

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 **WARNING!** on pages 11/1 and 11/2,
2. Review 11, 21, 22, 23, 24, 31, 33, 35, 36,
3. Review section 0,
4. Connect HHT and readout DTC memory, see 11,
5. Ignition: **OFF**
6. Connect test cable with socket box as per "Connection Diagram - Socket Box", see 22/5.



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

Note regarding “Test Connection” column:

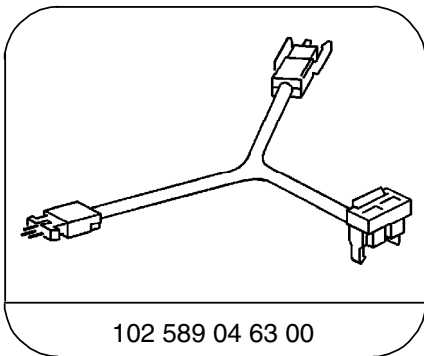
The numbers indicated in parentheses, for example, ⇒ 1.0 (2A) signify:

2 = Socket 2 on wiring diagram.

A = Connector A on wiring diagram,

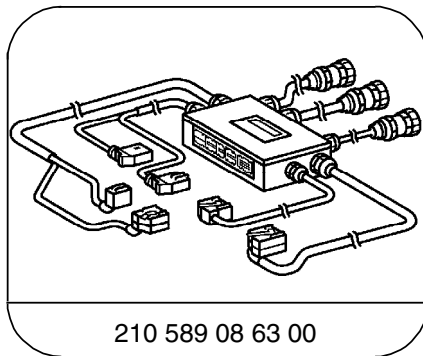
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Special Tools



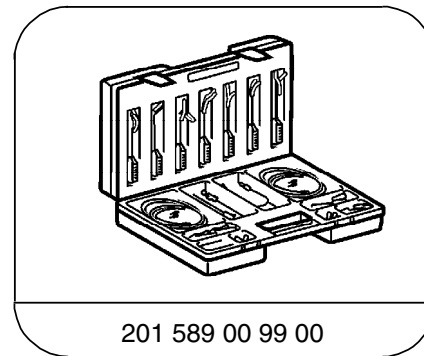
102 589 04 63 00

Test cable



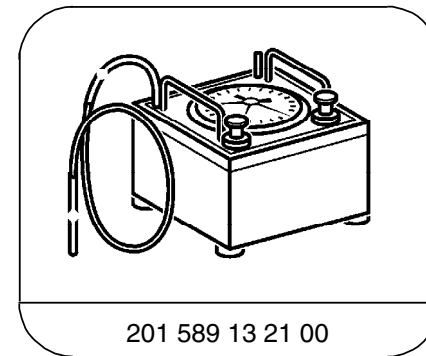
210 589 08 63 00

145-pin test cable



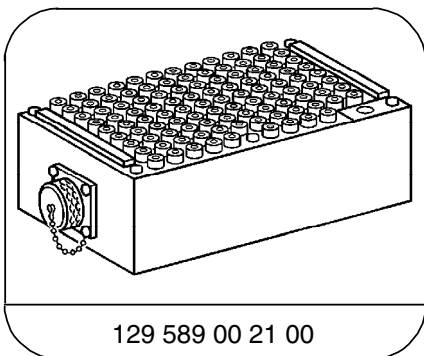
201 589 00 99 00

Electrical connecting set



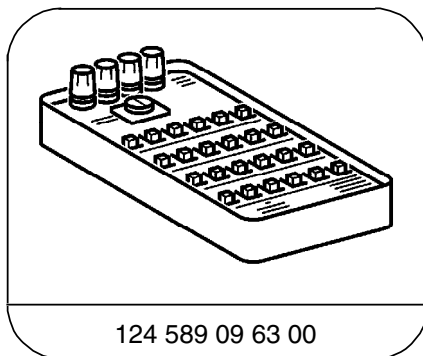
201 589 13 21 00

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

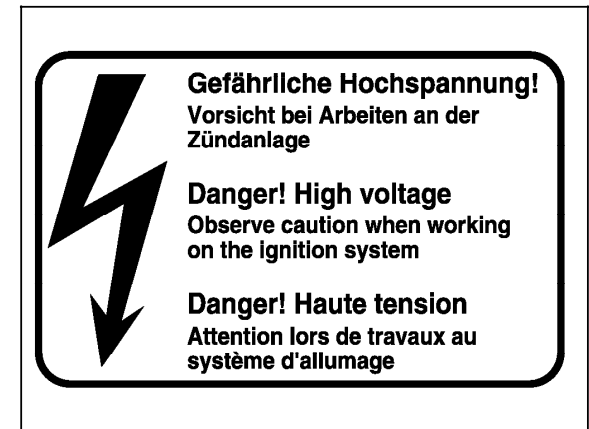
Description	Brand, model, etc.
Digital multimeter	Fluke models 23, 77 III, 83, 85, 87
Engine analyzer	Bear DACE Hermann Electronic

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).

- Persons with heart pacemakers are not to perform repairs on this type of ignition system.
- 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.
- No exposed metal connectors or sending units may be installed in the ignition wires.



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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).
- If assisting a disabled vehicle and it becomes necessary to perform an ignition spark test, perform this test only on one ignition/spark 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 two separate ignition and fuel injection systems.

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.**

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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.


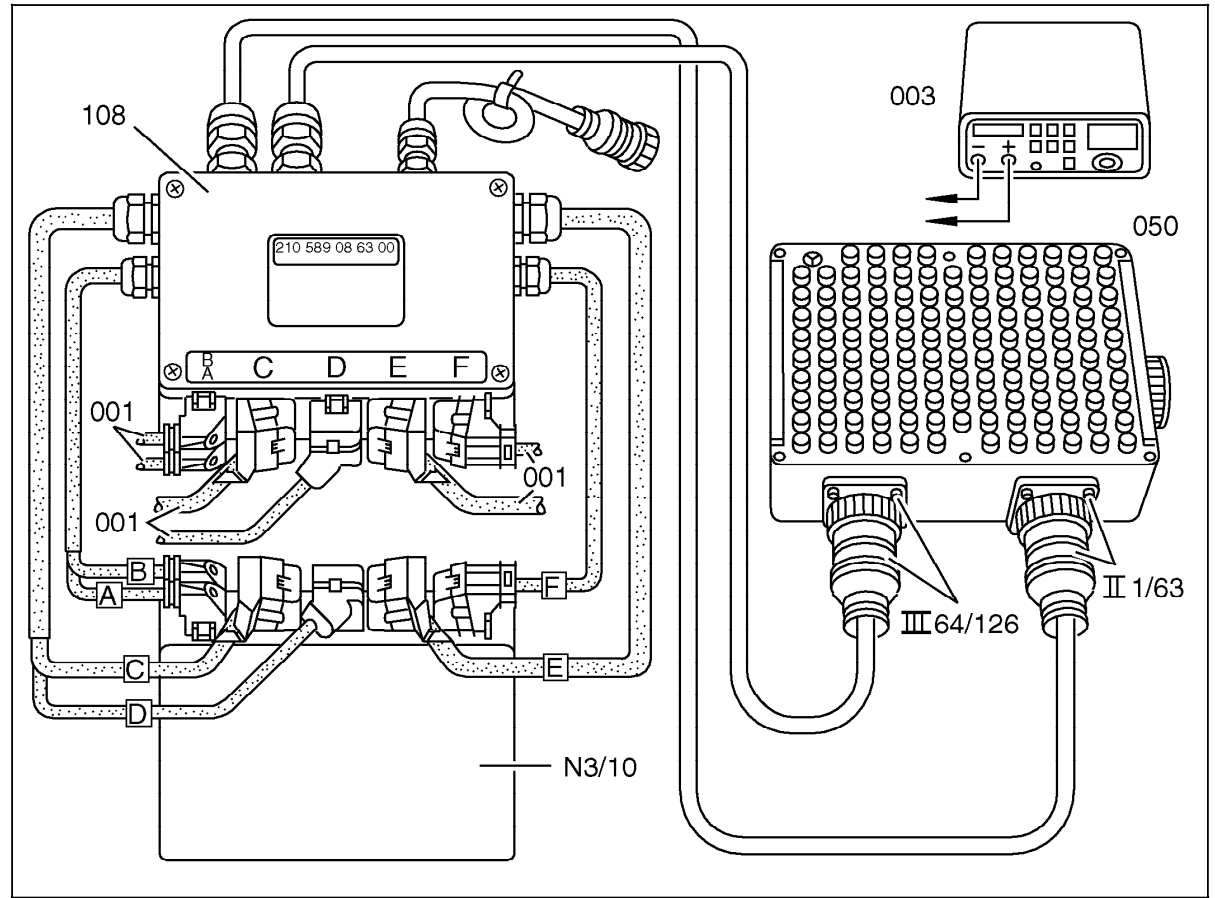
 **Connector with red marking is not required at this time since the engine control module has presently no function installed for it.**

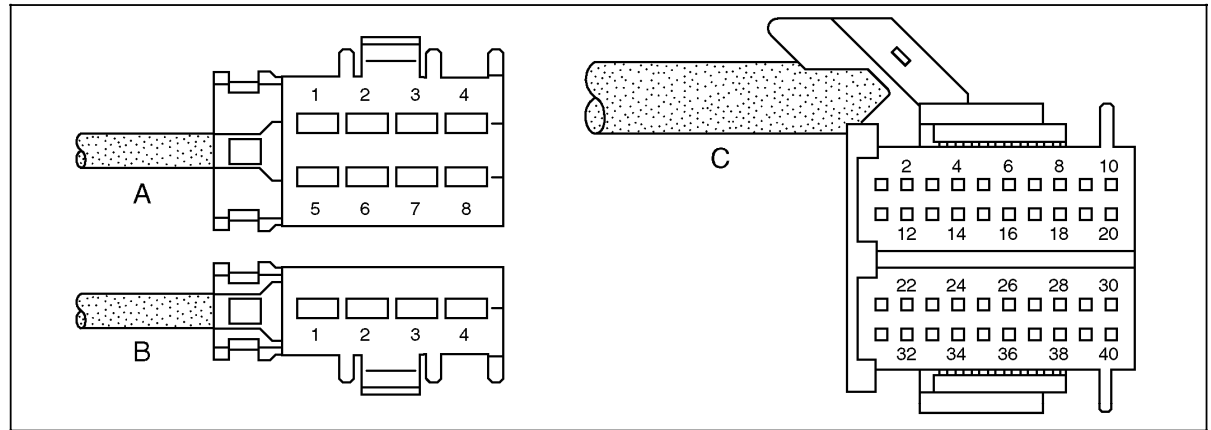
Figure 1
 001 Engine control module connectors
 003 Digital multimeter
 050 Socket box (126-pole)
 108 Test cable
 N3/10 Engine control module (ME-SFI)
 A-F Connectors
 III64/126 and II1/63:
 Connection descriptions on socket box and test cable



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Connector Layout - Engine Control Module



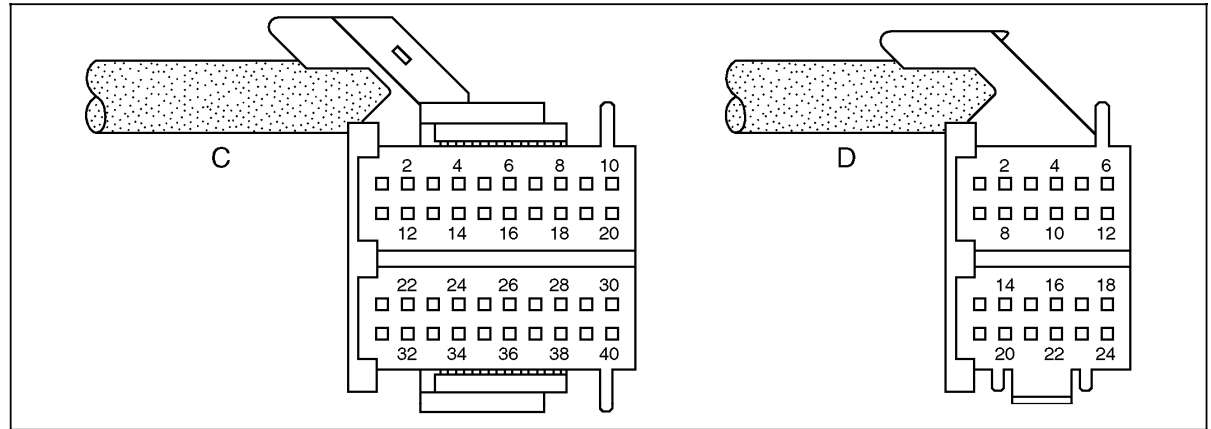
P07.61-0251-04

Figure 2

1A	–	1C – 20C	–
2A	Voltage supply (circuit 87), Model 170 relay module, Model 202 fuse and relay module box	21C	Purge control valve
3A	Ground, Model 170 component compartment W16, Model 202 right component compartment W16/6	22C	Pedal value sensor (+ nominal value potentiometer 1)
4A	–	23C	Pedal value sensor (– nominal value potentiometer 1)
5A	O2S 1 heater (before TWC)	24C	Pedal value sensor (nominal value potentiometer 1 wiper)
6A	Control of engine/climate control electric cooling fan	25C	Pedal value sensor (nominal value potentiometer 2 wiper)
7A	Ground, Model 170 component compartment W16, Model 202 right component compartment W16/6	26C	Pedal value sensor (– nominal value potentiometer 2)
8A	Ground, Model 170 component compartment W16, Model 202 right component compartment W16/6	27C	Pedal value sensor (+ nominal value potentiometer 2)
1B	O2S 2 heater (after TWC) (only USA)	28C	AIR relay module in fuse and relay module box (Model 202.023 only USA)
2B	–	29C	FP relay module (on model 170 in relay module)
3B	Diagnosis connection (data link connector)		
4B	Voltage supply (circuit 30), Model 170 relay module, Model 202 fuse and relay module box		

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Connector Layout - Engine Control Module



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Figure 3

30C	–	35D	Fuel tank pressure sensor signal (Model 170 only (USA), Model 202 as of 09/97)	19D	P/N recognition
31C	O2S 1 ground (before TWC)	36D	Fuel tank emissions monitoring pressure sensor signal (Model 202 only (USA), up to 08/97).	20D	CC switch (accelerate/set)
32C	O2S 1 signal (before TWC)	37D	Voltage supply 5 V for fuel tank pressure sensor (Model 170 only (USA), Model 202 as of 09/97)	21D	CC switch (decelerate/set)
33C – 37C	–	38D	Voltage supply 5 V for fuel tank emissions monitoring pressure sensor (Model 202 only (USA), up to 08/97)	22D	CC switch (resume)
38C	Datalink connector (engine rpm signal)	39D	O2S 2 ground (after TWC)	23D	CC switch (control contact)
39C	Data link connector (ME-SFI DTC's)	40D	O2S 2 signal (after TWC)	24D	CC switch (off)
40C	Signal (circuit 50)				
1D	–				
2D	Activated charcoal canister shut-off valve (only Model 170 only (USA), Model 202 as of 09/97)				
3D	Starter relay (Model 170 only (USA), Model 202 as of 06/97)				
4D	Ground, fuel tank pressure sensor (Model 170 only (USA), Model 202 as of 09/97) Ground, fuel tank emission monitoring pressure sensor (Model 202 only (USA), up to 08/97)				

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Connector Layout - Engine Control Module

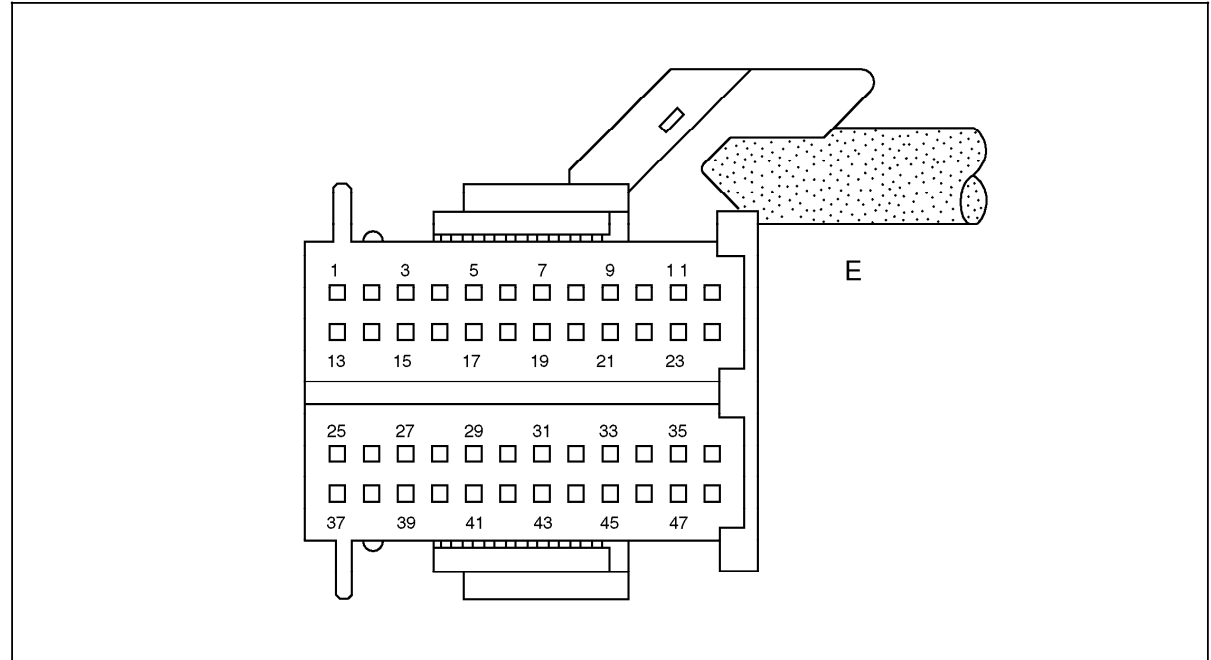


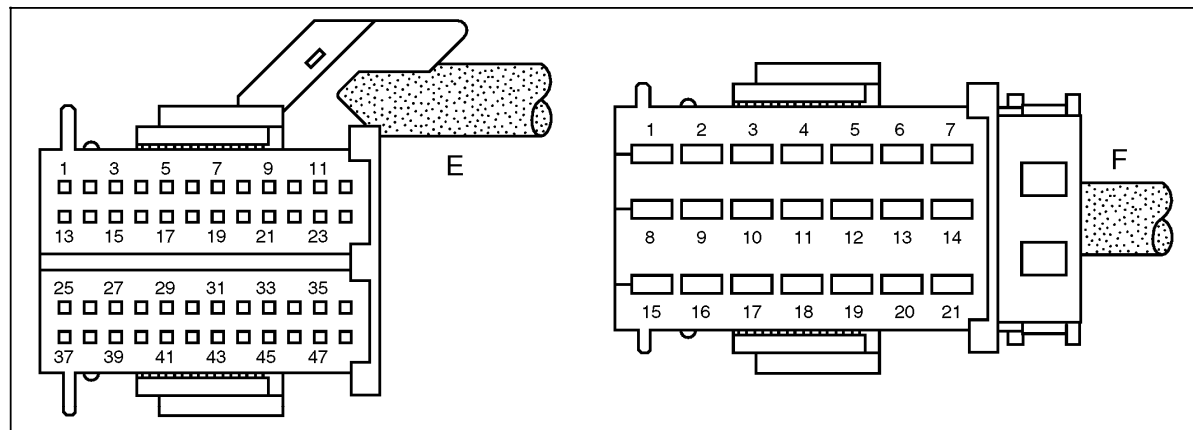
Figure 4

P07.61-0253-05

1E – 2E	–	15E – 16E	–	31E	EA/CC/ISC actuator (actual value potentiometer 1 wiper)
3E	Air flap/air filter actuator (supercharger only)	17E	Oil level switch	32E	EA/CC/ISC actuator (actual value potentiometer ground)
3E	A/C compressor cut-out (normally aspirated engine)	18E – 21E	–	33E	Actual value potentiometer voltage supply
4E	Adjustable camshaft timing solenoid	22E	Voltage supply 5 V, pressure sensor (only USA)	34E	EA/CC/ISC actuator (actual value potentiometer 2 wiper)
5E	EGR switchover valve (Model 202 only USA), without supercharger)	23E	Pressure sensor signal (only USA)	35E – 36E	–
6E – 9E	–	24E	Pressure sensor ground (only USA)		
10E	AIR pump switchover valve (Model 170, 202 only USA)	25E	Injector cyl. 1		
11E – 12E	–	26E	Injector cyl. 3		
13E	Injector cyl. 4	27E	–		
14E	Injector cyl. 2	28E	ETC sensor ground		
		29E	ECT sensor signal		
		30E	–		

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Connector Layout - Engine Control Module



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Figure 5

37E	CKP sensor ground	1F	EA/CC/ISC actuator (-)
38E	CKP sensor signal	2F	EA/CC/ISC actuator (+)
39E	Camshaft Hall-effect sensor ground	3F - 7F	-
40E	Camshaft Hall-effect sensor signal	8F	Output ground, Model 170 component compartment W16/1, Model 202 right component compartment W16/6
41E	Knock sensor ground	9F - 12F	-
42E	Knock sensor signal	13F	Ignition coil T1/2, cyl. 2 and 3
43E - 44E	-	14F	-
45E	IAT sensor (in hot film MAF sensor)	15F	Output ground, Model 170 component compartment W16/1, Model 202 right component compartment W16/6
46E	Hot film MAF sensor voltage supply 5 V	16F - 19F	-
47E	Hot film MAF sensor signal	20F	Ignition coil T1/1, cyl. 1 and 4
48E	Hot film MAF sensor ground	21F	Magnetic supercharger clutch