
18E – 20E	–
21E	Signal for oil pressure switch
22E	Voltage supply 5 V, pressure sensor (only USA)
23E	Pressure sensor signal (only USA)
24E	Pressure sensor ground (only USA)
25E	Injector cyl. 1
26E	Injector cyl. 5
27E	AIR pump relay in relay module (only USA)
28E	ECT sensor ground
29E	ECT sensor signal
30E	–
31E	EA/CC/ISC actuator (actual value potentiometer 1 wiper)
32E	EA/CC/ISC actuator (actual value potentiometer ground)
33E	Actual value potentiometer voltage supply
34E	EA/CC/ISC actuator (actual value potentiometer 2 wiper)
35E – 36E	–
37E	CKP sensor ground
38E	CKP sensor signal
39E	Camshaft Hall-effect sensor ground
40E	Camshaft Hall-effect sensor signal

Electrical Test Program – Preparation for Test

Connector Layout - Engine Control Module

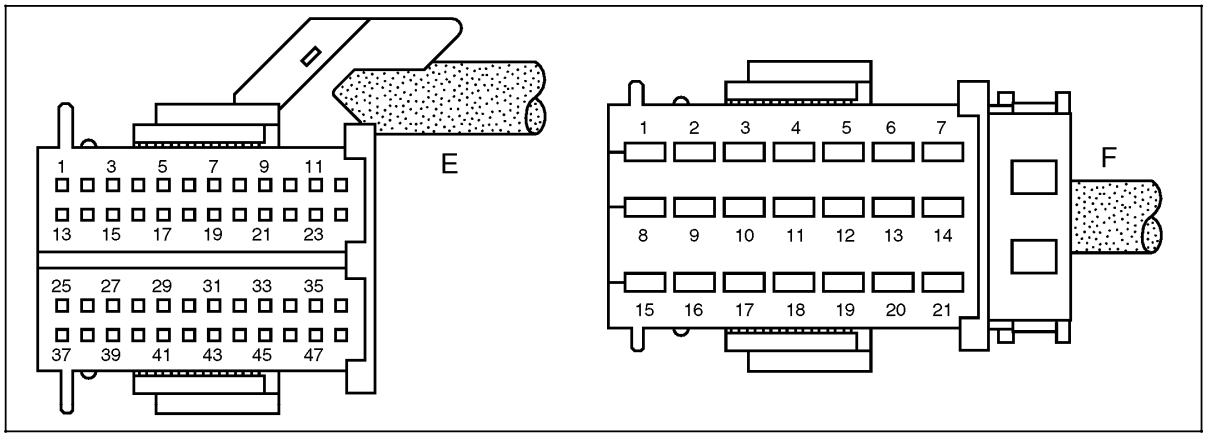

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Figure 5

33E	Actual value potentiometer voltage supply	1F	EA/CC/ISC actuator (–)	15F	Ground
34E	EA/CC/ISC actuator (actual value potentiometer 2 wiper)	2F	EA/CC/ISC actuator (+)		Model 129: (control module box/module box) (W27)
35E – 36E	–	3F	–		Model 163: (component compartment) (W16)
37E	CKP sensor ground	4F	Ignition coil T1/3 b cyl. 3		Model 208/210: (electronics ground - component compartment - right) (W16/6)
38E	CKP sensor signal	5F	Ignition coil T1/3 a cyl. 3	16F	Ignition coil T1/6, b cyl. 6
39E	Camshaft Hall-effect sensor ground	6F	Ignition coil T1/4 a cyl. 4	17F	Ignition coil T1/6, a cyl. 6
40E	Camshaft Hall-effect sensor signal	7F	Ignition coil T1/4 b cyl. 4	18F	Ignition coil T1/2, b cyl. 2
41E	KS 1 ground (right side of engine)	8F	Ground	19F	Ignition coil T1/2, a cyl. 2
42E	KS 1 signal (right side of engine)		Model 129: (control module box/module box) (W27)	20F	Ignition coil T1/1, a cyl. 1
43E	KS 2 ground (left side of engine)		Model 163: (component compartment) (W16)	21F	Ignition coil T1/1, b cyl. 1
44E	KS 2 signal (left side of engine)		Model 208/210: (electronics ground - component compartment - right) (W16/6)		
45E	IAT sensor (in hot film MAF sensor)	9F	Ignition coil T1/8 b cyl. 8		
46E	Hot film MAF sensor voltage supply 5 V	10F	Ignition coil T1/8 a cyl. 8		
47E	Hot film MAF sensor signal	11F	Ignition coil T1/7 b cyl. 7		
48E	Hot film MAF sensor ground	12F	Ignition coil T1/7 a cyl. 7		
		13F	Ignition coil T1/5 a cyl. 5		
		12F	Ignition coil T1/5 b cyl. 5		