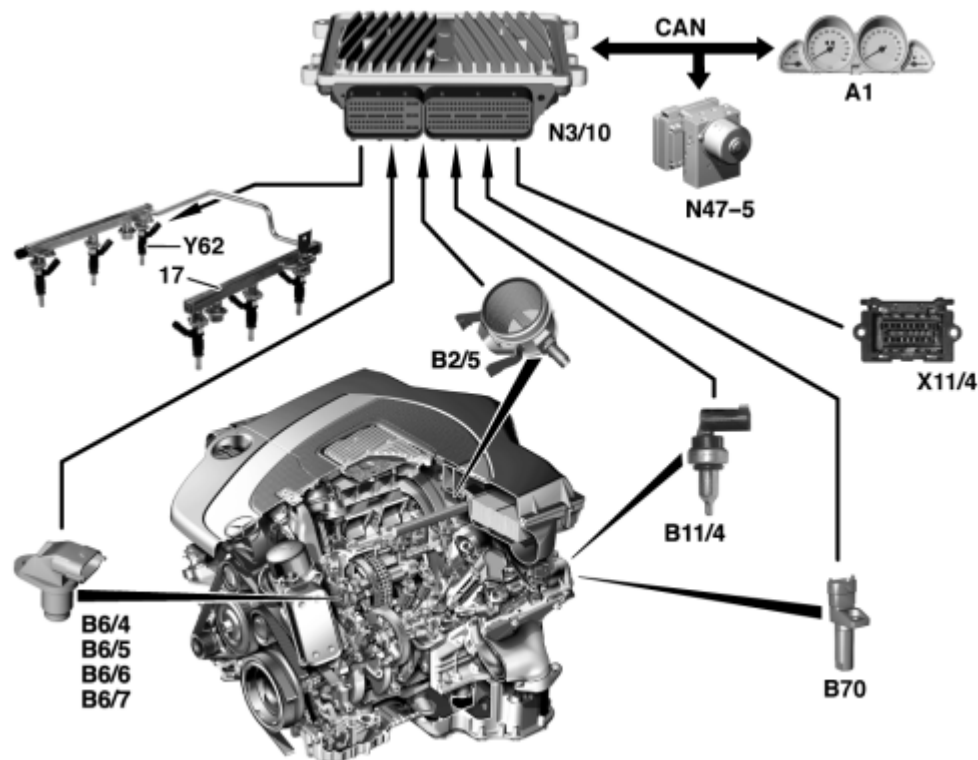| GF07.61-P-3034V	The smooth engine running analysis function	2.3.04

ENGINE 272.967 in MODEL 164.1
ENGINE 273.923 /963 in MODEL 164.8

P07.61-3078-06

Shown on engine 272.963 in model 171

17 Fuel rail

A1 Instrument cluster
B2/5 Hot film MAF sensor
B6/4 Left intake camshaft Hall sensor
B6/5 Right intake camshaft Hall sensor
B6/6 Left exhaust camshaft Hall sensor
B6/7 Right exhaust camshaft Hall sensor

B11/4 Coolant temperature sensor
B70 Crankshaft Hall sensor
N3/10 ME-SFI [ME] control unit
N47-5 ESP and BAS control unit
X11/4 Data link connector
Y62 Fuel injection valves

CAN Data bus

To protect the catalytic converters from thermal overload through combustion misfirings and in order to keep the exhaust emission

values, the engine operation is continuously monitored. If the smooth engine running analysis in the ME-SFI [ME] control unit detects combustion misfiring, the fuel injection valves affected are no longer actuated after a certain number of misfiring.

The following combustion misfiring causes are detected:
- Ignition system
- control unit
- Engine, mechanical aspects (e. g. fresh air, valve seat, valve springs)
- Fuel shortage

Smooth engine running signal
A Engine running without misfiring, acceleration values within tolerance range (up to approx. 3 m/s2)
B Engine running with misfiring, acceleration values too high
C Misfire counter (starting of misfire detection)
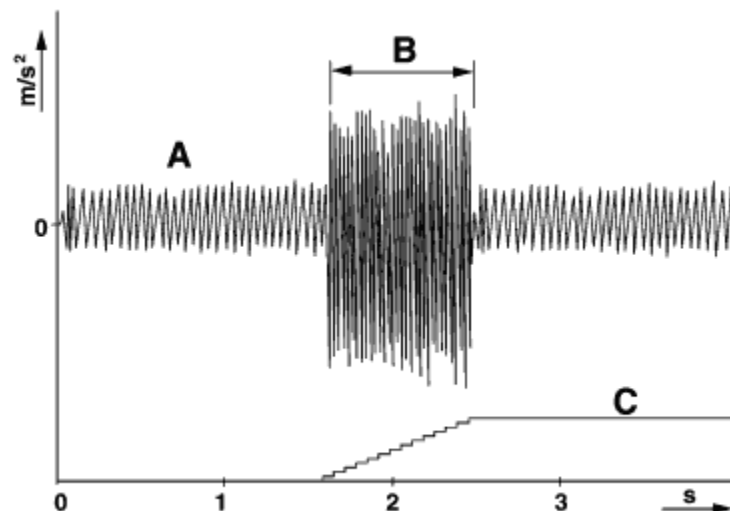
P07.61-2092-11

For the smooth engine running analysis the signal supplied by the Hall sensor is analyzed exactly in respect of time uniformity between the individual combustions by means of a comprehensive mathematical method.
Each individual combustion must produce a characteristic acceleration at the flywheel.
In case of combustion misfirings, the flywheel mass rotates slightly slower until the next ignition (short variations in torque).

The following factors are taken into account:
- Engine speed, engine load
- Engine temperature
- Recognition of uneven road surface
- Synchronization of fuel injection and firing order
- Fuel reserve signal
- Sensor wheel adaptation takes place.

1. Engine speed, engine load
A comparative value for the time between two combustions is calculated from these two parameters.

2nd Engine temperature
If engine is cold, several combustion misfires are allowed temporarily.

3rd Recognition of uneven road surface
The wheel speed signal is sent via the CAN databus from the traction systems control unit (even run).
On poor road surfaces (washboard roads) the smooth engine running analysis is set less sensitive. Vibrations transmitted through the drive train may have a negative influence on the smooth operation analysis at certain engine speeds and load states.

4th Synchronization of fuel injection and firing order
The cylinder recognition is required for storing and -evaluation.

5th Fuel reserve signal
If combustion misfires are detected, a fault is stored if the fuel tank level is too low. Combustion misfires due to fuel starvation are detected via this additional information.

6. Sensor wheel adaptation
After sensor adaptation is performed, the smooth engine running analysis becomes more sensitive and can be adapted to the specific smooth running properties of the engine.
During a deceleration phase (uniform smooth running) the smooth running analysis stores the particular smooth running properties of the engine. These are required as a comparison parameter for misfire detection.

Misfire counter
The following information is entered in the fault memory:
● Total of all misfirings
● Misfiring of specific cylinders
● Misfiring at "emission limit"
● Misfiring "harmful to TWC"

	Component description for the ME-SFI [ME] control unit		GF07.61-P-6000V
	Component description for the crankshaft Hall sensor		GF07.04-P-6220V
	Component description for the camshaft Hall sensor		GF07.04-P-6020V
	Component description for the coolant temperature sensor		GF07.04-P-6040V
	Component description for the fuel injection valves		GF07.03-P-6010V
	ME-SFI synchronization for the fuel injection and firing order function		GF07.61-P-4009V

ME fuel reserve signal function		GF07.61-P-4024V