9.2 Engine 111 as of 08/96

Diagnosis - Diagnostic Trouble Code (DTC) Memory

Preliminary work: . . . . . Engine Test, Adjustment, Engines (SMS, Job No. 07-1100)

⚠ WARNING!
Risk of severe injury when touching ignition parts which produce high voltages. Do not touch igntion components.
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 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.

⚠ WARNING!
Risk of fatal injury from being pulled into rotating vehicle parts.
Do not reach into rotating parts.
Wear closed and tight-fitting work clothes.
Protect vicinity of rotating vehicle components from unauthorized access.

⚠ WARNING!
Risk of explosion from fuel igniting, risk of poisoning from inhaling and swallowing fuel as well as risk of injury to eyes and skin from contact with fuel.
No fire, sparks, exposed flames or smoking.
Pour fuels only into suitable and appropriately marked containers.
Wear protective clothing when handling fuel.
Possible hazards
Risk of explosion, poisoning and injury
Fuels are highly inflammable and toxic if inhaled. Fuel may cause skin damage. Contact with gasoline fuel, for example, removes the natural oils on the skin. Fuel vapors are explosive, invisible and spread out at floor level. They are toxic if inhaled and have a narcotic effect in high concentrations.

Protective measures/guidelines

- Pay attention to national safety regulations and provisions.
- No fire, sparks, exposed flames or smoking.
- Ensure that the place of work is adequately ventilated.
- Never drain or pour in fuels over assembly pits.
- Store drained fuel in suitable and sealed containers.
- Immediately eliminate any fuel spills which have been spilled out of the container.

Continued on next page:

Diagnosis - Diagnostic Trouble Code (DTC) Memory

Preliminary work: . . . . . Engine Test, Adjustment, Engines (SMS, Job No. 07-1100)

Conducting work on a vehicle with exposed flame
(e.g. welding etc.)

- Prior to commencing such work, remove appropriate parts of the fuel system and seal open fuel lines with plugs.

First-aid measures

- Clean contaminated/exposed skin with water and soap.
- Change contaminated clothing as quickly as possible.
- If fuel gets into the eyes, rinse out eyes immediately with water, and contact a doctor, if necessary.

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).
- 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.

Engine 120 has separate ignition and fuel injection system.

Readout via the impulse counter scan tool is not possible.

Note:
Symbol for emission related malfunctions which lead to the activation of the CHECK ENGINE MIL when a certain test cycle was performed and a fault was recognized.

Diagnosis - Diagnostic Trouble Code (DTC) Memory

Preliminary work: . . . . . Engine Test, Adjustment, Engines (SMS, Job No. 07-1100)

Note regarding diagnostic trouble code (DTC) readout:
The engine control module (N3/10) for the ME-SFI system is equipped with diagnostic trouble code (DTC) memory. Malfunctions are recognized and stored as DTC's and are distinguished as follows:

- Malfunctions which are constantly present,
- Intermittent contact malfunctions which have occured during a trip.

The DTC memory is erased when the vehicle's battery is disconnected.

Malfunctions which are no longer present, are automatically erased as follows:

- After three trips the "CHECK ENGINE" MIL goes out.
- After an additional 40 warm-up periods the DTC is automatically erased.

A warm-up period or trip is defined as follows:

Warm-up period
- Engine coolant temperature at start < 35° C,
- Engine coolant temperature increases to > 70° C.

Trip
- Engine running for > 20 minutes,
- Engine temperature > – 7° C,
- Engine speed > 500 rpm,
- All emission related logic chain functions already were checked during previous trips.

The stored DTC's can be read at the data link connector (X11/4) **using the HHT only**, with the ignition switched "**ON**" or with the "engine running".

Readout via an on-off ratio readout or impulse counter scan tool has been eliminated.

Note regarding mixture preparation self-adaptation:
The Lambda control system determines the fuel injection duration so precisely that the fuel/air ratio is kept constant at Lambda level 1 (equals 14.7 kg air to 1 kg fuel) under all operating conditions.
Should malfunctions occur in the form of:
- Intake air leaks,
- Injector wear or injector carbon build-up,
- Engine wear,
- Transition resistance in MAF sensor,
- Defective diaphragm pressure regulator,
- Defective purge control valve,

the engine control module (ME-SFI, 2.1) automatically performs a mixture adjustment.

Diagnosis - Diagnostic Trouble Code (DTC) Memory

The degree of correction is constantly calculated and permanently stored. The self-adaptation is performed additive at idle and multiplicative under partial load. The correction towards rich or lean is ± 1.0 milliseconds (injection duration) at idle and the factor of 0.68 – 1.32 at partial load. After repair work is performed, the engine control module will automatically adapt itself again.

Note regarding version coding:
The engine control module is equipped with a version coding feature. The coding must be performed with the Hand-Held Tester (automatically or manually, see Notes for HHT "Version coding" 11/5) upon installation of a new control module.
The following vehicle version data must be determined for coding:

- Vehicle model,
- Engine,
- Manual/automatic transmission
- Non-catalytic converter (non-TWC),
- Country version,
- 30 km/h limitation

Note regarding Drive Authorization System (DAS X, DAS 2b and DAS 3):
Model 170 as of production start up and model 202 as of 08/96:
Vehicles with ME-SFI are equipped with DAS. DAS is activated from the DAS control module (N54/1) via the CAN data bus to the engine control module.
Upon activation of the DAS, the engine control module renders the fuel injection system inoperative.
Model 170 and model 202 up to 05/97 as well as model 210 up to 02/97 use DAS X.
Model 170 uses DAS 2b as of 02/97
The activation or deactivation is accomplished with a transponder in the ignition key. As soon as the key is turned in the steering lock, the DAS control module receives a signal and activates the engine control via the CAN data bus.
As of M.Y. 1998, in models 202 and 208, 210 **DAS 3** is used. DAS 3 can only be activated or deactivated using the electronic key. Upon inserting the electronic key into the ignition lock, the DAS control module activates the engine control via the CAN data bus.
The locking and unlocking of the vehicle, using the mechanical key has no effect on the DAS system.
The engine control module and the DAS control module are "married" to one another through identification codes. The identification codes can not be erased (see HHT nominal values "DAS", menu selection 3/7).
Therefore, swapping the engine or DAS control module from one vehicle to another is not possible!

If an exchange engine control module is installed for test purposes, up to 40 start attempts can be performed before the engine and DAS control modules "marry" to one another. Prior to perfroming the first start, the engine control module must be version coded using the HHT. Additionally, the code number and VIN must be entered (see HHT nominal values "DAS", menu selection 3/7).

Diagnosis - Diagnostic Trouble Code (DTC) Memory

Notes regarding automatic recognition of the mechanical end stop and wide open position of the throttle valve from the actuator:
The end stops of the throttle valve is determined by the actuator and stored in the engine control module.
After replacing the control module or actuator, the mechanical end stop and wide open position must again be determined and recorded.
Thereby allowing learned data to be erased with the HHT and new data to be learned. When the new engine control module is connected for the first time to circuit 30 (B+), the engine control module performs a self-adaptation of the actuator with the ignition "ON"
(lower mechanical end stop).

Requirements for learning process:
- Selector lever in position P/N,
- Vehicle standing still,
- Engine off,
- Engine coolant temperature between 5° C and 100° C,
- Accelerator pedal not applied.

When all requirements are met, turn **ignition ON for at least 60 seconds**, then turn **ignition OFF for at least 10 seconds**.
The learned value is stored in memory, only after the first 10 start cycles, provided the voltage supply has not been interrupted. Should the battery be disconnected after the 9th start cycle, the re-learning process must be performed again.
Notes regarding VSS sensor adaption for rough running engine test:
After the replacement of the ME-SFI control module, CKP sensor (L5), starter ring gear or motor mount, a sensor adaption must be performed:
- Engine coolant temperature approx. > 70 ºC,
- Drive vehicle on road.
- With selector lever in position 4: Increase engine rpm to approx. 2,500 rpm and then coast until engine rpm is approx. < 1,500 rpm.
- With selector lever in position 2: Increase engine rpm to approx. 6,100 rpm and then coast until engine rpm is approx. < 4,100 rpm. Again increase engine rpm to approx. 6,100 rpm and then coast until engine rpm is approx. < 3,000 rpm.
- Using the HHT, determine if VSS sensor adaption has taken place.

Notes regarding performance/speedometer test:
Disconnecting the ESP/ASR/ETS/ABS control modules is not allowed. The engine control module and transmission control module rely on these modules to supply the VSS data via the CAN bus.

To disable the brake and engine regulation function of the ESP/ASR/ETS/ABS control modules:

A. Working without HHT
- Ignition: **OFF**.
- Connect HHT adapter to data link connector (X11/4).
- Bridge sockets 1 and 6.
- Engine: **Start** (BAS/ESP or BAS/ASR MIL must illuminate!).

B. Working with HHT
- Ignition: **OFF**.
- Disconnect front axle VSS sensor connector (ESP/ASR MIL must illuminate!).

When work is completed, reconnect VSS sensor connector and erase DTC's with HHT!

Diagnosis - Diagnostic Trouble Code (DTC) Memory

Notes for HHT

- **Fault search with HHT**
  Diagnostic trouble code (DTC) memory: Select “Current DTC’s”.
  If the actual condition changes, e.g. when wiggling a connector, the change is reported optically and acoustically so that troubleshooting can be performed directly with the HHT.

- **Loose connections**
  Loose connections are stored if they occur several times in a certain time period. Therefore, they can appear only as “Stored DTC’s” and never as “Current DTC’s”.

- **Nominal values**
  All nominal values relative to the actual values shown on the HHT are listed in the Diagnostic Manual, Engines, Volume 1, section A.

- **Actual value for engine speed**
  For engine speed, the HHT display indicates the closed throttle speed (CTP) nominal value calculated by the control module on the left, and the rpm actual value on the right. Both values should differ from each other only slightly. Permissible tolerances are not yet determined.

- **Version coding with HHT**
  a) Before replacement of the engine control module, the existing code number must be read and stored with the HHT (menu selection 5 “Version coding”). After installation of the new control module, the previously read code number must be entered.
  Note:
  If returning a new control module to a PDC, the code number must be erased.

  b) If the code number can **not** be read, the vehicle equipment/version must be determined, the corresponding code number obtained from the Spare Parts Microfiche (group 54) and manually entered with the HHT.

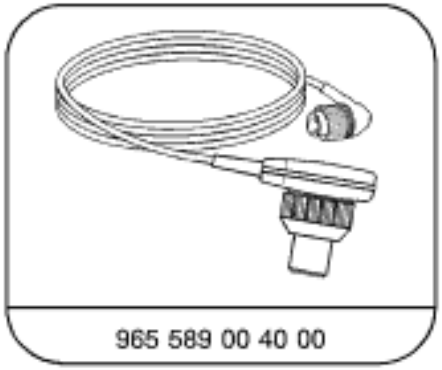
- **Drive authorization system (DAS) stage X**
  Upon replacement the engine control module must be version coded using the HHT. Additionally, the code number and VIN must be entered (see HHT nominal values “DAS”, menu selection 3/7).

Diagnosis - Diagnostic Trouble Code (DTC) Memory

Special Tools

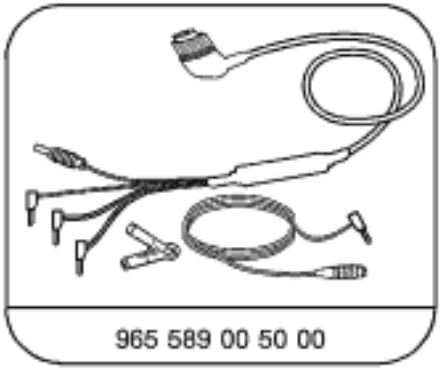
965 589 00 01 00

Hand-Held-Tester



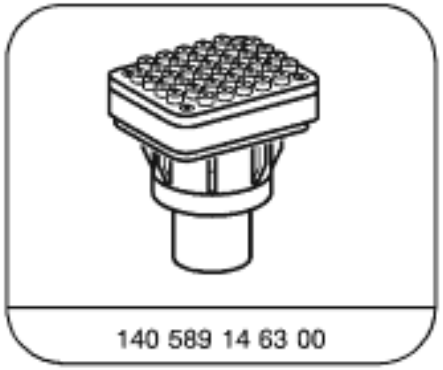
965 589 00 40 00

Test cable



965 589 00 50 00

Adapter cable



140 589 14 63 00

Adapter

Diagnosis - Diagnostic Trouble Code (DTC) Memory

Connection Diagram - Hand-Held Tester (HHT)

1 Connect HHT (087) with test cable (097) to data link connector (X11/4)

2. Ignition: **ON**

3. As per display in HHT:
   a) read out/erase DTC memory
   b) read out actual values
   c) perform activations
   d) program control modules

4. Disconnect HHT

Observe system specific notes, which are described in the beginning of each chapter. Erase all stored faults which come about when tests or simulations are performed, upon completion of the repairs.

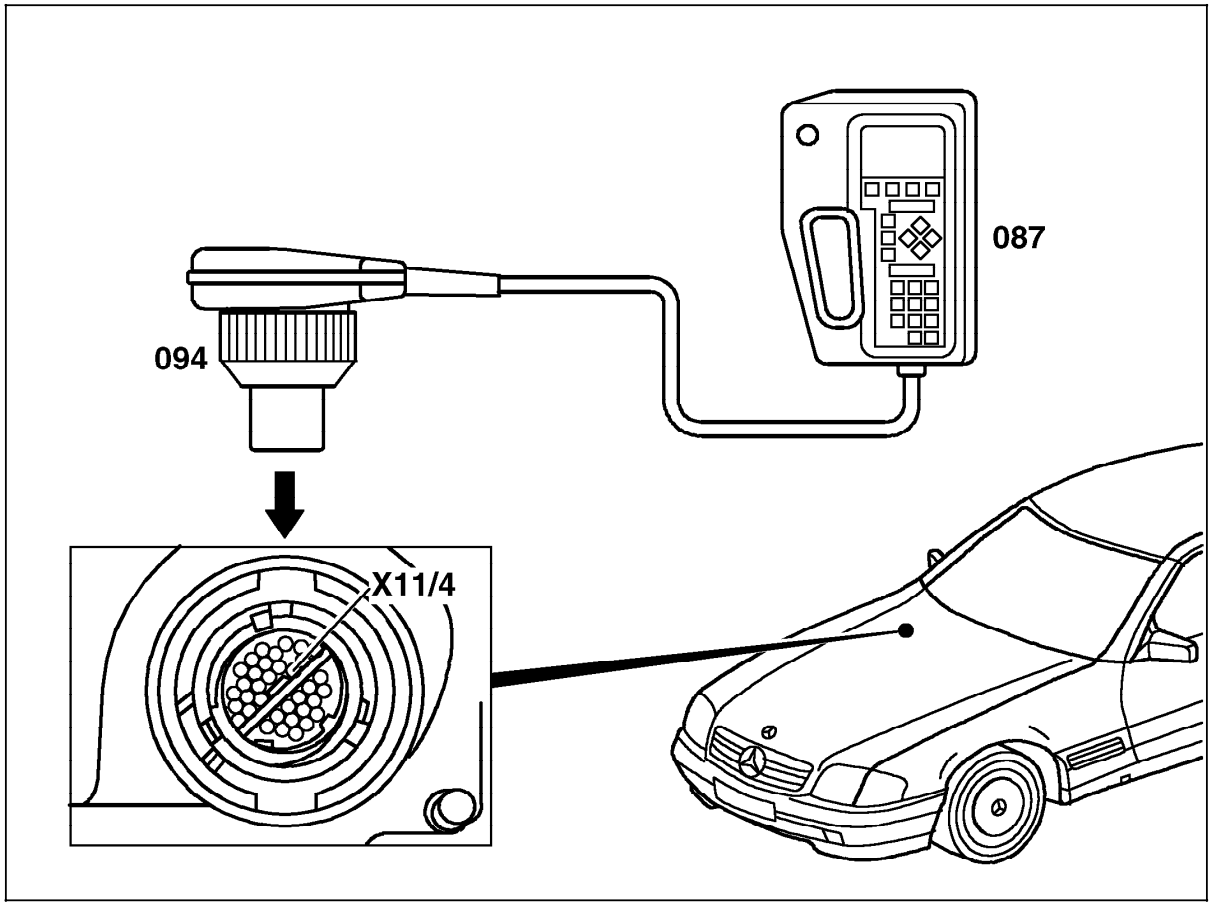


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Figure 1

087	Hand-Held Tester
094	Multiplexer cable
X11/4	Data link connector (DTC readout) (38-pole)

Diagnosis - Diagnostic Trouble Code (DTC) Memory

Connection Diagram - Hand-Held Tester (HHT)

1 Connect HHT (087) with test cable (097) to data link connector (X11/4)

2. Ignition: **ON**

3. As per display in HHT:
   a) read out/erase DTC memory
   b) read out actual values
   c) perform activations
   d) program control modules

4. Disconnect HHT

Observe system specific notes, which are described in the beginning of each chapter. Erase all stored faults which come about when tests or simulations are performed, upon completion of the repairs.

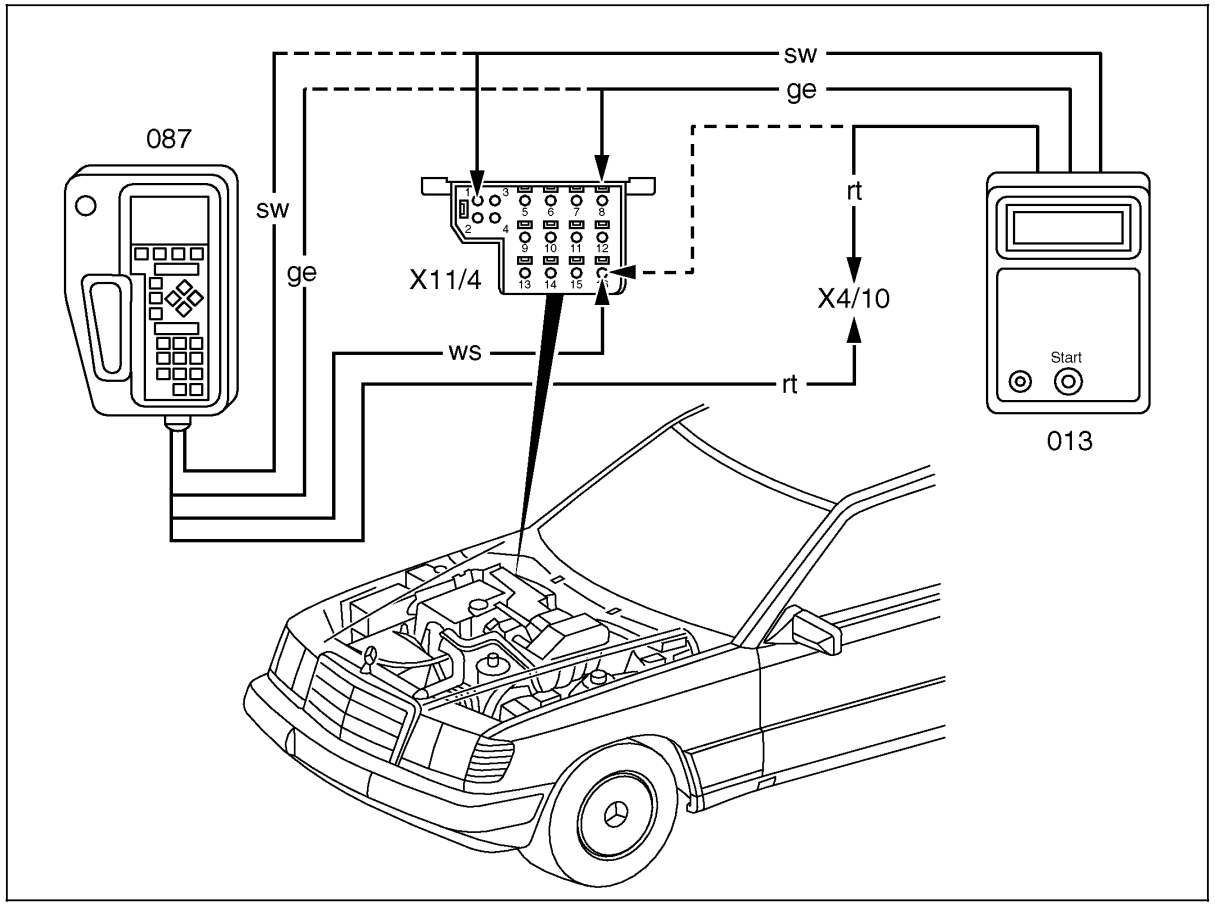

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Figure 1

087	Hand-Held Tester
094	Multiplexer cable
X11/4	Data link connector (DTC readout) (38-pole)

Diagnosis – Diagnostic Trouble Code (DTC) Memory

Prerequisites for readout of DTC memory

⚠

Readout via the impulse counter scan tool is not possible.

Note:

Symbol for emission related malfunctions which lead to the activation of the CHECK ENGINE MIL when a certain test cycle was performed and a fault was recognized.

1. Review **WARNING!** on pages 11/1 and 11/2,
2. Review document (in WIS): AD07.61-P-1000WZ,
3. Perform Test and adjustment of engine, see DM, Engines, Vol. 1, section B, if necessary.
4. Review 11, 21, 22, 23, 24, 31, 33,
5. Connect HHT (087) with test cable (097) to data link connector (X11/4). Readout DTC fault codes.
6. Ignition: **ON**

DTC	Possible cause		Test step/Remedy [1]
	SAE nomenclature	Explanation	
–	No malfunction in system		In case of complaint, perform 23, 24, 25 or 26 entirely.
P0 100	MAF circuit malfunction	Hot film MAF sensor (B2/5)	23⇒ 4.0
P0 105	MAP circuit malfunction	Pressure sensor (B28)	23⇒ 6.0
P0 110	IAT circuit malfunction	IAT sensor (in Hot film MAF sensor B2/5)	23⇒ 5.0
P0 115	ECT circuit malfunction	ECT sensor (B11/4)	23⇒ 8.0
P0 120	Throttle position circuit malfunction	Actual value potentiometer in CC/ISC actuator (M16/2)	25⇒ 3.0
P0 130	O2S 1 circuit malfunction	A. O2S 1 (before TWC) (G3/2) B. O2S 1 (before TWC) (G3/2) Voltage increase insufficient	23⇒ 10.0

[1] Observe Preparation for Test, see 22.

Diagnosis – Diagnostic Trouble Code (DTC) Memory

DTC	Possible cause		Test step/Remedy [1]
	SAE nomenclature	Explanation	
P0 133	O2S 1 circuit slow response	A O2S 1 (before TWC) (G3/2), ageing correction value exceeded B O2S 1 (before TWC) (G3/2), ageing time period too long	23⇒ 10.0
P0 135	O2S 1 heater circuit malfunction	O2S 1 heater (before TWC) (G3/2)	23 ⇒ 11.0
P0 136	O2S 2 circuit malfunction	O2S 2 (after TWC) (G3/1) (only USA)	23 ⇒ 12.0
P0 141	O2S 2 heater circuit malfunction	Right O2S 2 heater (after TWC) (G3/1) (only USA)	23⇒ 13.0
P0 170	Fuel trim malfunction	A Self adaptation of fuel mixture “partial load“ at limit from engine control module (N3/10). B Self adaptation of fuel mixture “CTP“ at limit from engine control module (N3/10).	Intake air leak, injectors, diaphragm pressure regulator, engine wear.
P0 201	Injector circuit malfunction - cyl. 1	Injector (Y62y1) – cylinder 1	23⇒ 14.0
P0 202	Injector circuit malfunction - cyl. 2	Injector (Y62y2) – cylinder 2	23⇒ 15.0
P0 203	Injector circuit malfunction - cyl. 3	Injector (Y62y3) – cylinder 3	23 ⇒ 16.0
P0 204	Injector circuit malfunction - cyl. 4	Injector (Y62y4) – cylinder 4	23 ⇒ 17.0
P0 243	Recirculated air flap actuator(M16/7) for supercharger	For engine with supercharger only	23 ⇒ 37.0

[1] Observe Preparation for Test, see 22.

Diagnosis – Diagnostic Trouble Code (DTC) Memory

DTC	Possible cause		Test step/Remedy [1]
	SAE nomenclature	Explanation	
P0 300	Random misfire detected	A Random misfire B Random misfire, TWC damaging	24 ⇒ 7.0 – 8.0 24 ⇒ 9.0 36 ⇒ 1.0 – 2.0 Compression pressure
P0 301	Cylinder 1 misfire detected	A Cylinder 1 misfire B Cylinder 1 misfire, TWC damaging	24 ⇒ 7.0 24 ⇒ 9.0 36 ⇒ 1.0 – 2.0 Compression pressure
P0 302	Cylinder 2 misfire detected	A Cylinder 2 misfire B Cylinder 2 misfire, TWC damaging	24 ⇒ 8.0 24 ⇒ 9.0 36 ⇒ 1.0 – 2.0 Compression pressure
P0 303	Cylinder 3 misfire detected	A Cylinder 3 misfire B Cylinder 3 misfire, TWC damaging	24 ⇒ 8.0 24 ⇒ 9.0 36 ⇒ 1.0 – 2.0 Compression pressure
P0 304	Cylinder 4 misfire detected	A Cylinder 4 misfire B Cylinder 4 misfire, TWC damaging	24 ⇒ 7.0 24 ⇒ 9.0 36 ⇒ 1.0 – 2.0 Compression pressure

[1] Observe Preparation for Test, see 22.

Diagnosis – Diagnostic Trouble Code (DTC) Memory

DTC		Possible cause		Test step/Remedy [1]
		SAE nomenclature	Explanation	
P0 325		KS 1 circuit malfunction	Front KS 1 (A16)	Wiring, connector, A16
P0 335		CKP sensor circuit malfunction	CKP sensor (L5)	24 ⇒ 5.0
P0 341		CMP sensor circuit range/performance	Camshaft Hall-effect sensor (B6/1)	24 ⇒ 6.0
P0 370		Angle deviation between camshaft and crankshaft	Angle deviation between camshaft and crankshaft	Check basic adjustment of camshaft.
P0 400	Only (USA) **Model 202: without supercharger**	Exhaust gas recirculation flow malfunction	Exhaust gas recirculation malfunction (logic chain), engine 111.974 (USA)	23 ⇒ 22.0 – 23.0
P0 410	Only (USA) **Models 170, 202**	Air injection system malfunction	AIR system malfunction (logic chain), Compressor (engine 111.975) (USA)	23 ⇒ 20.0
P0 422		TWC efficiency below threshold	TWC efficiency below threshold	Replace TWC
P0 440	Only (USA) **Model 170, Model 202 as of 09/97**	EVAP system malfunction	EVAP system leak (logic chain)	23 ⇒ 26.0 – 28.0
P0 441		EVAP system incorrect purge flow	EVAP not functioning	23 ⇒ 26.0 – 27.0

[1] Observe Preparation for Test, see 22.

Diagnosis – Diagnostic Trouble Code (DTC) Memory

DTC		Possible cause		Test step/Remedy [1]
		SAE nomenclature	Explanation	
P0 442	Only USA **Model 170** **Model 202** **as of 09/97**	EVAP system leak detected (small leak)	EVAP system, small leak	23 ⇒ 28.0
P0 443		EVAP system purge control valve circuit malfunction	Purge control valve (Y58/1)	23 ⇒ 26.0
P0 446	Only USA **Model 170** **Model 202** **as of 09/97**	EVAP system vent control malfunction	A. Activated charcoal canister shut-off valve (Y58/4) B. End stage activated charcoal canister shut-off valve (Y58/4)	23 ⇒ 27.0, 28.0, 29.0, 30.0
P0 450	Only USA **Model 170** **Model 202** **as of 09/97**	EVAP system pressure sensor malfunction	A. Fuel tank pressure sensor (B4/3) electrical fault B. Fuel tank pressure sensor (B4/3) electrical fluctuations	23 ⇒ 30.0 Charcoal canister plugged.
	Model 202 **only USA, up** **ot 08/97**		Purge monitoring pressure sensor (B4/4)	23 ⇒ 31.0
P0 455	Only USA **Model 170** **Model 202** **as of 09/97**	EVAP system leak detected (large leak)	EVAP system, large leak Fuel tank pressure sensor (B4/3)	23 ⇒ 28.0 23 ⇒ 30.0

[1] Observe Preparation for Test, see 22.

Diagnosis – Diagnostic Trouble Code (DTC) Memory

DTC	Possible cause		Test step/Remedy [1]
	SAE nomenclature	Explanation	
P0 460 Only (USA) **Model 170 Model 202 as of 09/97**	Fuel level sensor circuit low input	Fuel tank level too low	Read out Instrument Cluster memory.
P0 500	VSS sensor malfunction	A VSS left front B VSS left rear	Test ASR/ETS see DM, Chassis and Drivetrain, Vol. 3, Section 9.3
P0 507	ISC rpm higher than expected	Idle control system	25 ⇒ 1.0 – 3.0
P0 560	System voltage malfunction	Voltage supply at engine control module (N3/10)	23 ⇒ 1.0 – 2.0
P0 565	Cruise control switch	CC switch (S40)	26 ⇒ 1.0
P0 600	Serial communication link malfunction	CAN bus from ESP/SPS control module (N47-5)	23 ⇒ 32.0
P0 604	Internal control module random Access memory (RAM) error	A. Engine control module (N3/10) B. Engine control module (N3/10)	(N3/10)
P0 605	Internal control module read only memory (ROM) error	Engine control module (N3/10)	(N3/10)
P0 700	Transmission control system malfunction	Read DTC memory of transmission control module (N15/3)	Test ETC, see DM, Chassis & Drivetrain, Vol. 1, section 2.
P0 702	Transmission control system electrical	Read DTC memory of transmission control module (N15/3)	Test ETC, see DM, Chassis & Drivetrain, Vol. 1, section 2.

[1] Observe Preparation for Test, see 22.

Diagnosis – Diagnostic Trouble Code (DTC) Memory

DTC	Possible cause		Test step/Remedy [1]
	SAE nomenclature	Explanation	
P0 715	Input/turbine speed sensor circuit malfunction	Read DTC memory of transmission control module (N15/3)	Test ETC, see DM, Chassis & Drivetrain, Vol. 1, section 2.
P0 720	Output speed sensor circuit malfunction	Read DTC memory of transmission control module (N15/3)	Test ETC, see DM, Chassis & Drivetrain, Vol. 1, section 2.
P0 730	Incorrect gear ratio	Read DTC memory of transmission control module (N15/3)	Test ETC, see DM, Chassis & Drivetrain, Vol. 1, section 2.
P0 740	Torque converter clutch circuit malfunction	Read DTC memory of transmission control module (N15/3)	Test ETC, see DM, Chassis & Drivetrain, Vol. 1, section 2.
P0 743	Torque converter clutch circuit electrical	Read DTC memory of transmission control module (N15/3)	Test ETC, see DM, Chassis & Drivetrain, Vol. 1, section 2.
P0 748	Pressure control solenoid electrical	Read DTC memory of transmission control module (N15/3)	Test ETC, see DM, Chassis & Drivetrain, Vol. 1, section 2.
P0 753	Shift solenoid A electrical	Read DTC memory of transmission control module (N15/3)	Test ETC, see DM, Chassis & Drivetrain, Vol. 1, section 2.
P0 758	Shift solenoid B electrical	Read DTC memory of transmission control module (N15/3)	Test ETC, see DM, Chassis & Drivetrain, Vol. 1, section 2.
P0 763	Shift solenoid C electrical	Read DTC memory of transmission control module (N15/3)	Test ETC, see DM, Chassis & Drivetrain, Vol. 1, section 2.
P0 801	Engine/climate control electric cooling fan malfunction	Engine/climate control electric cooling fan (M4/3)	23 ⇒ 38.0

[1] Observe Preparation for Test, see 22.

Diagnosis – Diagnostic Trouble Code (DTC) Memory

DTC		Possible cause		Test step/Remedy [1]
		SAE nomenclature	Explanation	
P0 803	**Supercharger only**	Air flap/air filter actuator (M16/7) malfunction	Supercharger function, (logic chain, measured via air mass)	23 ⇒ 37.0
P0 805	**Supercharger only**	Air flap/air filter actuator (M17/6) malfunction	Supercharger function, (endstage of actuator)	23 ⇒ 35.0
P0 806	**Supercharger only**	Magnetic supercharger clutch (y2/1)	Magnetic supercharger clutch (Y2/1)	23 ⇒ 36.0
P0 809		Angle deviation between camshaft and crankshaft	Angle deviation between camshaft and crankshaft	Check basic adjustment of camshaft.
P0 811		CAN from electronic ignition lock	CAN from electronic ignition lock	23 ⇒ 32.0
P1 163		Oil level switch	Oil level switch (S43)	23 ⇒ 33.0
P1 181		Engine/climate control electric cooling fan malfunction	Engine/climate control electric cooling fan (M4/3) functional fault	23 ⇒ 38.0
P1 182	**Model 170 only** **Model 202 as of 06/97**	Starter lock-out relay module (N65k2) Starter relay (K40/4k2)	Starter relay in passenger-side fuse and relay module box (K40/4)	23 ⇒ 3.0
P1 186		Fuel safety shut-off recognized	EA/CC/ISC actuator (M16/1)	25 ⇒ 3.0 – 4.0, EA/CC/ISC actuator (M16/1) sticks or jammed, Check intake system for residue.

[1] Observe Preparation for Test, see 22.

Diagnosis – Diagnostic Trouble Code (DTC) Memory

DTC		Possible cause		Test step/Remedy [1]
		SAE nomenclature	Explanation	
P1 235	**Supercharger only**	Air flap/air filter actuator (M17/6)	Supercharger function, (endstage of actuator)	23 ⇒ 35.0
P1 236	**Supercharger only**	Magnetic supercharger clutch (Y2/1)	Magnetic clutch function	23 ⇒ 36.0
P1 386		Knock sensor control from ECM (N3/10) at end stop	Knock sensor regulation from engine control module (N3/10) at end stop	1. Increased knock tendency due to bad fuel, carbon in combustion chamber or mechanical damage, 2. Engine control module (N3/10).
P1 400	Only (USA) **Model 202, without supercharger**	EGR switchover valve malfunction	EGR switchover valve (Y27), engine 111.974 (USA)	23 ⇒ 21.0
P1 420	Only (USA) **Models 170, 202**	AIR pump switchover valve	AIR pump switchover valve (Y32), Compressor (engine 111.975) (USA)	23 ⇒ 19.0
P1 453	Only (USA) **Model 202, without supercharger**	AIR relay module	AIR relay module in passenger-side fuse and relay module box (K40/4), engine 111.974 (USA)	23 ⇒ 18.0
P1 491		Refrigerant pressure in A/C system too high	Refrigerant pressure in A/C system too high	Check automatic A/C system.
P1 519		Adjustable camshaft timing solenoid	Adjustable camshaft timing solenoid (Y49) (logic chain)	23 ⇒ 25.0

[1] Observe Preparation for Test, see 22.

Diagnosis – Diagnostic Trouble Code (DTC) Memory

DTC	Possible cause		Test step/Remedy [1]
	SAE nomenclature	Explanation	
P1 525	Adjustable camshaft timing solenoid	Adjustable camshaft timing solenoid (Y49)	23 ⇒ 24.0
P1 542	Pedal value sensor	Pedal value sensor (B37)	25 ⇒ 1.0 – 2.0
P1 551	A/C compressor shut-off, endstage	With Tempmatic A/C (USA)	23 ⇒ 39.0, Wrong A/C pushbutton control module installed.
P1 570	CAN signal from DAS control module to engine control module	A. Start attempted with "locked" DAS B. CAN signal from DAS control module (N54/1) to engine control module (N3/10) interrupted. C. Engine control module (ME-SFI) and DAS control module are not compatible.	User error, Check correct operation of DAS, see DM, Body and Accessories, Vol. 1 23 ⇒ 32.0 Check control modules and part no.
P1 580	EA/CC/ISC actuator	EA/CC/ISC actuator (M16/6)	25 ⇒ 3.0 – 4.0
P1 584	Stop lamp switch	Stop lamp switch (S9/1)	Check switch.
P1 603	CAN signal from EIS	CAN failure	23 ⇒ 32.0
P1 605		Poor road/traction condition recognition signal (via comparison of VSS rpm signals)	Test ASR/ESP, see DM, Chassis and Drivetrain, Vol. 3, Section 9.3, 10.2
P1 642	Engine control module incorrectly coded	Engine control module incorrectly coded (coded for MT, vehicle has AT)	Check version coding and correct.

[1] Observe Preparation for Test, see 22.

Diagnosis – Diagnostic Trouble Code (DTC) Memory

DTC	Possible cause		Test step/Remedy [1]
	SAE nomenclature	Explanation	
P1 643	Engine control module incorrectly coded or No CAN transmission from transmission control module	Engine control module incorrectly coded (coded for MT, vehicle has AT) or No CAN transmission from transmission control module (N15/3)	Check version coding and correct. Test ETC, see DM, Chassis & Drivetrain, Vol. 1, section 2.
P1 644	Transmission version can not be checked due to low voltage at transmission control module	Transmission version can not be checked due to low voltage at transmission control module (N15/3)	Test ETC, see DM, Chassis & Drivetrain, Vol. 1, section 2.
P1 681	Crash signal not plausible.	as of 06/98	23 ⇒ 41.0
P1 747	CAN signal from ETC	A. CAN failure: Transmission protection malfunction from transmission control module (N15/3) B. CAN failure: Instrument cluster	Test ETC, see DM, Chassis & Drivetrain, Vol. 1, section 2. Test instrument cluster, see DM, Body & Accessories, Vol. 1

[1] Observe Preparation for Test, see 22.

Diagnosis – Complaint Related Diagnostic Chart – Injection/Ignition

⚠ 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.

Preparation for Test:

1. Review **WARNING!** on pages 11/1 and 11/2,
2. Review 11, 21, 22, 23, 24, 31, 33,
3. Review section 0,
4. Connect HHTand readout DTC memory, see 11,
5. Ignition: **OFF**

Complaint/Problem	Possible cause	Test step/Remedy [1]	Actual value Engine test Menu item
Engine starts and accelerates poorly when cold	Injector (Y62) activation and injection duration. Hot film MAF sensor (B2/5). ECT sensor (B11/4). Ignition voltage too low. Intake air leak.	23 ⇒ 14.0 – 17.0 23 ⇒ 4.0 23 ⇒ 8.0 24 ⇒ 9.0 Remedy air leak.	3/11 2/11 4/11 – –
Engine does not start	Voltage supply is missing. Malfunction of drive authorization system (DAS) . Fuel pumps defective. No compression, oil pressure too high. Ignition voltage too low.	23 ⇒ 1.0 – 2.0 23 ⇒ 32.0 34 ⇒ 1.0 – 2.0 Check compression and oil pressure. 24 ⇒ 9.0	– DAS 1/1 – – –
Engine has uneven idle	Camshaft timing. Injector (Y62) activation and injection duration. Intake air leak.	23 ⇒ 24.0 – 25.0 23 ⇒ 14.0 – 17.0 Remedy air leak.	3/11 3/11 –

[1] Observe Preparation for Test, see 22.

Diagnosis – Complaint Related Diagnostic Chart – Injection/Ignition

Complaint/Problem	Possible cause	Test step/Remedy [1]	Actual value Engine test Menu item
Engine has insufficient output	TWC flow restricted.	Check exhaust back pressure, see DM, Engines, Vol. 1, section A, “Engine Output“	–
	O2S 1 (G3/2) (before TWC).	23 ⇒ 10.0 – 11.0	8/11
	ECT sensor (B11/4).	23 ⇒ 8.0	4/11
	Hot film MAF sensor (B2/5).	23 ⇒ 4.0	2/11
	Camshaft timing.	23 ⇒ 24.0 – 25.0	3/11
Engine runs unevenly (shakes)	Injector (Y62) activation and injection duration.	23 ⇒ 14.0 – 17.0	3/11
	Injector leaking, spray pattern.	36 ⇒ 1.0 – 2.0	–
	O2S 1 (G3/2) (before TWC).	23 ⇒ 10.0, 11.0	8/11
	Ignition voltage too low.	24 ⇒ 9.0	–
	Compression on one or more cylinders too low.	Check compression.	–
	Intake air leak.	Remedy air leak.	–
Engine runs unevenly (misfiring)	Ignition voltage too low.	24 ⇒ 9.0	–
	Hot film MAF sensor (B2/5).	23 ⇒ 4.0	2/11
Engine surges after cold start	Intake air leak.	Remedy air leak.	–

[1] Observe Preparation for Test, see 22.

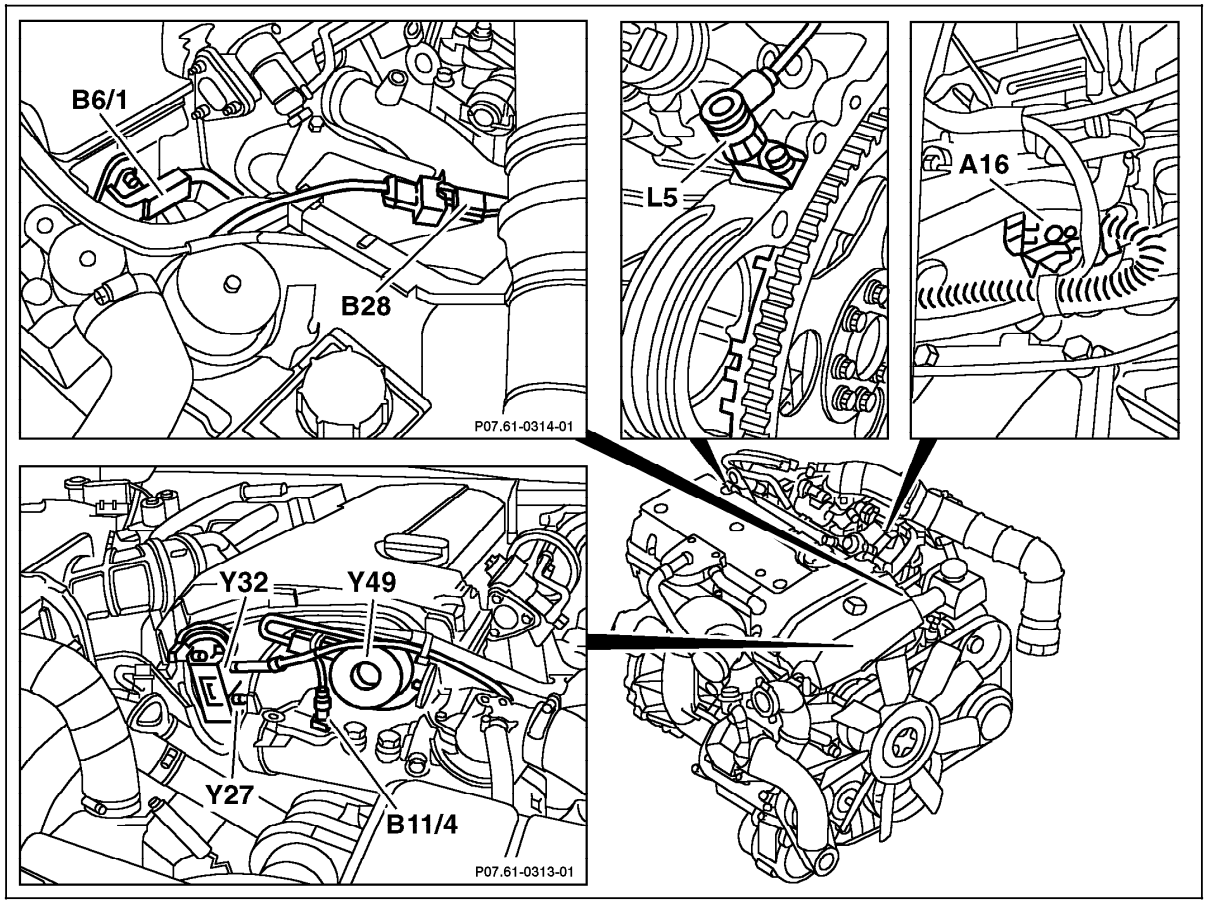
Diagnosis – Complaint Related Diagnostic Chart – Injection/Ignition

Complaint/Problem	Possible cause	Test step/Remedy [1]	Actual value Engine test Menu item
Transition failure during warm-up	ECT sensor (B11/4). Hot film MAF sensor (B2/5). Intake air leak.	23 ⇒ 8.0 23 ⇒ 4.0 Remedy leak.	4/11 2/11 –
Transition failure when warm or increased fuel consumption	O2S 1 (G3/2) (before TWC). Purge control valve (Y58/1) stuck in open position.	23 ⇒ 10.0 – 11.0 23 ⇒ 26.0 – 27.0	8/11 4/11
Engine vibrates	Hot film MAF sensor (B2/5). Ignition voltage too low. O2S 1 (G3/2) (before TWC).	23 ⇒ 4.0 24 ⇒ 9.0 23 ⇒ 10.0 – 11.0	2/11 – 8/11
EA is in “limp-home” mode	Nominal value potentiometer in pedal value sensor (B37). EA/CC/ISC actuator actual value potentiometer.	25 ⇒ 1.0 – 3.0 25 ⇒ 1.0 – 3.0	5/11 5/11

[1] Observe Preparation for Test, see 22.

Electrical Test Program – Component Locations

Components on engine
Model 170



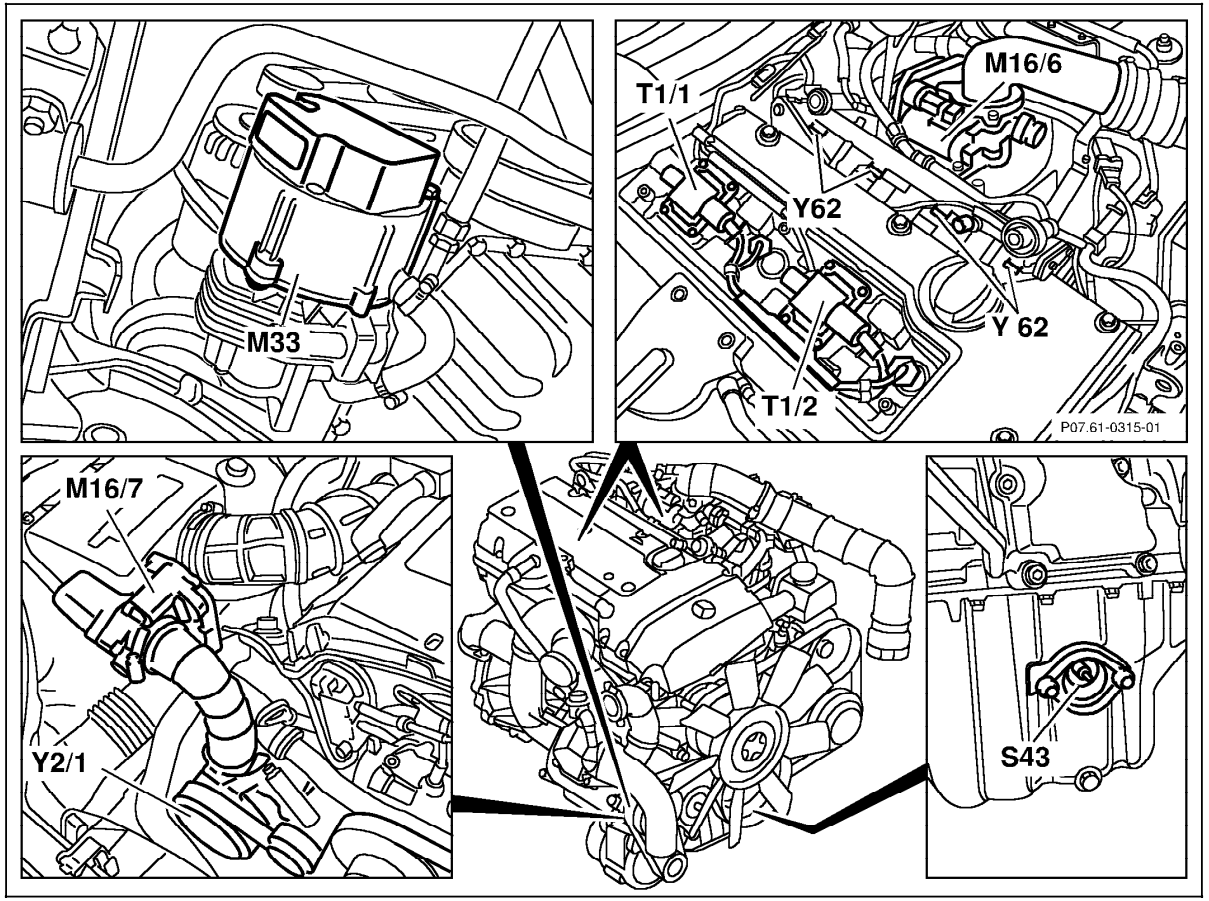
P07.61-0335-06

Figure 1

A16	Knock sensor
B6/1	Camshaft Hall-effect sensor
B11/4	ECT sensor
B28	Pressure sensor (only USA)
L5	CKP sensor
Y27	EGR switchover valve (Model 202 only) (only USA)
Y32	AIR pump switchover valve (Model 170/202 only) (only USA)
Y49	Adjustable camshaft timing solenoid

Electrical Test Program – Component Locations

Components on engine
Model 170



P07.61-0336-06

Figure 2

M16/6	ISC actuator
M16/7	Air flap/air filter actuator (for supercharger only)
M33	AIR pump (model 202 [only USA], without supercharger)
S43	Oil level switch
T1/1	Ignition coil, cylinder 1 and 4
T1/2	Ignition coil, cylinder 2 and 3
Y2/1	Magnetic super charger clutch (for supercharger only)
Y62	Injectors

Electrical Test Program – Component Locations

Engine Compartment
Model 170

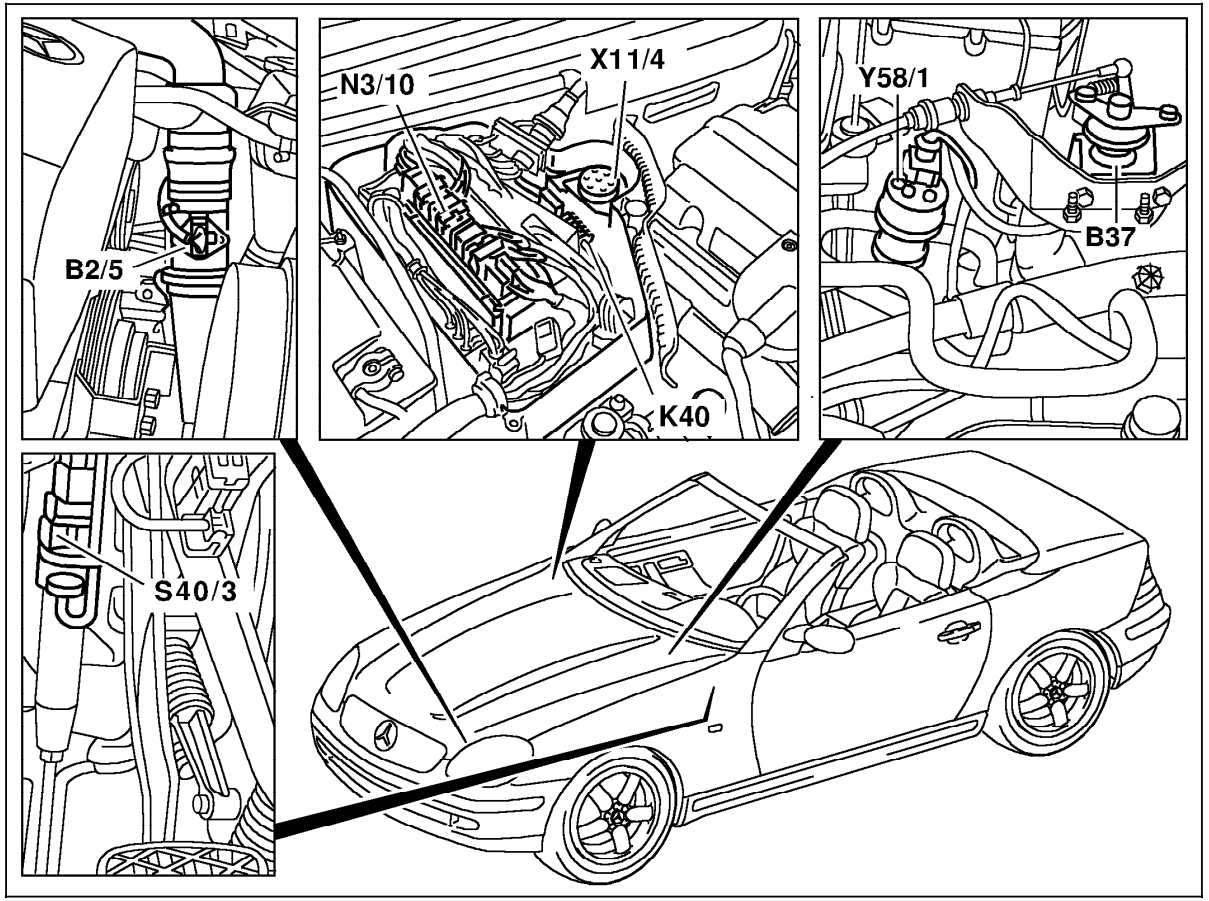


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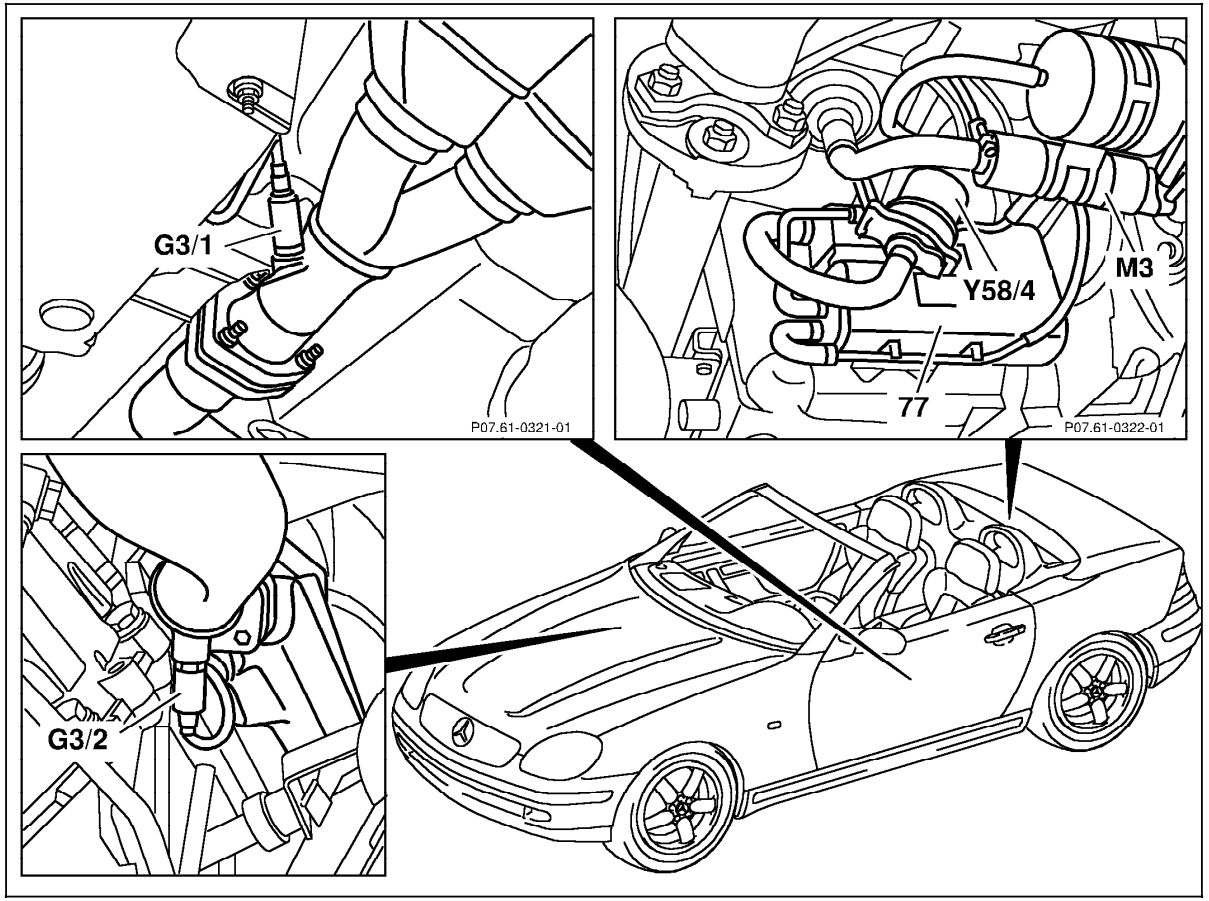
Figure 3

B2/5	Hot film MAF sensor
B37	Pedal value sensor
K40	Relay module with: FP relay AIR pump relay (only USA)
N3/10	Engine control module (ME-SFI)
S40/3	Clutch pedal switch (not USA)
X11/4	Data link connector (DTC readout) (38-pole)
Y58/1	Purge control valve

Electrical Test Program – Component Locations

Engine Compartment
Model 170



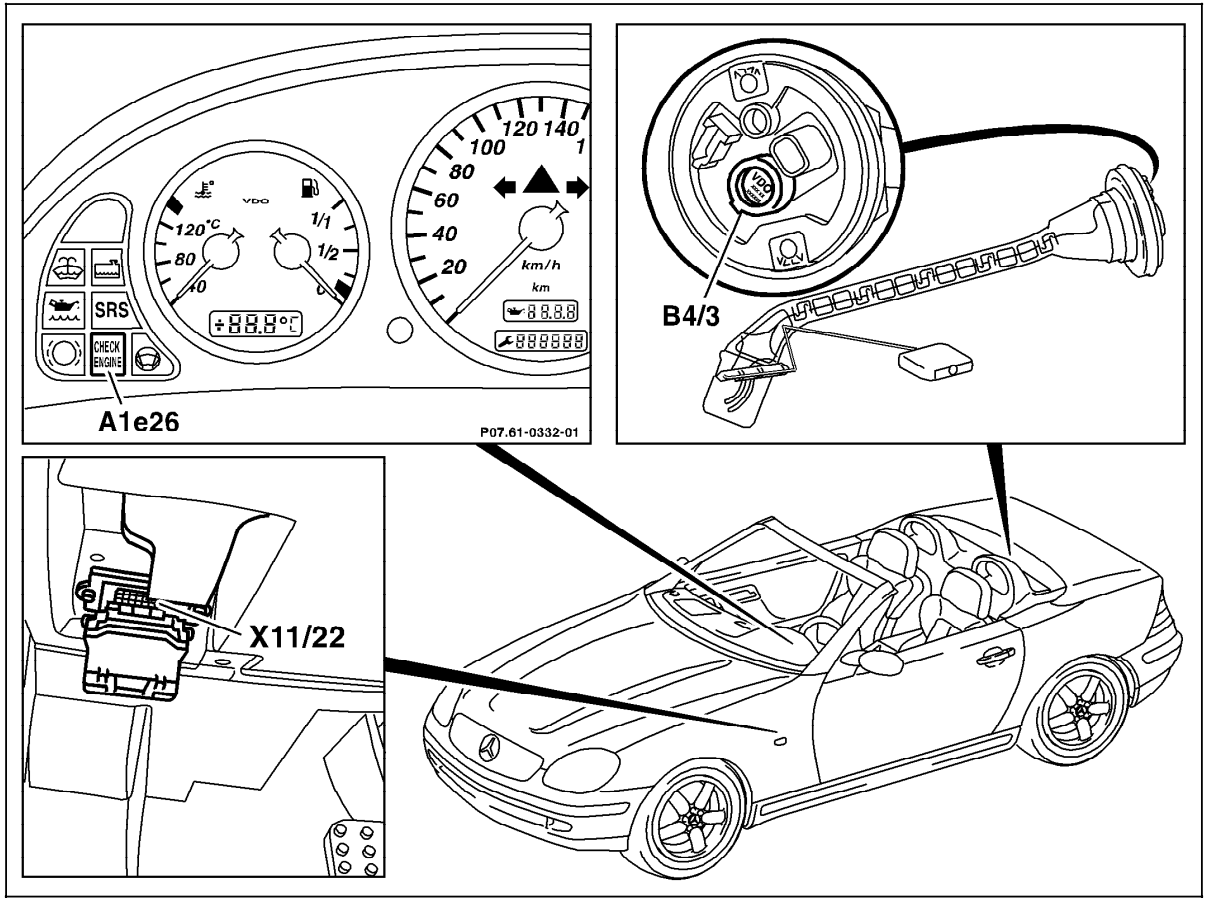
P07.61-0338-06

Figure 4

G3/1	O2S 2 (after TWC) (only USA)
G3/2	O2S 1 (before TWC)
M3	Fuel pump
Y58/4	Activated charcoal canister shut-off valve (only USA)
77	Activated charcoal canister (only USA)

Electrical Test Program – Component Locations

Model 170



P07.61-0339-06

Figure 5

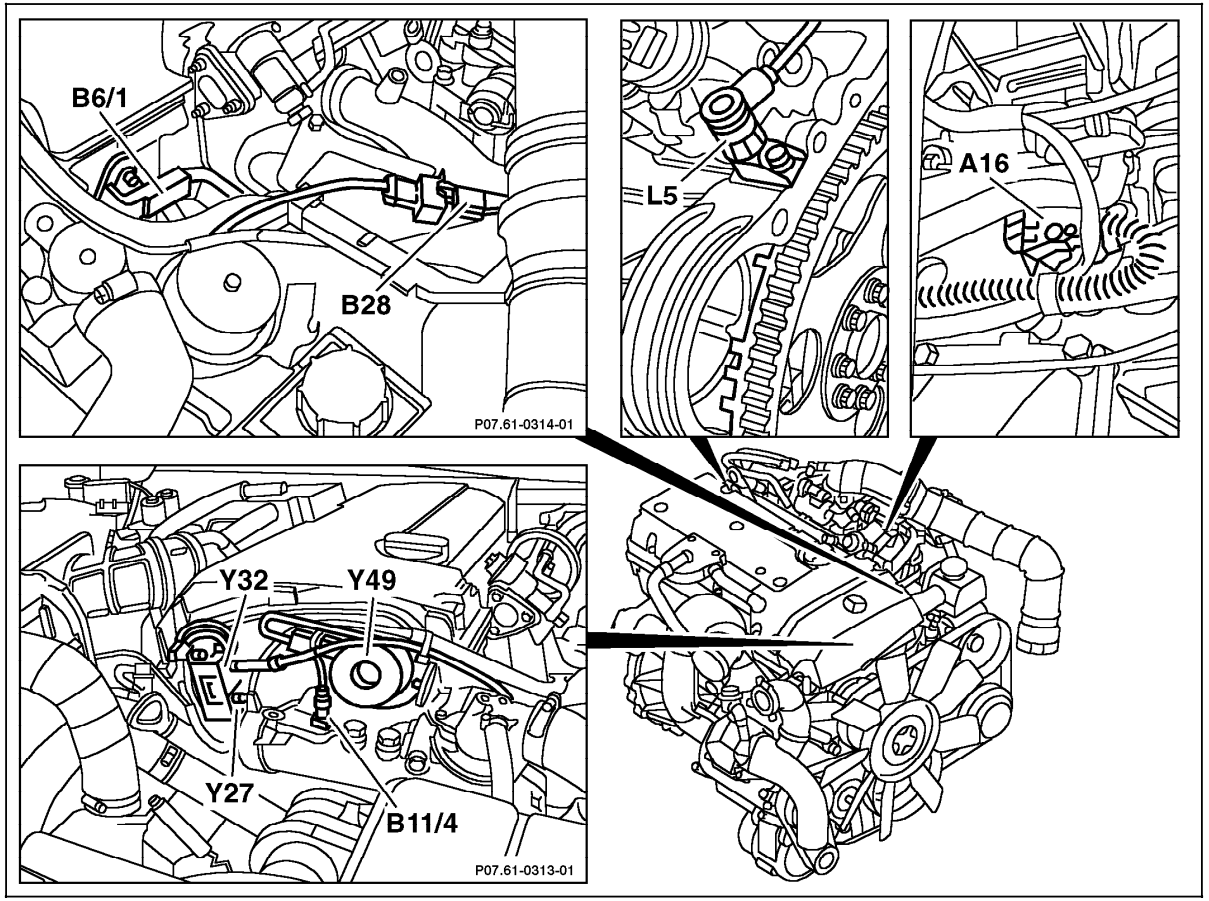
A1e26 "CHECK ENGINE" MIL (only USA)

B4/3 Fuel tank pressure sensor (only USA)

X11/22 Diagnostic module (OBD II) generic scan tool connector (only USA)

Electrical Test Program – Component Locations

Components on engine
Model 202



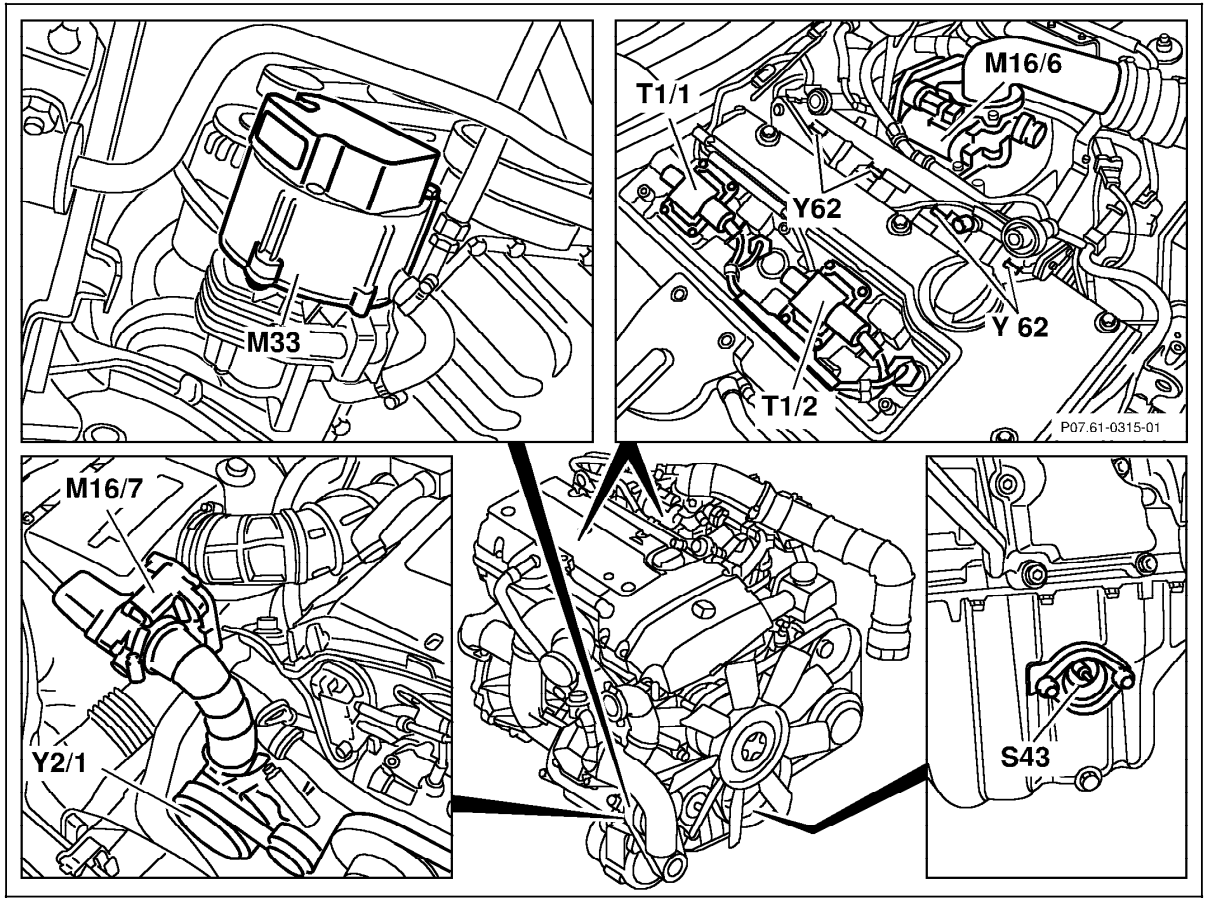
P07.61-0335-06

Figure 6

A16	Knock sensor
B6/1	Camshaft Hall-effect sensor
B11/4	ECT sensor
B28	Pressure sensor (only USA)
L5	CKP sensor
Y27	EGR switchover valve (Model 202 [only USA], without supercharger)
Y32	AIR pump switchover valve (Model 170/202 only) (only USA)
Y49	Adjustable camshaft timing solenoid

Electrical Test Program – Component Locations

Components on engine
Model 202



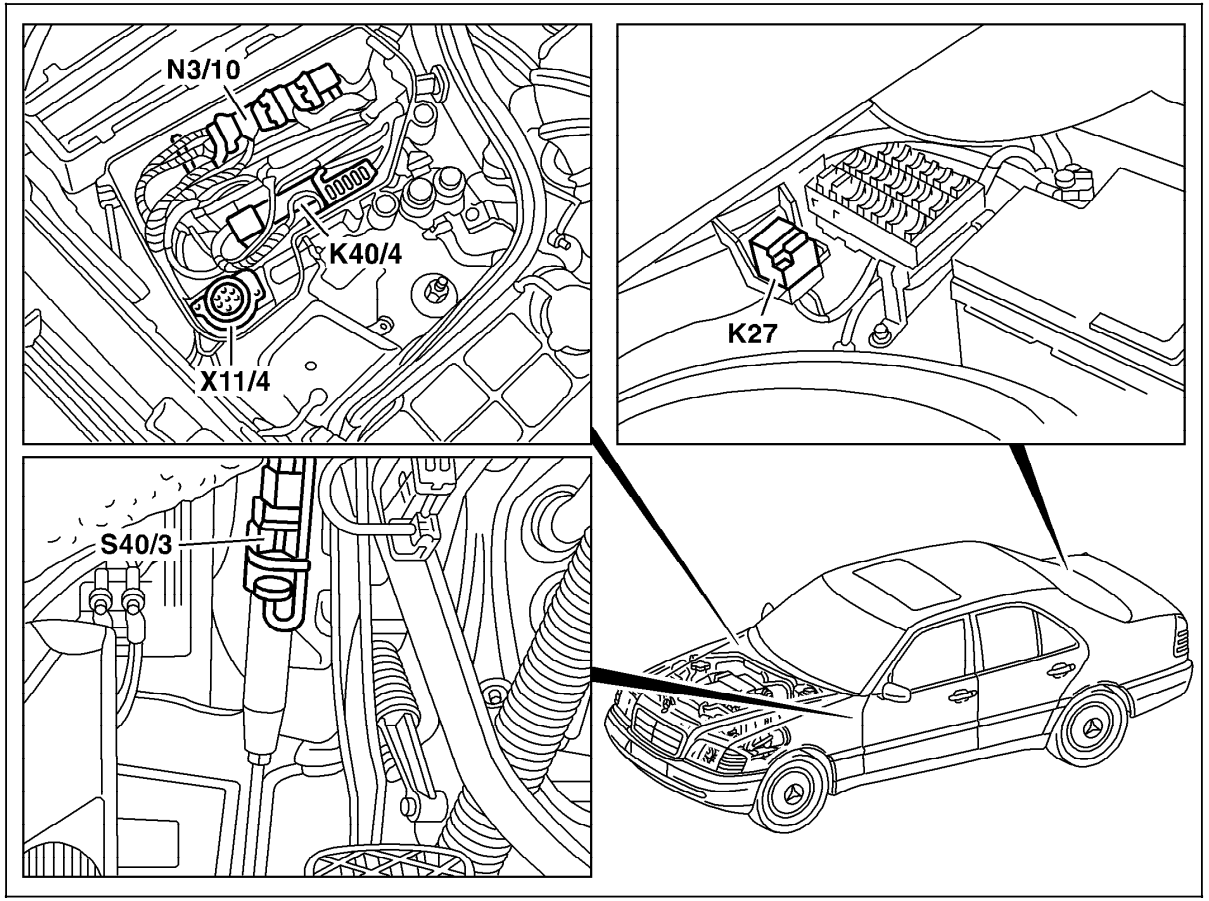
P07.61-0336-06

Figure 7

M16/6	ISC actuator
M16/7	Air flap/air filter actuator (for supercharger only)
M33	AIR pump (Model 202 [only (USA)], without supercharger)
S43	Oil level switch
T1/1	Ignition coil, cylinder 1 and 4
T1/2	Ignition coil, cylinder 2 and 3
Y2/1	Magnetic supercharger clutch (for supercharger only)
Y62	Injectors

Electrical Test Program – Component Locations

Engine Compartment
Model 202



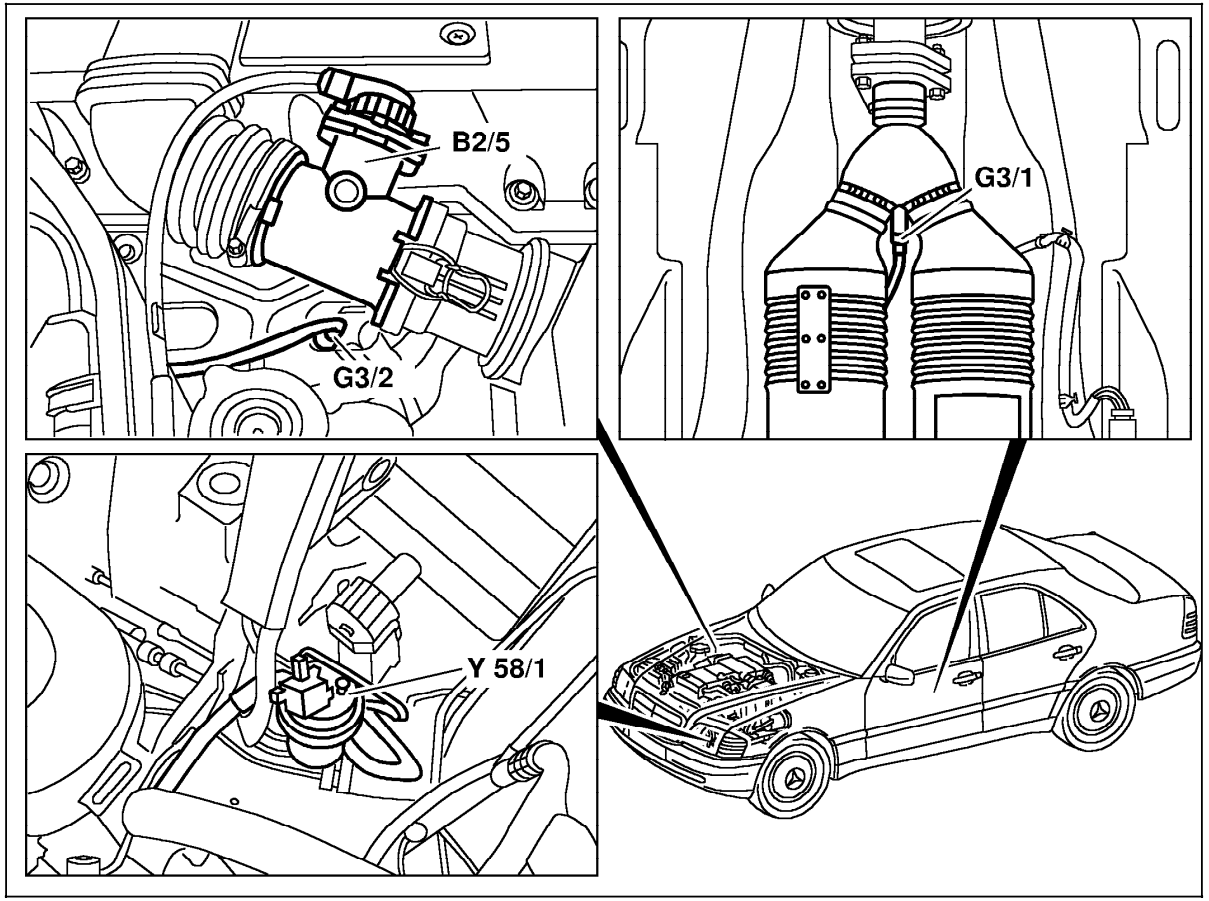
P07.61-2038-06

Figure 8

K27	FP relay module
K40/4	Passenger-side fuse and relay module box with: Starter relay Relay module, AIR pump (model 202 [only USA], without supercharger)
N3/10	Engine control module (ME-SFI)
S40/3	Clutch pedal switch (not USA)
X11/4	Data link connector (DTC readout)

Electrical Test Program – Component Locations

Engine Compartment
Model 202



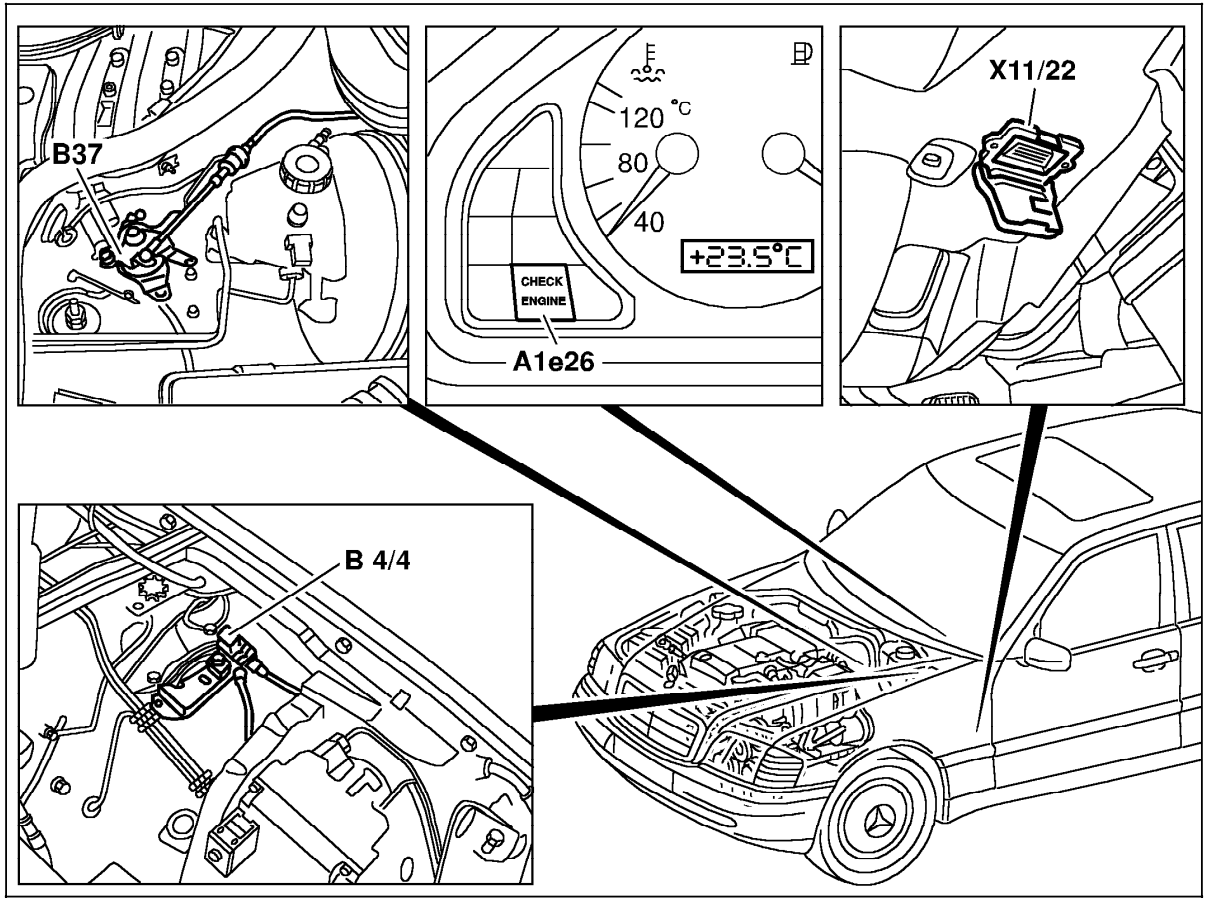
P07.61-0326-06

Figure 9

B2/5 Hot film MAF sensor
G3/1 O2S 2 (after TWC) (only USA)
G3/2 O2S 1 (before TWC)
Y58/1 Purge control valve

Electrical Test Program – Component Locations

Engine Compartment
Model 202



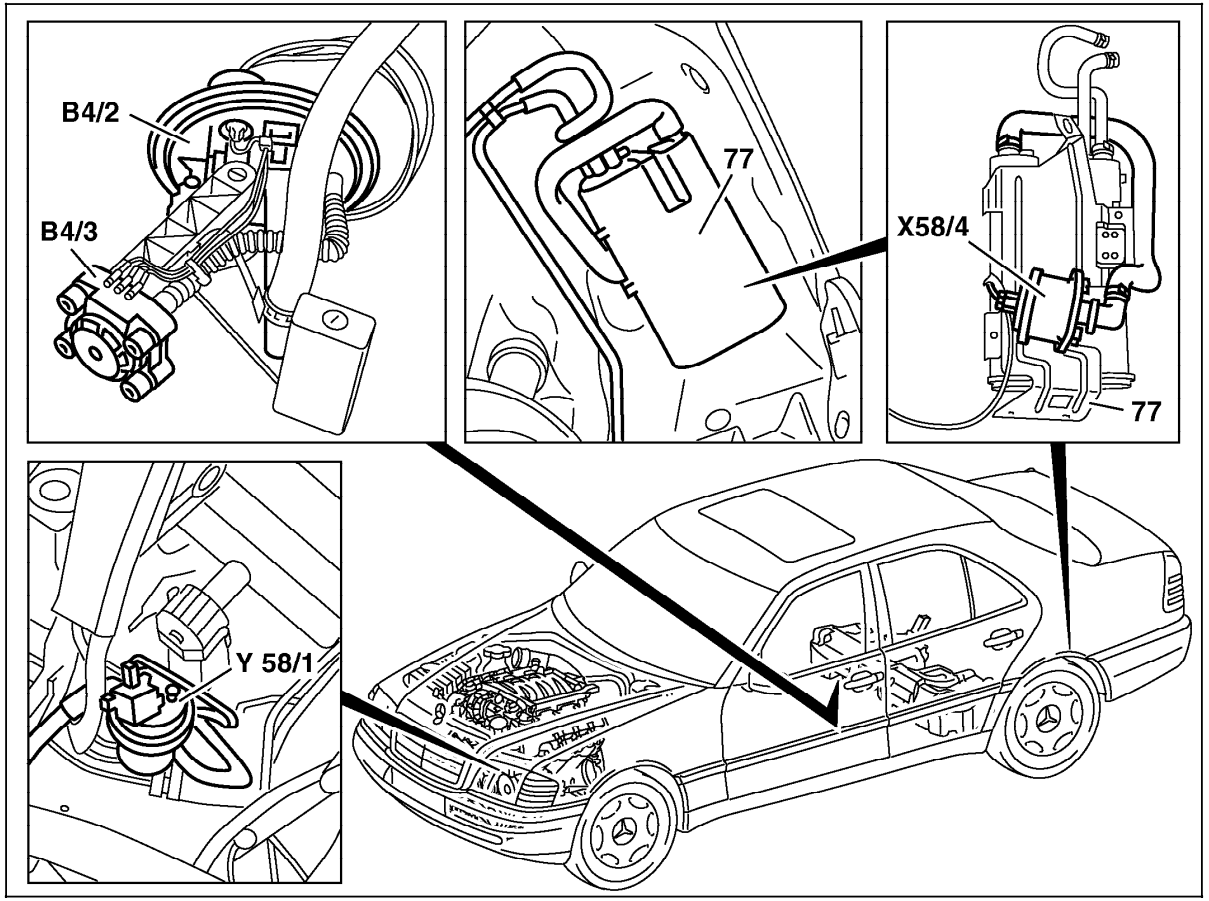
P07.61-0328-06

Figure 10

A1e26 "CHECK ENGINE" MIL (only USA)
B4/4 Fuel tank emissions monitoring pressure sensor (only USA, up to 08/97)
B37 Pedal value sensor
X11/22 Diagnostic module (OBD II) generic scan tool connector (only USA)

Electrical Test Program – Component Locations

Purge control valve
Model 202



P07.61-0550-06

Figure 11

B4/2	Right fuel level sensor
B4/3	Fuel tank pressure sensor ((USA) as of 09/97)
Y58/4	Activated charcoal canister shut-off valve ((USA) as of 09/97)
Y58/1	Purge control valve
77	Activated charcoal canister

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 **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 HHTand 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

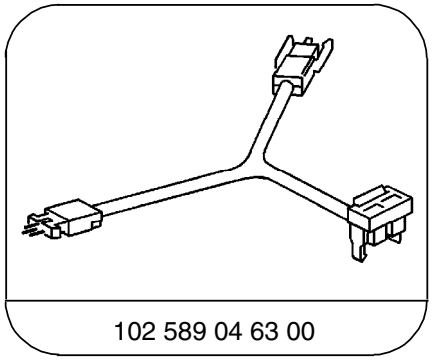
Note regarding "Test Connection" column:

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

2 = Socket 2 on wiring diagram.
A = Connector A on wiring diagram,

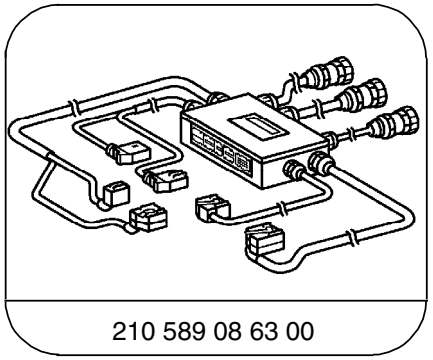
Electrical Test Program – Preparation for Test

Special Tools



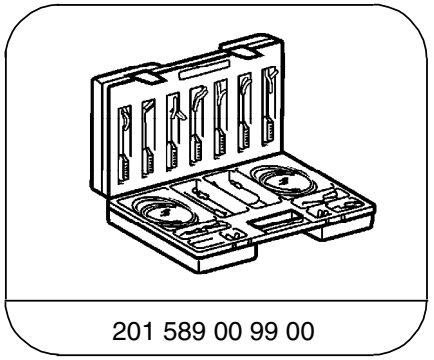
102 589 04 63 00

Test cable



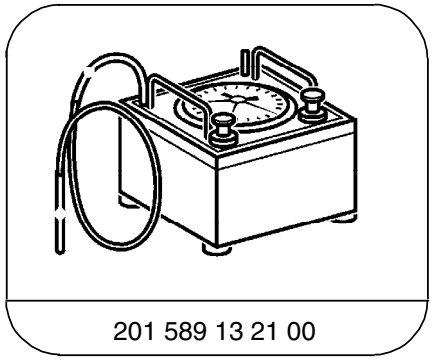
210 589 08 63 00

145-pin test cable



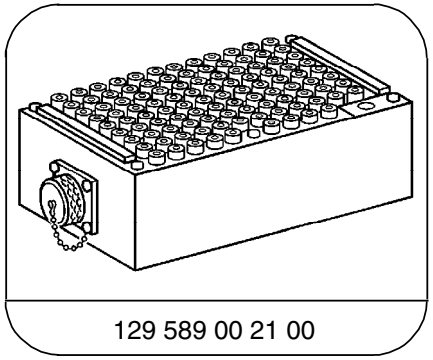
201 589 00 99 00

Electrical connecting set



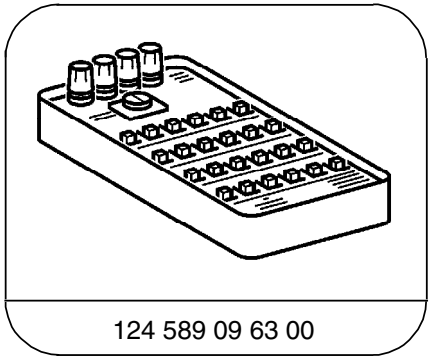
201 589 13 21 00

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 palpatations, cardiac arrest etc).

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

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).
- 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 two separate ignition and fuel injection systems.

Using Test Equipment

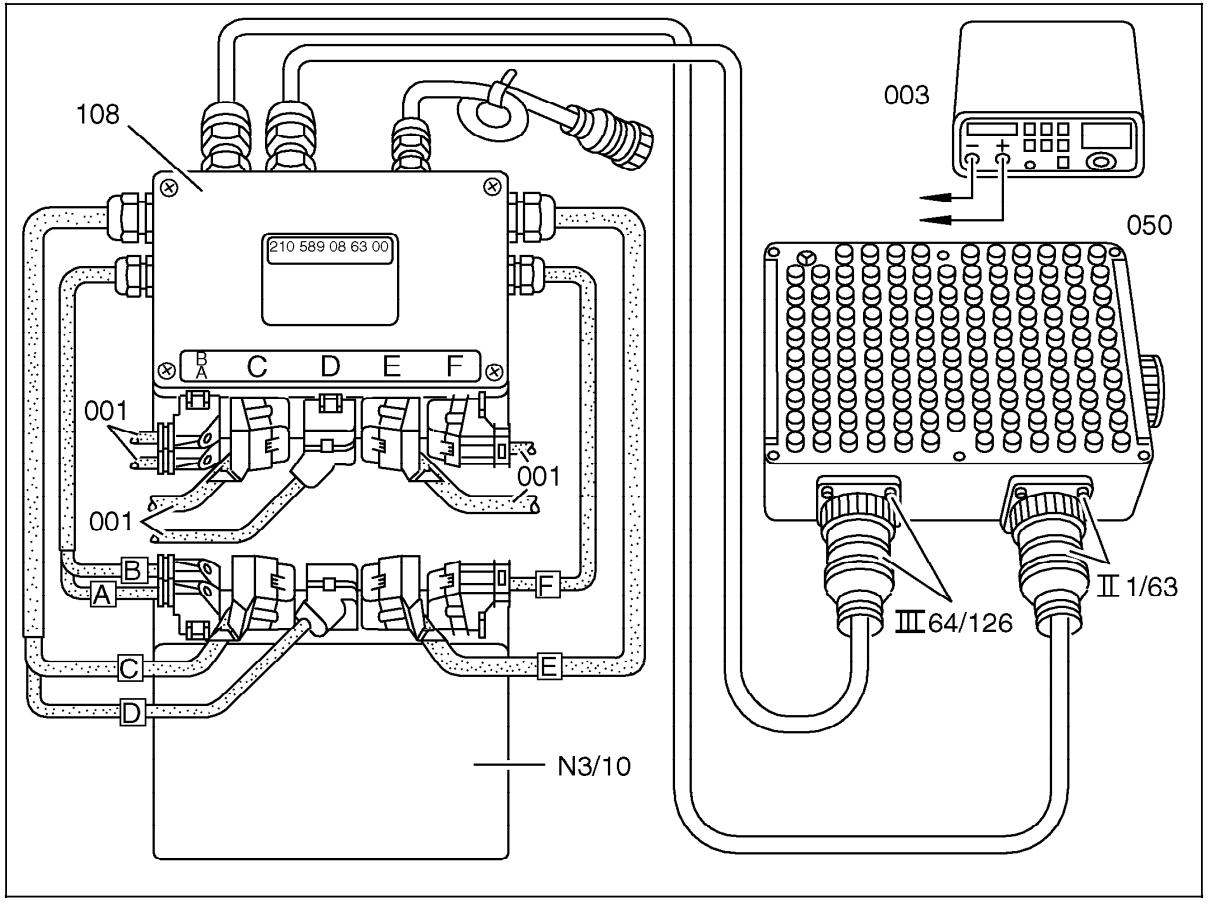
- **Ensure that the engine and ignition are OFF when connecting/ disconnecting test equipment to a coil.**
- **Connect the secondary voltage measuring equipment on the corresponding secondary ignition lead only when engine is stopped and ignition is OFF.**
- **If the circuit breaker is activated (power 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.**

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.



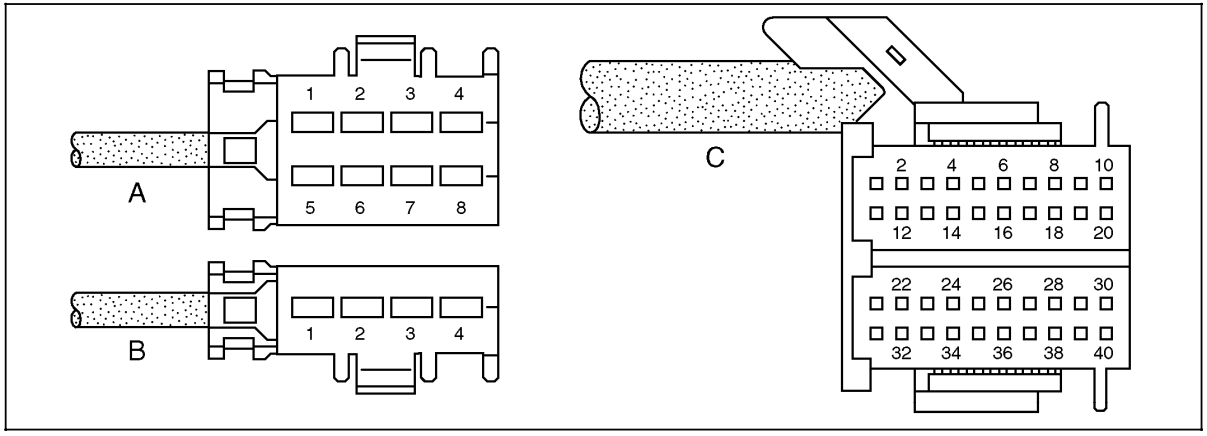
P07.61-0267-06

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

Electrical Test Program – Preparation for Test

Connector Layout - Engine Control Module



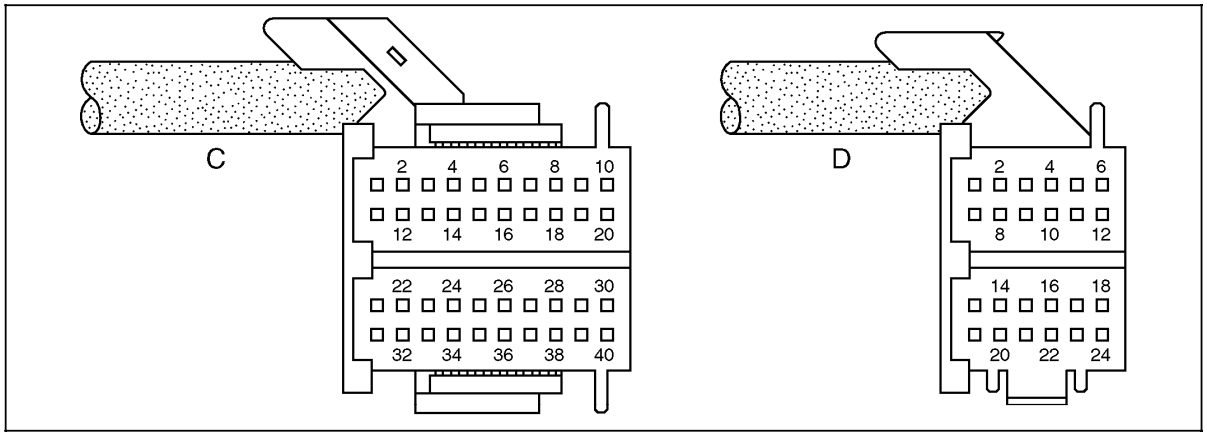
P07.61-0251-04

Figure 2

1A	–
2A	Voltage supply (circuit 87), Model 170 relay module, Model 202 fuse and relay module box
3A	Ground, Model 170 component compartment W16, Model 202 right component compartment W16/6
4A	–
5A	O2S 1 heater (before TWC)
6A	Control of engine/climate control electric cooling fan
7A	Ground, Model 170 component compartment W16, Model 202 right component compartment W16/6
8A	Ground, Model 170 component compartment W16, Model 202 right component compartment W16/6
1B	O2S 2 heater (after TWC) (only USA)
2B	–
3B	Diagnosis connection (data link connector)
4B	Voltage supply (circuit 30), Model 170 relay module, Model 202 fuse and relay module box
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 relay module in fuse and relay module box (Model 202.023 only USA)
29C	FP relay module (on model 170 in relay module)

Electrical Test Program – Preparation for Test

Connector Layout - Engine Control Module



P07.61-0252-04

Figure 3

30C –
31C O2S 1 ground (before TWC)
32C O2S 1 signal (before TWC)
33C – 37C –
38C Datalink connector (engine rpm signal)
39C Data link connector (ME-SFI DTC's)
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)

5D Fuel tank pressure sensor signal (Model 170 only (USA), Model 202 as of 09/97)
Fuel tank emissions monitoring pressure sensor signal (Model 202 only (USA), up to 08/97).
6D Voltage supply 5 V for fuel tank pressure sensor (Model 170 only (USA), Model 202 as of 09/97)
Voltage supply 5 V for fuel tank emissions monitoring pressure sensor (Model 202 only (USA), up to 08/97)
7D O2S 2 ground (after TWC)
8D O2S 2 signal (after TWC)
9D – 10D –
11D CAN data bus "H"
12D CAN data bus "L"
13D –18D –

19D P/N recognition
20D CC switch (accelerate/set)
21D CC switch (decelerate/set)
22D CC switch (resume)
23D CC switch (control contact)
24D CC switch (off)

Electrical Test Program – Preparation for Test

Connector Layout - Engine Control Module

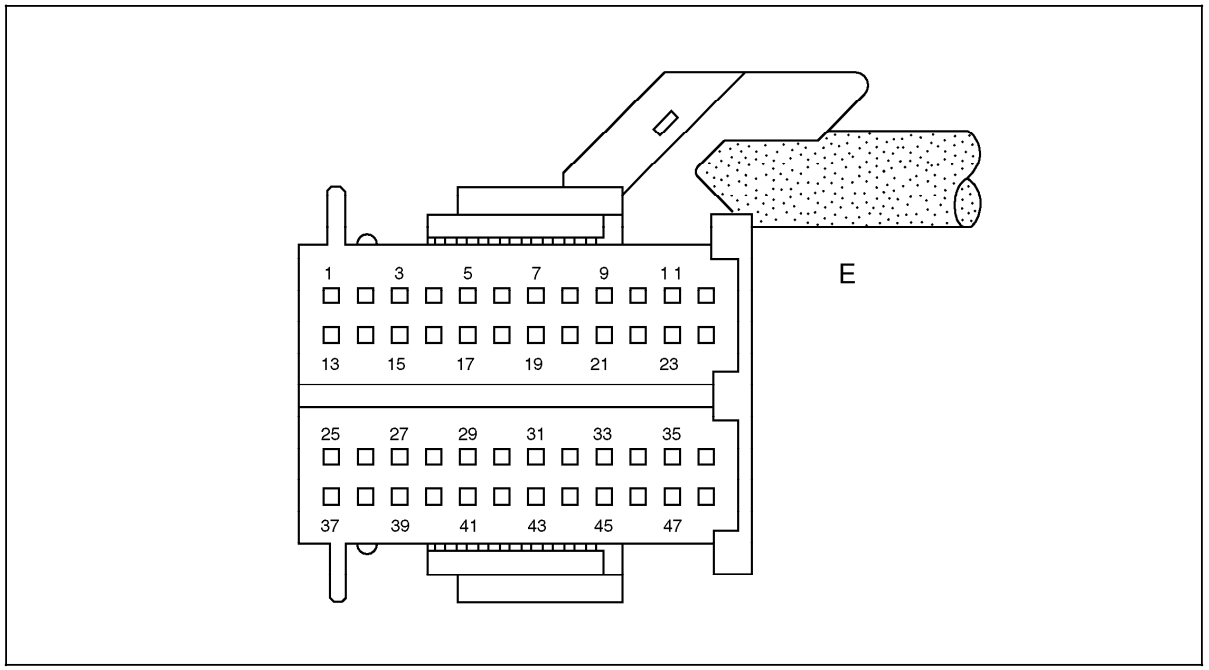


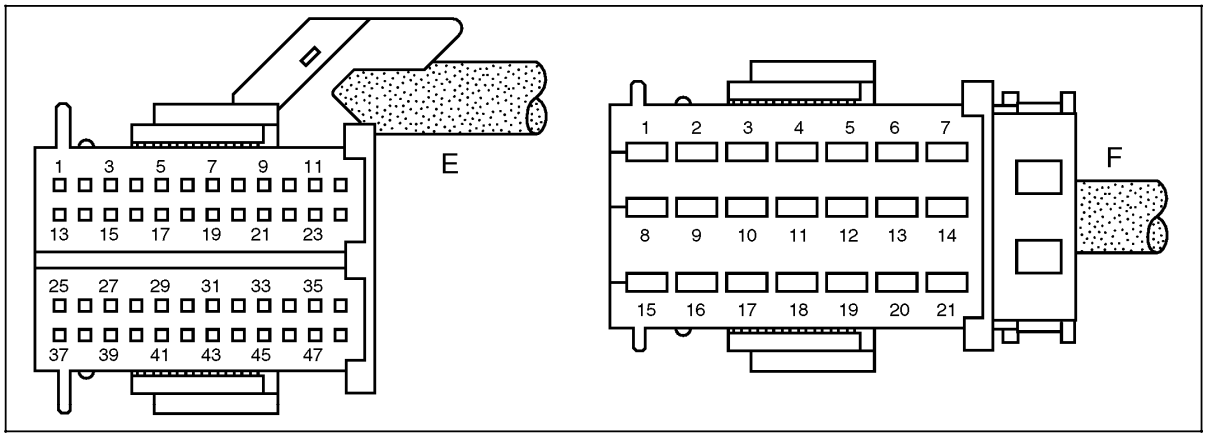
Figure 4

P07.61-0253-05

1E – 2E	–
3E	Air flap/air filter actuator (supercharger only)
3E	A/C compresser cut-out (normally aspirated engine)
4E	Adjustable camshaft timing solenoid
5E	EGR switchover valve (Model 202 only (USA)), without supercharger)
6E – 9E	–
10E	AIR pump switchover valve (Model 170, 202 only (USA))
11E – 12E	–
13E	Injector cyl. 4
14E	Injector cyl. 2
15E – 16E	–
17E	Oil level switch
18E – 21E	–
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. 3
27E	–
28E	ETC 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	–

Electrical Test Program – Preparation for Test

Connector Layout - Engine Control Module



P07.61-0254-04

Figure 5

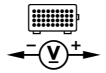
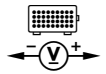
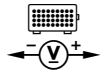
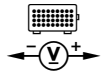
37E	CKP sensor ground
38E	CKP sensor signal
39E	Camshaft Hall-effect sensor ground
40E	Camshaft Hall-effect sensor signal
41E	Knock sensor ground
42E	Knock sensor signal
43E – 44E	–
45E	IAT sensor (in hot film MAF sensor)
46E	Hot film MAF sensor voltage supply 5 V
47E	Hot film MAF sensor signal
48E	Hot film MAF sensor ground

1F	EA/CC/ISC actuator (–)
2F	EA/CC/ISC actuator (+)
3F – 7F	–
8F	Output ground, Model 170 component compartment W16/1, Model 202 right component compartment W16/6
9F – 12F	–
13F	Ignition coil T1/2, cyl. 2 and 3
14F	–
15F	Output ground, Model 170 component compartment W16/1, Model 202 right component compartment W16/6
16F – 19F	–
20F	Ignition coil T1/1, cyl. 1 and 4
21F	Magnetic supercharger clutch

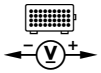
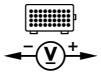
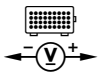
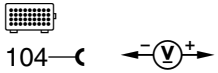
Electrical Test Program – Sequential Multiport Fuel Injection System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
1.0	P0 560	**Engine control module (ME-SFI) (N3/10)** Voltage supply Circuit 30	N3/10 3 (3A) — V — 12 (4B)	Ignition: **ON**	11 – 14 V	⇒ 1.1 – 1.2
1.1		Ground wire	N3/10 3 (3A) — V — X11/4 2 7 (7A) — V — X11/4 2 112 (8F) — V — X11/4 2 119 (15F) — V — X11/4 2	Ignition: **ON**	11 – 14 V	Wiring, **Model 170 and 202:** Output ground (W16/6), right component compartment.

Electrical Test Program – Sequential Multiport Fuel Injection System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
1.2		**Voltage supply** **Circuit 30**	N3/10 X11/4 1 — () — 12 (4B)	Ignition: **ON**	11 – 14 V	Wiring, **Model 170:** Relay module (K40). **Model 202:** Passenger-side fuse and relay module box (K40/4).
2.0	P0 560	**Engine control module (ME-SFI) (N3/10)** Voltage supply Circuit 87	N3/10 8 — () — 2 (8A) (2A)	Ignition: **ON**	11 – 14 V	⇒ 2.1 – 2.2
2.1		Electronics ground	N3/10 X11/4 8 — () — 2 (8A)	Ignition: **ON**	11 – 14 V	Wiring, **Model 170 and 202:** Output ground (W16/6), right component compartment.
2.2		Voltage supply Circuit 87	N3/10 X11/4 1 — () — 2 (2A)	Ignition: **ON** Ignition: **OFF**	11 – 14 V < 1 V	Wiring, **Model 170:** Relay module (K40). **Model 202:** Passenger-side fuse and relay module box (K40/4).

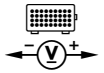
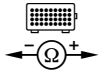
Electrical Test Program – Sequential Multiport Fuel Injection System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
3.0	P1 182	**Starter lock-out relay module (N65k2) or K40k2 Model 170, 202 as of 06/97** Activation	N3/10  35 (3D) 2 (2A)	Engine coolant temperature >20°C Ignition/starter switch: Turn to starter contact briefly.	11 – 14 V or if engine does not start, for approx. 5 seconds	⇒ 3.1 Engine control module (N3/10)
3.1		Starter signal Circuit 50	N3/10  8 (8A) 32 (40C)	Motor: **Start**	11 – 14 V, while cranking.	Wiring, Ignition switch.
4.0	P0 100	**Hot film MAF sensor (B2/5)** Hot film signal	N3/10  104 (48E) 103 (47E)	Ignition: **ON** Engine: **at Idle** Engine coolant temperature >70°C	0.9 – 1.1 V 1.3 – 1.7 V Increasing rpm = increasing voltage.	Wiring, ⇒ 4.1 – 4.3 Air intake system leak, B2/5.
4.1		Hot film MAF sensor (B2/5) Voltage supply 5 V	N3/10  104 (48E) B2/5 4	Disconnect MAF sensor (B2/5) connector and measure directly on socket 4 (br/yl). Ignition: **ON**	4.7 – 5.2 V	Wiring, N3/10

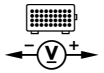
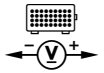
Electrical Test Program – Sequential Multiport Fuel Injection System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
4.2		Ground wire for hot film MAF sensor (B2/5)	B2/5 3 — (V) — N3/10 102 (46E)	Disconnect MAF sensor (B2/5) connector and measure directly on socket 3 (br). Ignition: **ON**	4.7 – 5.2 V	Wiring.
4.3		Hot film MAF sensor (B2/5) Voltage supply 12 V	N3/10 104 (48E) — (V) — B2/5 2 (2)	Disconnect MAF sensor (B2/5) connector and connect plus of voltmeter to socket 2 (rd/bu). Ignition: **ON**	11 – 14 V	Wiring, **Model 170:** Relay module (K40) **Model 202:** Passenger-side fuse and relay module box (K40/4).

Electrical Test Program – Sequential Multiport Fuel Injection System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
5.0	P0 110	**IAT sensor in hot film MAF sensor (B2/5)** Voltage	N3/10  104 (48E) — 101 (45E)	Ignition: **ON**	°C V 10 3.1 20 2.7 30 2.2 40 1.8 50 1.4 60 1.1 ± 5%	⇒ 5.1 N3/10
5.1		IAT sensor Resistance	N3/10  104 (48E) — 101 (45E)	Ignition: **OFF** Disconnect connector **E** on engine control module (N3/10).	°C Ω 10 3600 20 2420 30 1660 40 1170 50 850 60 600 ± 5%	Wiring, B2/5

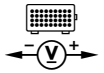
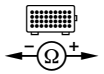
Electrical Test Program – Sequential Multiport Fuel Injection System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
6.0	P0 105	**Pressure sensor (B28)** Sensor signal (only USA)	N3/10  80 (24E) — 79 (23E)	Connect vacuum tester to pressure sensor (B28) using Y-fitting (Figure 1). Ignition: **ON** Engine: **at Idle**	 > 3.5 V < 2 V and vacuum climbs to > 500 mbar.	⇒ 6.1, Vacuum line, Wiring, B28
6.1		Pressure sensor (B28) Voltage supply (only USA)	N3/10  80 (24E) — 78 (22E)	Ignition: **ON**	4.7 – 5.3 V	N3/10

Electrical Test Program – Sequential Multiport Fuel Injection System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
7.0		**FP relay module** **Model 170** **in relay module (K40)** **Model 202:** **Passenger-side fuse and relay module (K40/4)** Activation	N3/10 21 (29C) — (V) — 2 (2A)	ℹ On Model 202 the activation of the fuel pump takes place via the passenger-side fuse and relay module box (K40/4). Ignition: **ON** ℹ The activation of the FP occurs only once after ignition "ON". For the next activation, the engine must have run briefly. Engine: **Start**	11 – 14 V for approx. 1 sec. 11 – 14 V during cranking and while engine runs.	Fuse, Wiring, K40, K40/4, N3/10
		Current draw K40 or K40/4	N3/10 8 (8A) — (A) — 21 (29C)	Ignition: **ON**	0.1 – 0.3 A	

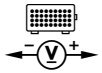
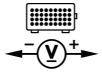
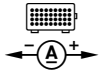
Electrical Test Program – Sequential Multiport Fuel Injection System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
8.0	P0 115	**ECT sensor (B11/4)** Voltage	N3/10  84 (28E) — 85 (29E)	Ignition: **ON**	°C V 20 3.4 30 2.9 40 2.4 50 1.9 60 1.5 70 1.2 80 0.9 90 0.7 100 0.5 ±5 %	⇒ 8.1, N3/10
8.1		Resistance (B11/4)	N3/10  84 (28E) — 85 (29E)	Ignition: **OFF** Disconnect connector **E** on engine control module (N3/10).	°C Ω 20 3090 30 2000 40 1330 50 900 60 630 70 440 80 320 90 230 100 170 ±5 %	Wiring, ⇒ 8.2

Electrical Test Program – Sequential Multiport Fuel Injection System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
8.2		ECT sensor (B11/4) Resistance	B11/4 1 – Ω + 2	Disconnect connector on ECT sensor (B11/4).	°C Ω 20 3090 30 2000 40 1330 50 900 60 630 70 440 80 320 90 230 100 170 ±5 %	B11/4
9.0		**Engine control module (N3/10)** TN-signal output	N3/10 8 (8A) — ⏚ — 30 (38C)	Test with oscilloscope. Engine: **Start** or Engine: **at Idle**	Signal, see Figure 2.	Wiring, N3/10
			N3/10 8 (8A) — V — 30 (38C)	Test with multimeter only if oscilloscope is not available.	7.5 – 9.0 V	

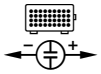
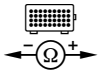
Electrical Test Program – Sequential Multiport Fuel Injection System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
10.0	P0 130 P0 133	**O2S 1** **(before TWC) (G3/2)** O2S signal	N3/10  23 (31C) — 24 (32C)	If ECT > 80 ° C, run engine at idle for at least two minutes.	fluctuates from – 0.2 V to + 1.0 V, by more than 0.3 V	Wiring, ⇒ 11.0 G3/2
11.0	P0 135	**O2S 1** **(before TWC) (G3/2)** O2S heater activation	N3/10  5 (5A) — 2 (2A)	If ECT > 80 ° C, run engine at idle for at least two minutes.	11 – 14 V	Wiring, G3/2 N3/10
		O2S 1 (G3/2) Current draw	N3/10  3 (3A) — 5 (5A)	Ignition: **ON**	0.6 – 3.4 A	

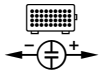
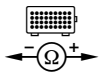
Electrical Test Program – Sequential Multiport Fuel Injection System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
12.0	P0 136	**O2S 2** **(after TWC) (G3/1)** O2S signal (only USA)	N3/10 39 (7D) — V — 40 (8D) N3/10 3 (3A) — 20 (28C) 3 (3A) — 66 (10E)	If ECT > 80° C, Engine: **Start** Raise and hold engine speed at 2000 – 3000 rpm for approx. 2 minutes. **Engine at idle:** Bridge sockets on socket box.	Within one minute, the value range of 450 mV to 500 mV must be either exceed or be below value range given. AIR pump runs. Voltage changes to < 40 mV within 60 seconds.	Wiring, ⇒ 13.0, G3/1, N3/10
13.0	P0 141	**O2S 2** **(after TWC) (G3/1)** O2S heater activation (only USA) O2S 2 (G3/1) Current draw	N3/10 9 (1B) — V — 2 (2A) N3/10 3 (3A) — A — 9 (1B)	Engine: **at Idle** If ECT > 80° C, run engine at idle for at least 2 minutes. Ignition: **ON**	11 – 14 V or voltage fluctuates between 1 – 14 V 0.6 – 3.4 A	Wiring, G3/1, N3/10

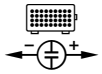
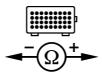
Electrical Test Program – Sequential Multiport Fuel Injection System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
14.0	P0 201	**Injector (Y62y1)** Activation and injection time	N3/10  81 (25E) — 2 (2A)	**ECT approx. 20° C** at start: **ECT approx. 80° C** at idle: accelerate briefly:	Injection time: approx. 8 ms approx. 2.7 – 4 ms approx. 14 ms (signal see Figures 3 and 4).	Fuse, Wiring, Y62y1, N3/10, ECT sensor (B11/4), IAT sensor in hot film MAF sensor (B2/5), O2S 1 (G3/2).
		Resistance (Y62y1)	N3/10  81 (25E) — 2 (2A)	Ignition: **OFF**	14 – 17 Ω	

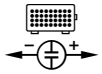
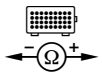
Electrical Test Program – Sequential Multiport Fuel Injection System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
15.0	P0 202	**Injector (Y62y2)** Activation and injection time	N3/10  70 (14E) — 2 (2A)	**ECT approx. 20° C** at start: **ECT approx. 80° C** at idle: accelerate briefly:	Injection time: approx. 8 ms approx. 2.7 – 4 ms approx. 14 ms (signal see Figures 3 and 4).	Fuse, Wiring, Y62y2, N3/10, ECT sensor (B11/4), IAT sensor in hot film MAF sensor (B2/5), O2S 1 (G3/2).
		Resistance (Y62y2)	N3/10  70 (14E) — 2 (2A)	Ignition: **OFF**	14 – 17 Ω	

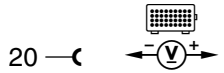
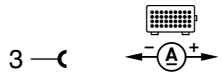
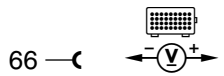
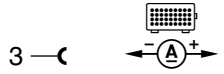
Electrical Test Program – Sequential Multiport Fuel Injection System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
16.0	P0 203	**Injector (Y62y3)** Activation and injection time	N3/10  82 (26E) — 2 (2A)	**ECT approx. 20° C** at start: **ECT approx. 80° C** at idle: accelerate briefly:	Injection time: approx. 8 ms approx. 2.7 – 4 ms approx. 14 ms (signal see Figures 3 and 4).	Fuse, Wiring, Y62y3, N3/10, ECT sensor (B11/4), IAT sensor in hot film MAF sensor (B2/5), O2S 1 (G3/2).
		Resistance (Y62y3)	N3/10  82 (26E) — 2 (2A)	Ignition: **OFF**	14 – 17 Ω	

Electrical Test Program – Sequential Multiport Fuel Injection System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
17.0	P0 204	**Injector (Y62y4)** Activation and injection time	N3/10  69 (13E) — 2 (2A)	**ECT approx. 20° C** at start: **ECT approx. 80° C** at idle: accelerate briefly:	Injection time: approx. 8 ms approx. 2.7 – 4 ms approx. 14 ms (signal see Figures 3 and 4).	Wiring, Y62y4, N3/10, ECT sensor (B11/4), IAT sensor in hot film MAF sensor (B2/5), O2S 1 (G3/2).
		Resistance (Y62y4)	N3/10  69 (13E) — 2 (2A)	Ignition: **OFF**	14 – 17 Ω	

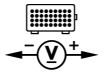
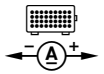
Electrical Test Program – Sequential Multiport Fuel Injection System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
18.0	P0 410 P1 453	**AIR pump relay in passenger-side fuse and relay module box (K40/4),** Model 202, without supercharger (only USA) Activation	N3/10  20 (28C) — 2 (2A)	Disconnect ECT sensor (B11/4) connector. Simulate 2.5 kΩ resistance at sockets 1 and 4 with resistance substitution unit. Engine: **at Idle**	11 – 14 V for approx. two minutes **and** AIR pump runs.	Wiring, AIR pump fuse, K40/4, N3/10
		Current draw (K40/4)	N3/10  3 (3A) — 20 (28C)	Ignition: **ON**	0.1 – 0.3 A	
19.0	P0 410 P1 420	**AIR pump switchover valve (Y32)** (only USA) Activation	N3/10  66 (10E) — 2 (2A)	Disconnect ECT sensor (B11/4) connector. Simulate 2.5 kΩ resistance at sockets 1 and 4 with resistance substitution unit. Engine: **at Idle**	11 – 14 V for approx. two minutes **and** AIR pump runs.	Fuse, Wiring, Y32, N3/10
		Current draw (Y32)	N3/10  3 (3A) — 66 (10E)	Ignition: **ON**	0.4 – 0.6 A	

Electrical Test Program – Sequential Multiport Fuel Injection System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
20.0	P0 410	**AIR system** (logic chain) (only USA) i The O2S 1 signal before TWC is being measured.	N3/10 23 — (31C) — V — 24 (32C) **Super-charger** N3/10 3 — (3A) — 125 (21F) 3 — (3A) — 66 (10E) **Normally aspirat-ed eng.** 3 — (3A) — 20 (28C) 3 — (3A) — 66 (10E)	If ETC > 80°C, run engine at idle for at least 2 minutes. Bridge sockets on socket box.	The O2S voltage oscillates in the area of –0.2 V and +1.0 V AIR pump **or** supercharger runs. Voltage changes to < 100 mV within 20 seconds.	Y32 binding, AIR combi valve, AIR pump or supercharger no output.

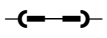
Electrical Test Program – Sequential Multiport Fuel Injection System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
21.0	P1 400	**EGR switchover valve (Y27) Model 202, without supercharger, engine 111.974** (USA) Activation	N3/10  61 (5E) — 2 (2A)	Engine: **at Idle** ECT > 60 °C Accelerate briefly	 11 – 14 V	Wiring, Y27, N3/10, ⇒ 22.0 – 23.0
		Y27 Current draw	N3/10  3 (3A) — 61 (5E)	Ignition: **ON**	0.3 – 0.5 A	
22.0	P0 400	**EGR switchover valve (Y27) Model 202, without supercharger, engine 111.974** (USA) Vacuum control		Test connection: Connect vacuum tester to EGR valve. Engine: **Start** and run at > 3000 rpm	 > 400 mbar	Vacuum line, EGR valve, Y27

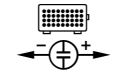
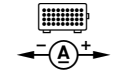
Electrical Test Program – Sequential Multiport Fuel Injection System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
23.0	P0 400	**EGR switchover valve (Y27)** **Model 202, without supercharger, engine 111.974** (USA) Mechanical test		Test connection: engine: **at Idle** Apply 500 mbar vacuum to EGR valve. Engine: **OFF** Apply 500 mbar vacuum to EGR valve and pull off vacuum hose.	Engine runs uneven. EGR valve closes audibly.	EGR valve

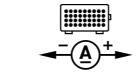
Electrical Test Program – Sequential Multiport Fuel Injection System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
24.0	P1 525	**Adjustable camshaft timing solenoid (Y49)** Current draw	Y49 1 — () — 2	**Test connection note:** Connect test cable (102 589 04 63 00) to solenoid. Engine: **at idle** ECT > 70°C Increase engine speed to approx. 2000 rpm.	1.0 – 1.5 A	⇒ 24.1, ⇒ 25.0, N3/10
24.1		Resistance Y49	N3/10  60 — () — 2 (4E) (2A)	Ignition: **OFF**	7 – 12 Ω	Wiring, Y49
25.0	P1 519	**Adjustable camshaft timing solenoid (Y49)** Mechanical function	N3/10  60 — () — 3 (4E) (3A)	Engine: **at Idle** Bridge sockets on socket box for a maximum of 10 seconds.	Engine runs rough or stalls	Check function of camshaft adjuster (see SMS, Engine 104, Job No. 05-2160).

Electrical Test Program – Sequential Multiport Fuel Injection System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
26.0	P0440 P0441 P0443	**Purge control valve (Y58/1)** Activation	N3/10  13 (21C) — 2 (2A)	Engine: **at Idle** and at operating temperature.	After approx. 1 minute, purge control valve (Y58/1) must noticeably cycle (Fig. 5 to 6) Signal see Figure 7.	Fuse, Wiring, Y58/1, ⇒ 27.0, N3/10
		Current draw (Y58/1)	N3/10  3 (3A) — 13 (21C)	Ignition: **ON**	0.3 – 0.5 A	
27.0	P0440 P0441	**Purge control valve (Y58/1)** Vacuum control		Connect vacuum tester to purge control valve (Y58/1) between purge line to charcoal canister (Figure 5 to 6). Engine at operating temperature and at idle.	After approx. 1 minute, > 50 mbar and needle oscillates, Y58/1 must cycle.	Vacuum line, Y58/1

Electrical Test Program – Sequential Multiport Fuel Injection System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
28.0	P0440 P0442 P0446 P0455	**Purge system** System leaks **Model 170** (only USA) **Model 202** (only USA) **as of 09/97** Activated charcoal canister shut-off valve (Y58/4) Activate	N3/10  3 (3A) — 34 (2D)	Disconnect purge line to charcoal canister on purge control valve (Y58/1). Connect vacuum tester to purge line (Figure 5 and 6). Ignition: **ON** Apply approx. 25 mbar of vacuum.	 After approx. 1 minute, < 5 mbar vacuum loss.	Fuel tank cap, Purge line to charcoal canister, Purge line from charcoal canister to Y58/4, Charcoal canister, Y58/4, Y58/1, Fuel tank pressure sensor (B4/3). Charcoal canister, Y58/4, Purge control valve (Y58/1).
29.0	P0446	**Activated charcoal canister shut-off valve (Y58/4)** **Model 170** (only USA) **Model 202** (only USA) **as of 09/97** Current draw	N3/10  3 (3A) — 34 (2D)	Ignition: **ON**	0.5 – 0.9 A	Fuse, Wiring, Y58/4

Electrical Test Program – Sequential Multiport Fuel Injection System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
30.0	P0 446 P0 450 P0 455	**Fuel tank pressure sensor (B4/3)** **Model 170** (only USA) **Model 202** (only USA) **as of 09/97**	N3/10 36 (4D) — V — 37 (5D)	Disconnect purge line to charcoal canister on purge control valve (Y58/1). Connect vacuum tester to purge line (Figure 5 and 6).		⇒ 30.1, Wiring, Vacuum line, Charcoal canister clogged, B4/3
		Sender signal				
		Activated charcoal canister shut-off valve (Y58/4) Activate	N3/10 3 (3A) — 34 (2D)	Ignition: **ON**	> 2.3 V	
				Apply approx. 25 mbar of vacuum.	< 2.3 V	
30.1		Fuel tank pressure sensor (B4/3) (only USA) Voltage supply	N3/10 36 (4D) — V — 38 (6D)	Ignition: **ON**	4.7 – 5.3 V	N3/10

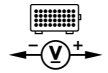
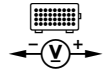
Electrical Test Program – Sequential Multiport Fuel Injection System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
31.0	P0 450	**Purge monitoring pressure sensor (B4/4)** **Model 202** (only USA) **up to 08/97** Sender signal	N3/10 36 (4D) — V — 37 (5D)	Disconnect vacuum line at purge monitoring pressure sensor (B4/4). Connect vacuum tester to purge monitoring pressure sensor (Figure 8). Ignition: **ON** Apply approx. 300 mbar of vacuum.	 > 3.5 V < 3 V	⇒ 31.1, Wiring, B4/4
31.1		Purge monitoring pressure sensor (B4/4) Voltage supply	N3/10 36 (4D) — V — 38 (6D)	Ignition: **ON**	4.7 – 5.3 V	N3/10

Electrical Test Program – Sequential Multiport Fuel Injection System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
32.0	P0 600 P0 811 P1 570 P1 603 P1 747	**CAN data bus**	N3/10 43 (11D) — Ω — 44 (12D)	Ignition: **OFF**	55 – 65 Ω	⇒ 32.1 – 32.2 Data line.
32.1		CAN element in: Electronic ignition lock control module (N73) or DAS control module (N54/1) Resistance	N3/10 43 (11D) — Ω — 44 (12D)	Ignition: **OFF** Disconnect connector **D** from engine control module (N3/10).	115 – 125 Ω	Wiring, Vehicles without EIS: DAS control module (N54/1). Vehicles with EIS: Electronic ignition lock control module (N73).
32.2		CAN element in: Engine control module (N3/10) Resistance	N3/10 43 (11D) — Ω — 44 (12D)	Ignition: **OFF** Disconnect connector **D** from test cable.	115 – 125 Ω	N3/10

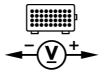
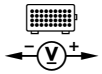
Electrical Test Program – Sequential Multiport Fuel Injection System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
33.0	P1 163	**Oil level switch (S43)**	N3/10  73 (17E) — 2 (2A)	Ignition: **ON** Oil level okay. Oil level low.	 11 – 14 V < 1 V	Wiring, S43
34.0		**Diagnosis line** Activation	N3/10  3 (3A) — 31 (39C)	Ignition: **ON**	11 – 14 V	Wiring, N3/10

Electrical Test Program – Sequential Multiport Fuel Injection System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
35.0	P0 805 P1 235	**Supercharger function**		Connect pressure tester to intake manifold. Drive vehicle on dynometer or road in transm. selector lever in range 3 or 3rd gear if manual trans. with full load at approx. 3500 rpm.	> 280 mbar pressure	⇒ 36.0 – 37.0 Air flap/air filter actuator (M16/7) binding, Charge air line plugged, Supercharger defective.
36.0	P0 806 P1 236	**Magnetic supercharger clutch (Y2/1)** Activation **Supercharger only**	N3/10 125 (21F) — V — 2 (2A)	Engine: **At Idle; Rapidly depress accelerator pedal (WOT):**	11 – 14 V, as long as the supercharger is engaged.	Wiring, Y2/1, N3/10
		Magnetic supercharger clutch (Y2/1) Current draw	N3/10 3 (3A) — A — 125 (21F)	Ignition: **ON**	2.6 – 4.5 A	

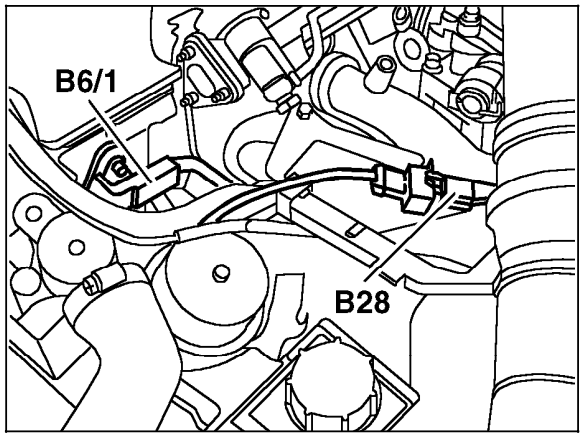
Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
37.0	P0 803 P0 243	**Air flap/air filter actuator (M16/7)** Activation **Supercharger only**	N3/10  59 (3E) — 3 (3A)	Ignition: **ON** Engine: **At Idle;** **Rapidly depress accelerator pedal (WOT):**	1.0 – 1.4 V 2.0 – 12.0 V	Wiring, M16/7, N3/10
38.0	P0 801 P1 181	**Engine/climate control electric cooling fan control module (N76)** Activation	N3/10  3 (3A) — 6 (6A)	Engine: **at Idle** ECT < 70 °C A/C system: **ON** ECT > 85 °C	1 – 1.9 V and fan is stopped. 2 – 6 V and fan runs. Between 2.5 – 12.5 V and fan runs according to activation.	Wiring, N76, N3/10

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
39.0	P1 551	**A/C System:** **A/C compresser shutoff** Activation With Tempmatic A/C (only USA)	N3/10 8 (8A) — V — 59 (3E)	Engine: **At Idle;** **Rapidly depress accelerator pedal (WOT):** (>2,000 rpm)	11 – 14 V, as long as the A/C compresser is disengaged.	Wiring, Wrong A/C control module installed for A/C system. N3/10
40.0		**Model 170** (only USA) **with manual transmission** **Clutch pedal engage/release switch (S40/5)**	N3/10 3 (3A) — V — 32 (40C)	Starter: **Engage** Press clutch pedal: Release clutch pedal:	11 – 14 V, and starter motor rotates. < 1.0 V, and starter motor stops (does not rotate).	Wiring, S40/5
41.0	P1 681	**Vehicles as of 06/98:** **Crash signal**	N3/10 8 (8A) — V — 48 (16D)	Ignition: **ON**	< 1.0 V	Wiring, Readout DTC memory for SRS

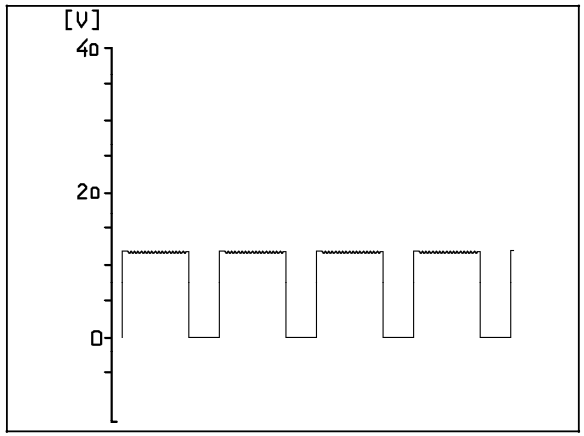
Electrical Test Program – Sequential Multiport Fuel Injection System Test



P07.61-0314-13

Figure 1

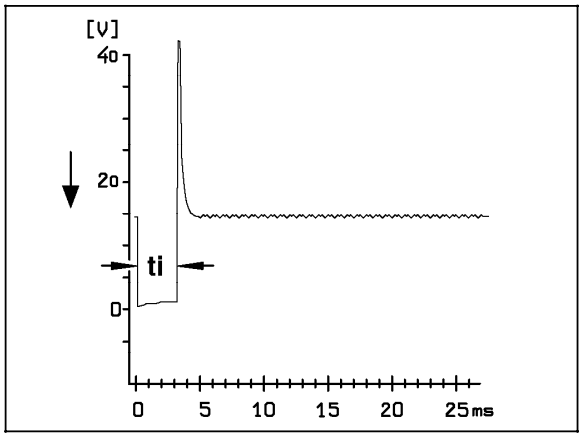
B28 Pressure sensor (USA only)



P07.61-0537-01

Figure 2

TN signal

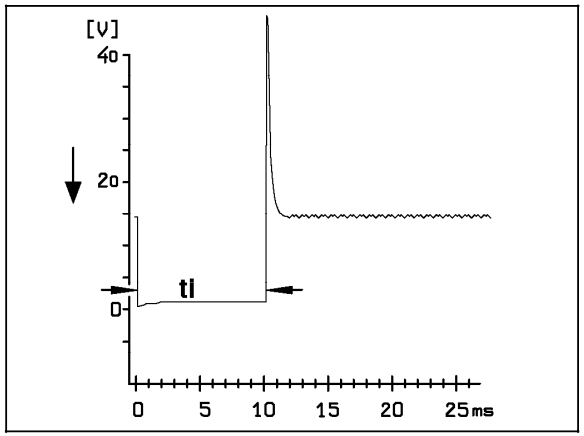


P07.61-0538-01

Figure 3

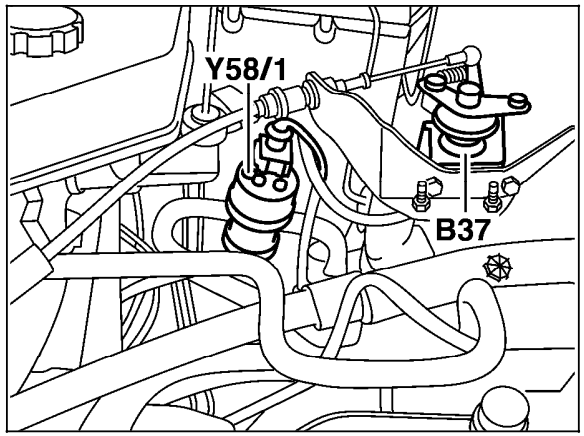
Injection duration “ti” at CTP

Electrical Test Program – Sequential Multiport Fuel Injection System Test



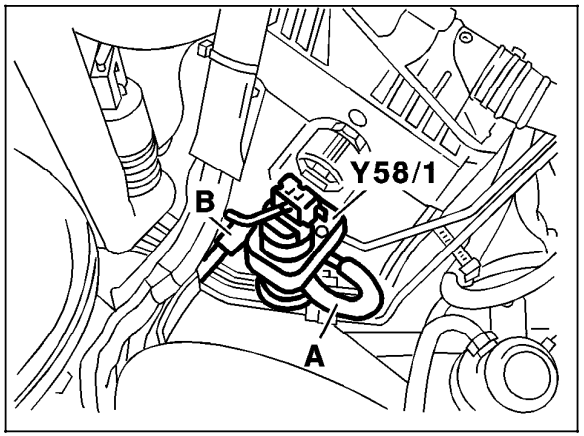
P07.61-0539-01

Figure 4
Injection duration “ti” at WOT



P07.61-0295-13

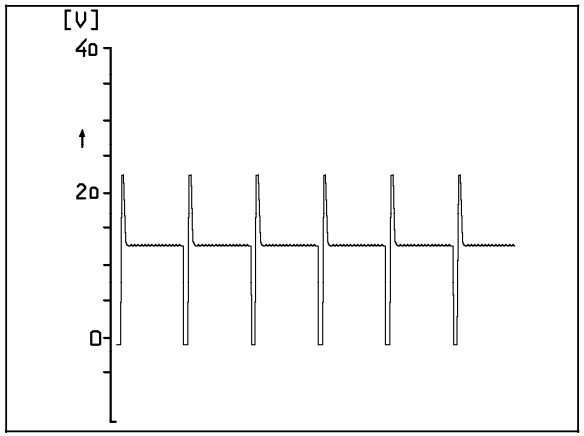
Figure 5
Model 170
Y58/1 Purge control valve



P07-5947-13

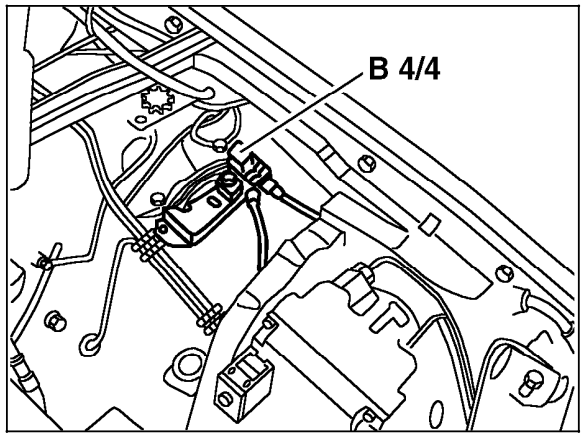
Figure 6
Model 202
Y58/1 Purge control valve

Electrical Test Program – Sequential Multiport Fuel Injection System Test



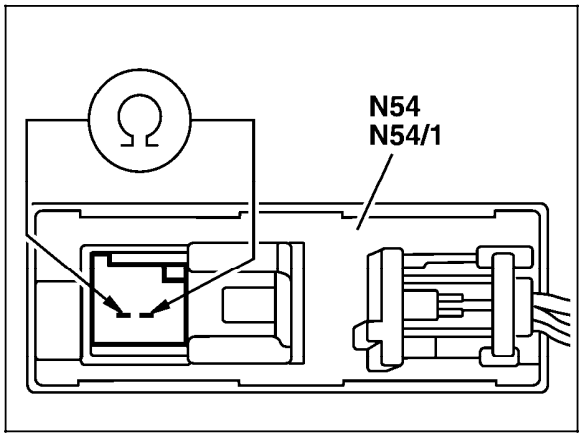
P07.61-0540-01

Figure 7
Purge control valve signal



P07.61-0297-13

Figure 8
Model 202
B4/4 Fuel tank emissions monitoring pressure sensor



P07.51-0426-13

Figure 9
N54/1 DAS control module

Electrical Test Program – Ignition System 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 **WARNING!** on pages 11/1 and 11/2,
2. Review 11, 21, 22, 23, 24, 31, 33,
3. Review section 0,
4. Connect HHTand 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 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

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
1.0	P0 560	**Engine control module (N3/10)** Voltage supply circuit 30	N3/10 3 (3A) — V — 12 (4B)	Ignition: **ON**	11 – 14 V	⇒ 1.1 – 1.2

Electrical Test Program – Ignition System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
1.1		Ground wire	N3/10 — X11/4 3 — 2 (3A) 7 — 2 (7A) 112 — 2 (8F) 119 — 2 (15F)	Ignition: **ON**	11 – 14 V	Wiring, **Model 170 and 202:** Output ground (W16/6), Right component compartment.
1.2		Voltage supply circuit 30	N3/10 — X11/4 X11/4 1 — 12 (4B)	Ignition: **ON**	11 – 14 V	Wiring, **Model 170:** Relay module (K40), **Model 202:** Passenger-side fuse and relay module box (K40/4).
2.0	P0 560	**Engine control module (N3/10)** Voltage supply circuit 87	N3/10 8 (8A) — 2 (2A)	Ignition: **ON**	11 – 14 V	⇒ 2.1 – 2.2

Electrical Test Program – Ignition System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
2.1		Electronics ground	N3/10 X11/4 8 — (8A) — 2	Ignition: **ON**	11 – 14 V	Wiring, **Model 170 and 202:** Output ground (W16/6), Right component compartment.
2.2		Voltage supply circuit 87	N3/10 X11/4 1 — 2 (2A)	Ignition: **ON** Ignition: **OFF**	11 – 14 V < 1 V	Wiring, **Model 170:** Relay module (K40). **Model 202:** Passenger-side fuse and relay module box (K40/4).
3.0		**Ignition coil (T1/1)** Cylinder 1 and 4 Voltage supply	N3/10 3 — (3A) — 124 (20F)	Ignition: **ON** Starter: **Crank**	11 – 14 V > 10 V	Wiring, Fuses: **Model 170:** fuse 11 **Model 202:** fuse and relay module box fuse 6 Ignition coil (T1/1)
4.0		**Ignition coil (T1/2)** Cylinder 2 and 3 Voltage supply	N3/10 3 — (3A) — 117 (13F)	Ignition: **ON** Starter: **Crank**	11 – 14 V > 10 V	Wiring, Fuses: **Model 170:** fuse 11 **Model 202:** fuse and relay module box fuse 6 Ignition coil (T1/2)

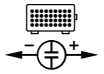
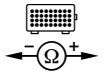
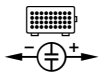
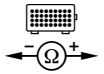
Electrical Test Program – Ignition System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
5.0	P0 335	**CKP sensor (L5)** Signal	N3/10 93 (37E) — (±) — 94 (38E)	Test with oscilloscope. Starter: **Crank** Engine: **at Idle**	Signal, see Figure 1 and 3.	⇒ 5.1, Teeth on starter ring gear.
		Voltage	N3/10 93 (37E) — (V) — 94 (38E)	Test with multimeter only if oscilloscope is unavailable. Starter: **Crank** Engine: **at Idle**	> 2.5 V > 5 V Voltage increases with increasing rpm.	
5.1		Resistance of CKP sensor (L5)	N3/10 93 (37E) — (Ω) — 94 (38E)	Ignition: **OFF** Unplug connector **E** on engine control module (N3/10).	700 – 1400 Ω (at 20°C): 600 – 1200 Ω	Wiring, L5

Electrical Test Program – Ignition System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
6.0	P0 341	**Camshaft Hall-effect sensor (B6/1)** Hall-effect signal	N3/10 95 (39E) — (±) — 96 (40E)	Test with oscilloscope. Engine: **at Idle**	Signal: see Figure 2 and 3	⇒ 6.1, Wiring B6/1
			N3/10 96 (40E) — (V) — 2 (2A)	Test with multimeter only if oscilloscope is unavailable. Engine: **at Idle**	1.2 – 1.7 V Value changes.	
6.1		Voltage supply to camshaft Hall-effect sensor (B6/1)	B6/1 1 — (V) — 3	Ignition: **ON** Disconnect connector from Hall-effect sensor (B6/1) and test directly on sockets 1 and 3 of connector.	11 – 14 V	Wiring.

Electrical Test Program – Ignition System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
7.0	P0 300 P0 301 P0 304	**Primary voltage** Ignition coil (T1/1), Cylinders 1 and 4	N3/10  124 (20F) — 2 (2A)	Test connection Individual primary pattern Range 400 V Duration 5 milliseconds Starter: **Crank**	200 – 350 V	⇒ 7.1
7.1		Primary winding of T1/1 and T1/2	N3/10  124 (20F) — 117 (13F)	Ignition: **OFF**	0.9 – 1.6 Ω The resistance of a single coil at 20 °C is approx. 0.6 Ω.	Wiring T1/1 or T1/2
8.0	P0 300 P0 302 P0 303	**Primary voltage** Ignition coil (T1/2) Cylinders 2 and 3	N3/10  117 (13F) — 2 (2A)	Test connection Individual primary pattern Range 400 V Duration 5 milliseconds Starter: **Crank**	200 – 350 V	⇒ 8.1
8.1		Primary winding of T1/2 and T1/1	N3/10  117 (13F) — 124 (20F)	Ignition: **OFF**	0.9 – 1.6 Ω The resistance of a single coil at 20 °C is approx. 0.6 Ω.	Wiring T1/2 or T1/1

Electrical Test Program – Ignition System Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
9.0	P0 300 P0 301 P0 302 P0 303 P0 304	**Firing voltage** Ignition coil (T1/1) and (T1/2)	Engine analyzer ⊖ ⏚ ⊕	ℹ Test connection Individual secondary pattern Range 20 kV Duration 5 milliseconds Connect kV pick-ups successively to T1/1 and T1/2. Starter: **Crank**	8 – 20 kV	⇒ 9.1, Spark plugs, N3/10
9.1		Secondary winding of T1/1 or T1/2	T1/1 T1/2 ⊖ Ω ⊕ cir. 4a cir. 4b	Disconnect both ignition cables on T1/1 or T1/2	6 – 8.5 kΩ	T1/1 or T1/2

Electrical Test Program – Ignition System Test

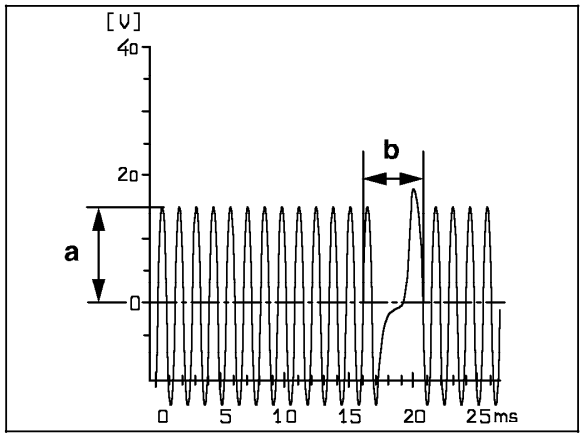


Figure 1

CKP sensor (L5) signal, shown at idle

b=2 missing teeth for cylinder 1 recognition

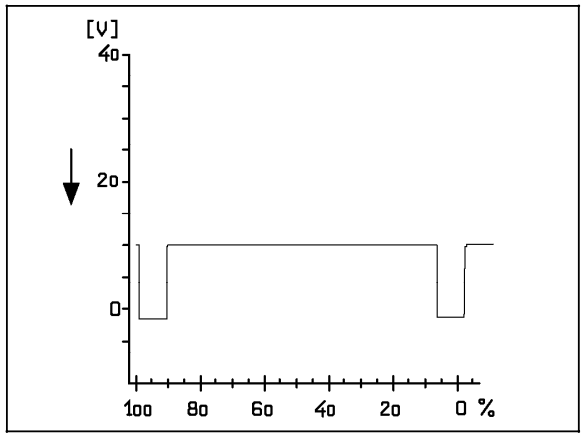
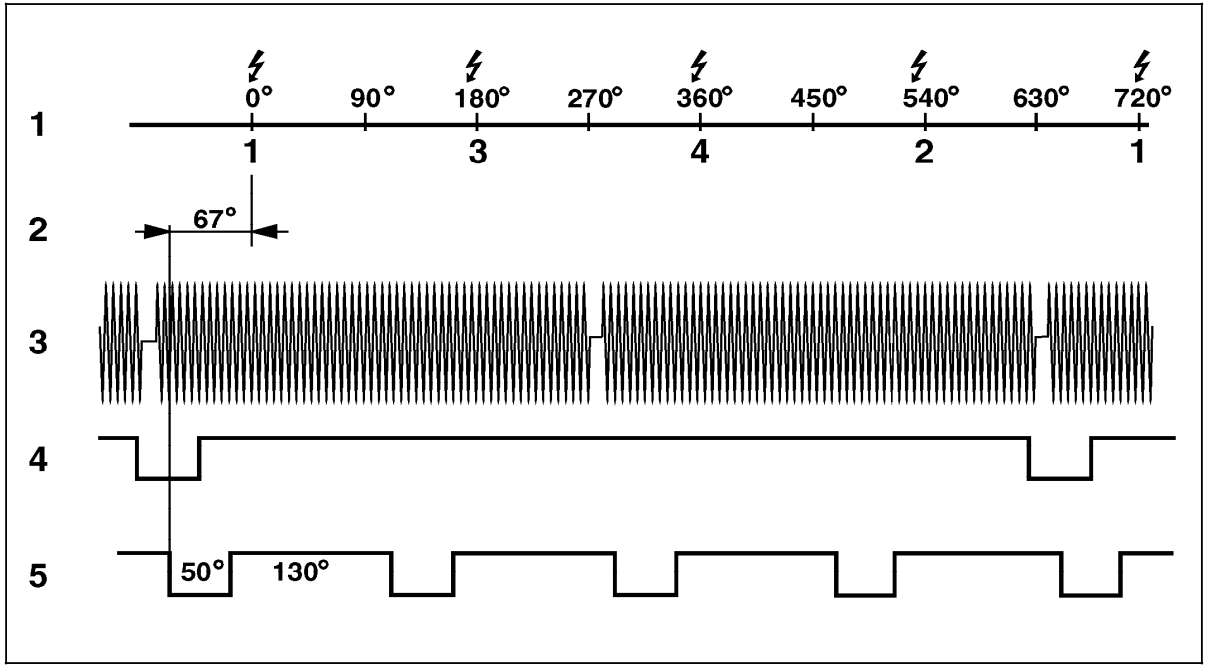


Figure 2

Camshaft Hall-effect sensor (B6/1) signal

Electrical Test Program – Ignition System Test

Signal survey



P07.61-0257-05

Figure 3

1 Crank angle (CKA)
2 Cylinder
3 CKP sensor (L5) signal
4 Camshaft Hall-effect sensor (B6/1) signal
5 Engine rpm signal TNA

Electrical Test Program – Electronic Accelerator (EA) 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 22 entirely, prior to performing this test section.

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
1.0	P1 542 P0 507	**Pedal value sensor (B37)** Signal Nominal value potentiometer 1	N3/10 15 (23C) — V — 16 (24C)	Ignition: **ON** Accelerator pedal position: CTP WOT or kick-down	 0.2 – 0.5 V 4.3 – 4.8 V	⇒ 1.1, Wiring, B37
1.1		Voltage supply Nominal value potentiometer 1	N3/10 15 (23C) — V — 14 (22C)	Ignition: **ON**	4.75 – 5.25 V	Wiring N3/10

Electrical Test Program – Electronic Accelerator (EA) Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
2.0	P1 542 P0 507	**Pedal value sensor (B37)** Signal Nominal value potentiometer 2	N3/10 18 (26C) — V — 17 (25C)	Ignition: **ON** Accelerator pedal position: CTP WOT and kick-down	 0.1 – 0.4 V 2.1 – 2.5 V	⇒ 2.1, Wiring, B37
2.1		Voltage supply Nominal value potentiometer 2 i Test step not valid for pedal value sensor with hall effect.	N3/10 18 (26C) — V — 19 (27C)	Ignition: **ON**	2.25 – 2.75 V	Wiring N3/10

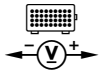
Electrical Test Program – Electronic Accelerator (EA) Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
3.0	P0 507 P0 120 P1 186 P1 580	**EA/CC/ISC actuator (M16/6)** Signal Actual value potentiometer 1	N3/10 88 (32E) — V — 87 (31E)	Ignition: **ON** Accelerator pedal position: CTP WOT or kick-down	 4.0 – 4.6 V < CTP value	⇒ 3.1, Wiring, M16/6
		Actual value potentiometer 2	N3/10 88 (32E) — V — 90 (34E)	Accelerator pedal position: CTP WOT or kick-down	 0.3 – 0.9 V > CTP value	
3.1		Voltage supply Actual value potentiometers 1 and 2	N3/10 88 (32E) — V — 89 (33E)	Ignition: **ON**	4.75 – 5.25 V	Wiring, N3/10

Electrical Test Program – Electronic Accelerator (EA) Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
4.0	P1 186 P1 580	**EA/CC/ISC actuator (M16/6)** Activation of actuator motor	N3/10 105 (1F) — V — 106 (2F)	Ignition: **ON** Engine: **at Idle** ECT > 70 °C	0.8 – 2.3 V 1.0 – 2.5 V Value oscillates.	Wiring, M16/6 N3/10
		Resistance of actuator motor	N3/10 105 (1F) — Ω — 106 (2F)	Ignition: **OFF**	< 10 Ω	
5.0		**P/N recognition** Transmission: 722.4/6	N3/10 51 (19D) — V — 2 (2A)	Ignition: **ON** Selector lever position: P/N R, D, 4, 3, 2, 1	 11 – 14 V < 1.5 V	Wiring, See DM, Chassis and Drivetrain, Vol. 1, section 2.3
6.0		**Manual Transmission only** **Clutch engage/release switch (S40/2)** Signal	N3/10 51 (19D) — V — 2 (2A)	Ignition: **ON** Clutch pedal not depressed: Clutch pedal depressed:	 < 1.0 V 11 – 14 V	Wiring, S40/2

Electrical Test Program – Electronic Accelerator (EA) Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
7.0		**Manual Transmission only** **Backup lampswitch (S16/2)** Signal	N3/10  3 (3A) — 46 (14D)	Ignition: **ON** Reverse gear not engaged: Reverse gear engaged:	 < 1.0 V 11 – 14 V	Wiring, S16/2

Electrical Test Program – Cruise Control (CC) 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 22 entirely.

Electrical Test Program – Cruise Control (CC) Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0	P0 565	**CC switch (S40)**	N3/10	Ignition: **ON**		Wiring,
				CC switch not activated.	< 1 V	S40
		V Decelerate/set	3 (3A) — (V) — 53 (21D)			
				Decelerate activated.	11 – 14 V	
		SP Memory recall	N3/10			
			3 (3A) — (V) — 54 (22D)	Memory activated.	11 – 14 V	
		B Accelerate/set	N3/10			
			3 (3A) — (V) — 52 (20D)	Accelerate activated.	11 – 14 V	
		A Off	N3/10	CC switch not activated.	11 – 14 V	
			3 (3A) — (V) — 56 (24D)	Off activated.	< 1 V	
		Control contact	N3/10			
				CC switch not activated.	< 1 V	
			3 (3A) — (V) — 55 (23D)	CC switch in position:		
				Activate decelerate/		
				accelerate/memory/off	11 – 14 V	

Hydraulic Test Program – Preparation for Test (Fuel System Pressure and Internal Leakage Test)

Operation No. of Text description and Time Allowance 07-1402

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

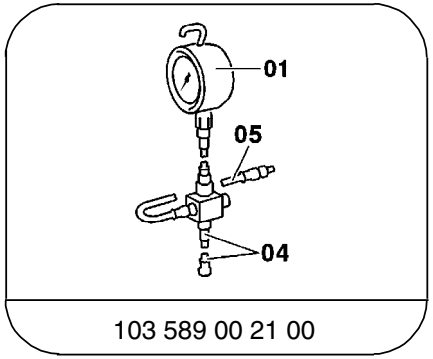
⚠ **WARNING!**
Risk of fatal injury from being pulled into rotating vehicle parts.
Do not reach into rotating parts.
Wear closed and tight-fitting work clothes.
Protect vicinity of rotating vehicle components from unauthorized access.

⚠ **WARNING!**
Risk of explosion from fuel igniting, risk of poisoning from inhaling and swallowing fuel as well as risk of injury to eyes and skin from contact with fuel.
No fire, sparks, exposed flames or smoking.
Pour fuels only into suitable and appropriately marked containers.
Wear protective clothing when handling fuel.

Preparation for Test

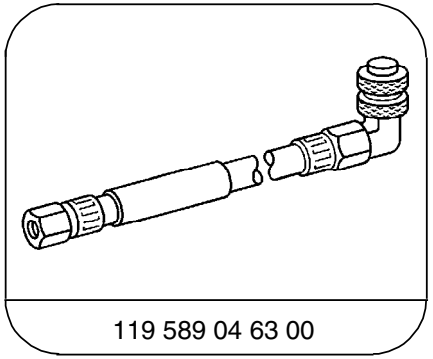
1. Review 11, 21, 22, 23, 24, 31, 33,
2. Review section O,
3. Connect pressure gauge to test connection (see Figure 1),
4. After completing test, using measurement glass (055), release fuel pressure and allow residual fuel to drain into glass (see Figure 1).

Special Tools



103 589 00 21 00

Tester

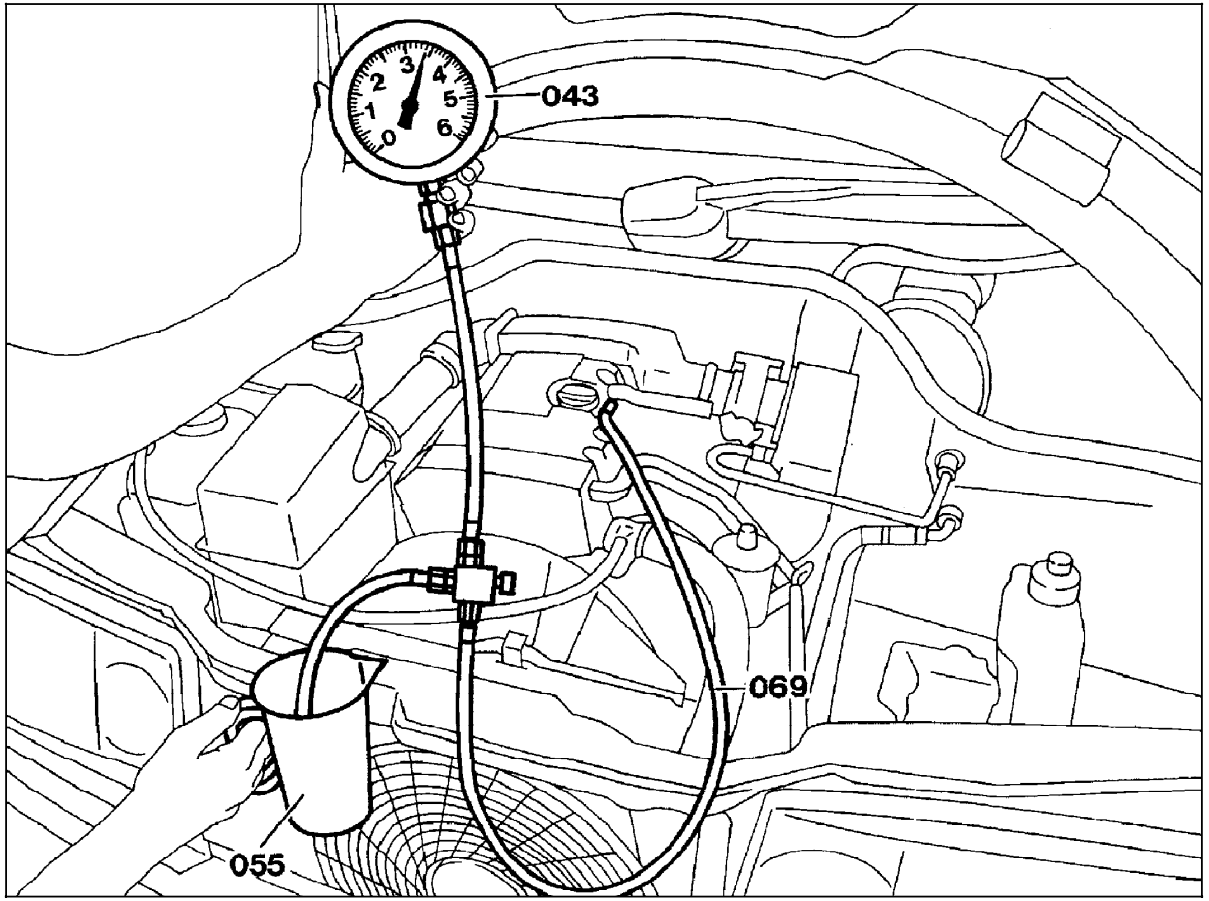


119 589 04 63 00

Pressure hose

Hydraulic Test Program – Preparation for Test (Fuel System Pressure and Internal Leakage Test)

Connection Diagram



P07.61-0582-06

Figure 1

043 Pressure gauge, part no. 103 589 00 21 00
055 Measuring glass
069 Pressure hose, part no. 119 589 04 63 00

Hydraulic Test Program – Test (Fuel System Pressure and Internal Leakage Test)

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy [1]
1.0		**Fuel pressure at idle (with vacuum)**	Pressure gauge connected to test connection.	Engine: **at Idle** Valve on pressure gauge closed.	3.2 – 3.6 bar	Check fuel pumps 34, Diaphragm pressure regulator.
2.0		**Fuel pressure at idle (without vacuum)**	Pressure gauge connected to test connection.	Engine: **at Idle** Disconnect vacuum hose from diaphragm pressure regulator.	3.7 – 4.2 bar	Diaphragm pressure regulator.
3.0		**Fuel system leakage**	Pressure gauge connected to test connection.	Engine: **OFF** After 30 minutes	> 3.0 bar > 2.5 bar	If the pressure drops quickly, replace check valve in fuel pumps. If the pressure drops slowly, check injectors 36, Replace diaphragm pressure regulator or O-rings on diaphragm pressure regulator.

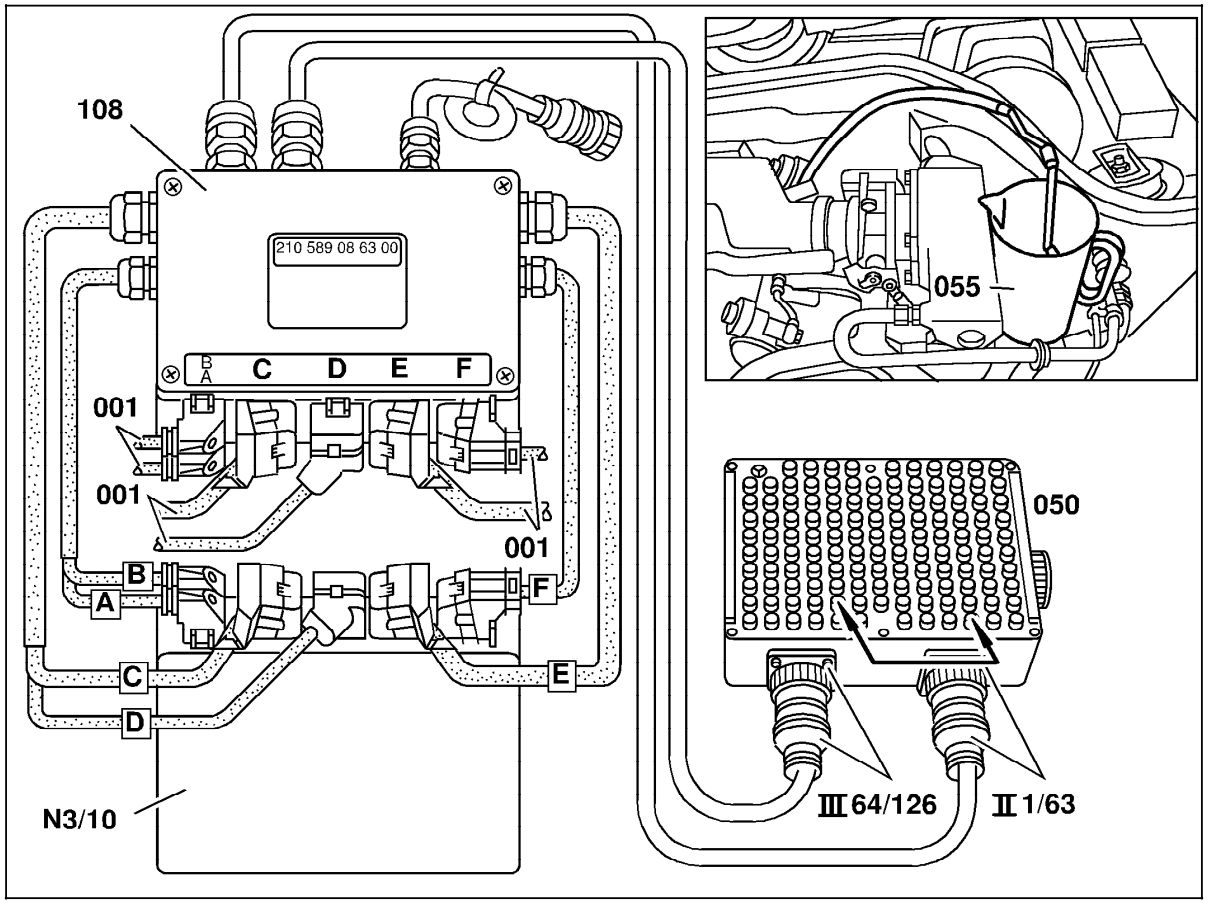
[1] Observe Preparation for Test, see 31.

Hydraulic Test Program – Preparation forTest (Fuel Pump Test)

Connection Diagram – Delivery Test

1. Review section 0,
2. Review 11, 21, 22, 23, 24, 31, 33,
3. Connect socket box tester to engine control module (N3/10)

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



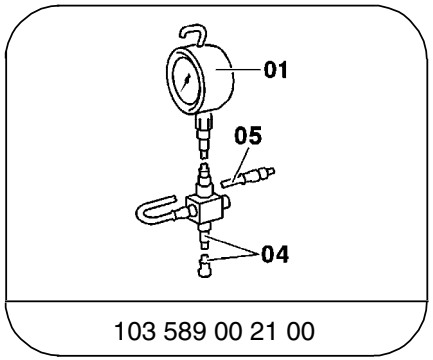
P07.61-0270-06

Figure 1

001 Engine control module connectors A–F
041 Stop watch
050 Socket box tester, 126 pole
055 Measuring glass
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

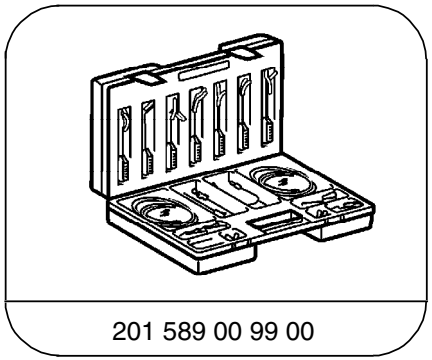
Hydraulic Test Program – Preparation forTest (Fuel Pump Test)

Special Tools



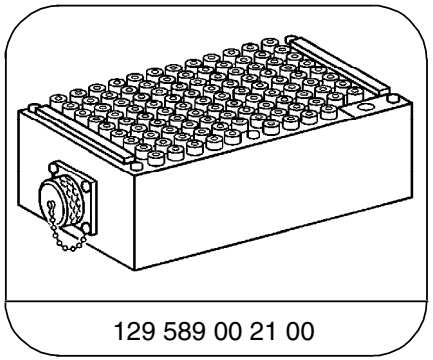
103 589 00 21 00

Tester



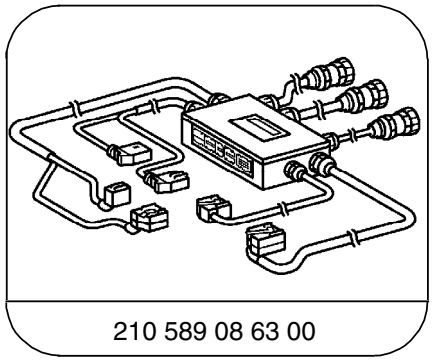
201 589 00 99 00

Electrical connecting set



129 589 00 21 00

126-pin socket box



210 589 08 63 00

145-pin test cable

Conventional tools, test equipment

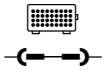
Description	Brand, model, etc.
Multimeter [1)]	Fluke models 23, 83, 85, 87
Stop watch	Local purchase
Measuring glass (1 liter minimum)	Local purchase

1) Available through the MBUSA Standard Equipment Program.

Hydraulic Test Program – Test (Fuel Pump Test)

Preparation for Test:

1. Review 11, 21, 22, 23, 24, 31, 33,
2. Review section O,
3. Connect socket box to engine control module (N3/10).

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy [1]
1.0		**Fuel pump** Delivery capacity	N3/10  3 (3A) 21 (29C)	Disconnect fuel return hose from fuel line and place end in measuring glass. Ignition: **ON**	1 liter of fuel within 35 seconds.	Check fuel lines for restrictions (kinks and dents). Replace fuel filter, ⇒ 2.0
2.0		**Fuel pumps** Current draw		**On Model 202:** Disconnect fuel pump relay module and connect multimeter to sockets 1 and 3. **On Model 170:** Disconnect connector B of relay module and connect multimeter to sockets 1 and 3. Ignition: **ON**	5 – 9 A	Fuel pump.

[1] Observe Preparation for Test, see 33.

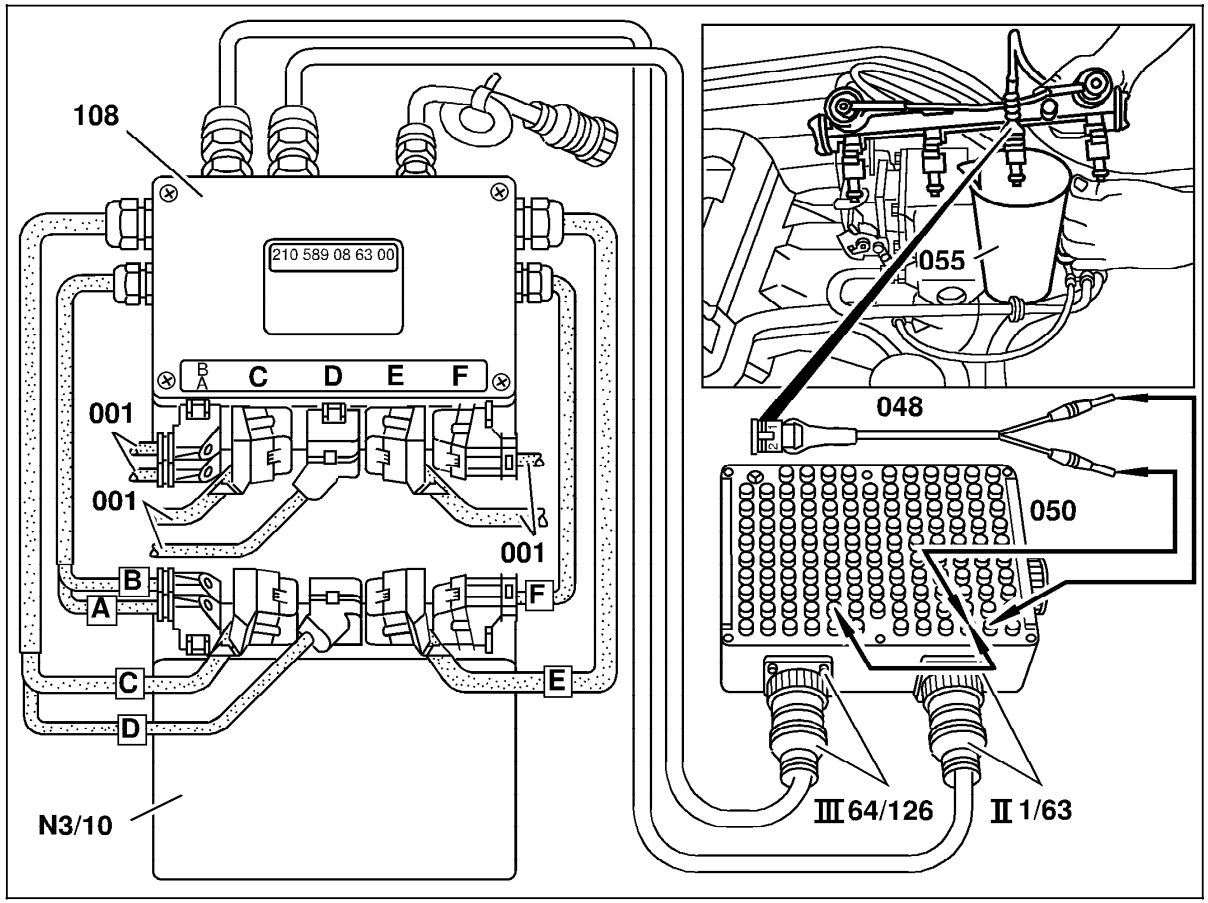
Hydraulic Test Program – Preparation for Test (Injector Test)

Preparation for Test

1. Review section 0,
2. Review 11, 21, 22, 23, 24, 31, 33,
3. Fabricate test harness for checking injectors, see WF58.50-P-0761-01A
4. Connect socket box tester to engine control module (N3/10).
5. Disconnect 2-pole connectors on injectors.
6. Remove fuel rail with injectors, thereby **not** disconnecting the fuel feed and return lines.
7. Connect self-made harness (048) to each injector one after another.
8. Hold each injector in measuring glass one after another.

Note:

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



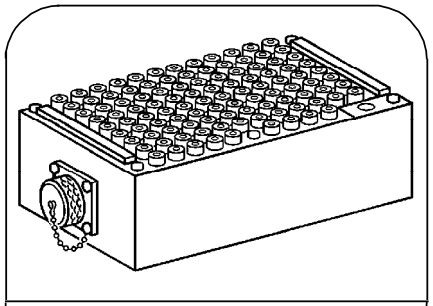
P07.61-0271-06

Figure 1

001 Engine control module
048 Self made harness
050 Socket box tester, 126 pole
055 Measuring glass
108 Test cable
N3/10 Engine control module (ME-SFI)
A-F Connectors
III64/126 and II1/63:
Connector descriptions on socket box and test cable

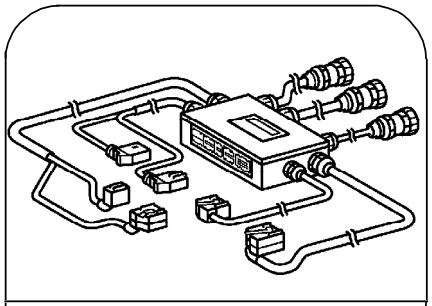
Hydraulic Test Program – Preparation for Test (Injector Test)

Special Tools



129 589 00 21 00

126-pin socket box



210 589 08 63 00

145-pin test cable

Conventional tools, test equipment

Description	Brand, model, etc.
Measuring glass (1 liter minimum)	Local purchase

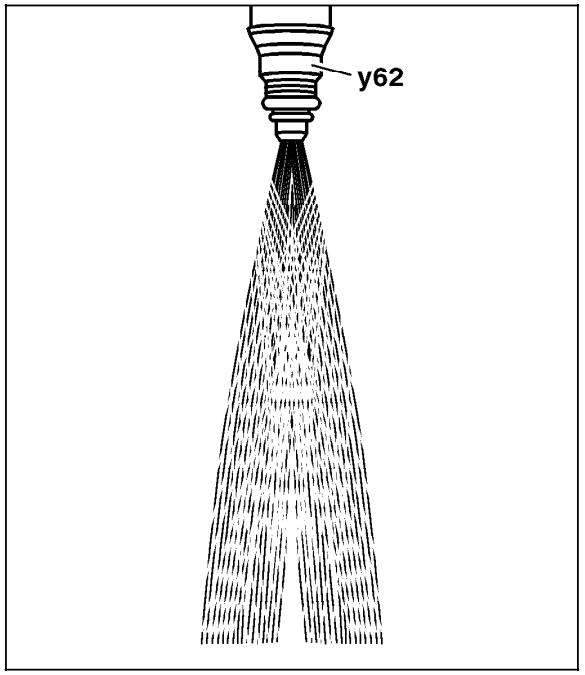
Hydraulic Test Program – Test (Injector Test)

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/remedy
1.0		**Injectors** Leakage test	N3/10 3 (3A) — 21 (29C)	Fuel rail and fuel injectors removed. Ignition: **ON**	Injectors must not drip.	Replace any dripping injectors, ⇒ 2.0
2.0		**Injectors** Operation and spray pattern test	N3/10 3 (3A) — 21 (29C)	Ignition: **ON** Hold each injector (one after another) into a container and, using the self-made test harness, manually activate the injector by connecting harness banana plugs to socket box sockets 3 (–) and 2 (+).	Injectors must spray evenly (Figure 1).	Replace defective injectors.

Hydraulic Test Program – Test (Injector Test)

Figure 1

Y62 Injector
Good spray pattern



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