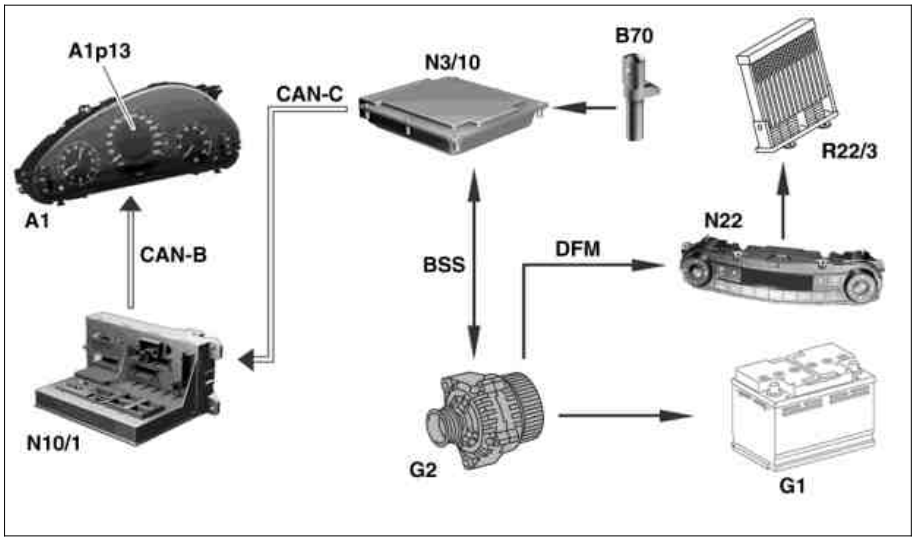
ENGINES 271 in MODEL 171, 203 up to Model Year 08 /Modification Year 07
valid with engine control unit variant SIM 4 only
ENGINES 275 in MODEL 221, 216, 230 up to Model Year 08 /Modification Year 07
valid with engine control unit variant ME 2.7.1 only
ENGINES 285 in MODEL 240
only valid with engine control unit variant ME 2.7.1
ENGINES 628 in MODEL 163, 211, 220
only valid with engine control unit variant CDI V1
ENGINES 646 in MODEL 203 up to Model Year 08 /Modification Year 07
valid with engine control unit variant CDI 3 (UP) only
ENGINES 648 in MODEL 211, 220
only valid with engine control unit variant CDI 3 (UP)
ENGINES 271 in MODEL 209, 211
valid with engine control unit variant SIM 4 only
ENGINES 646 in MODEL 209, 211
valid with engine control unit variant CDI 3 (UP) only

Shown on model 211 with engine 271

Networking



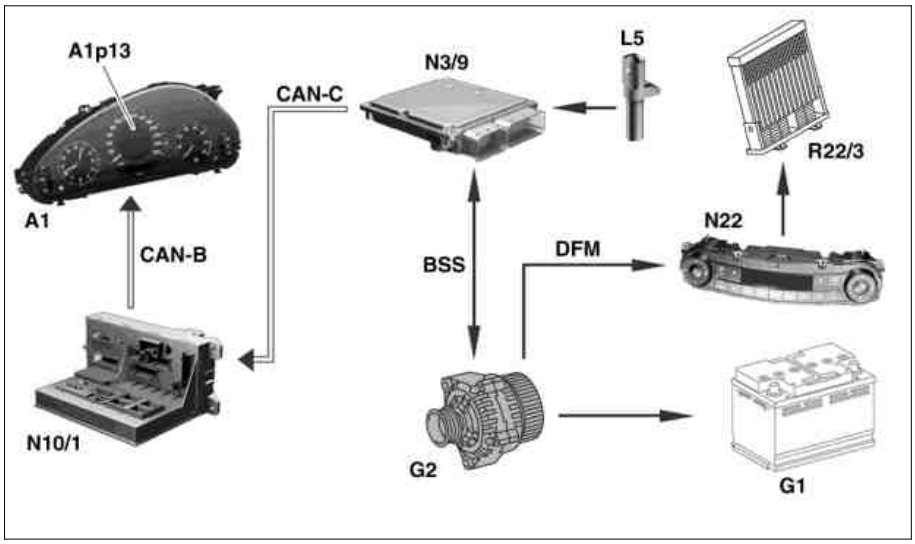
P15.40-2375-05

A1 *Instrument cluster*
A1p13 *Multifunction display*
B70 *Crankshaft Hall sensor*
G1 *Battery*
G2 *Generator*
N10/1 *Driver-side SAM control unit with fuse and relay module*
N22 *AAC [KLA] control and operating unit*
R22/3 *Heater booster*
N3/10 *ME-SFI [ME] control unit*

DFM *Dynamo Field Monitor signal*
BSS *Bit synchronous data interface*
CAN-B *Controller Area Network bus, class B (interior compartment) (CAN B)*
CAN-C *Controller Area Network, bus Class C (engine compartment) (CAN-C)*

Shown on model 211 with engine 648

Networking



P15.40-2374-05

A1 *Instrument cluster*
A1p13 *Multifunction display*
G1 *Battery*
G2 *Generator*
L5 *Crankshaft position sensor*
N10/1 *Driver-side SAM control unit with fuse and relay module*
N22 *AAC [KLA] control and operating unit*
R22/3 *Heater booster*
N3/9 *CDI control unit*

DFM *Dynamo Field Monitor signal*
BSS *Bit synchronous data interface*
CAN-B *Controller Area Network bus, class B (interior compartment) (CAN B)*
CAN-C *Controller Area Network, bus Class C (engine compartment) (CAN-C)*

General
When the engine is running, the alternator supplies the on-board electrical system with electrical energy and charges the battery. For this purpose, the alternator generates three-phase current which is rectified. A bit synchronous data interface is used as the alternator interface between the ME-SFI [ME] control unit or CDI control unit and the alternator. The data rate between the engine control unit and alternator is up to 1250 bit/s.

Function and task
Messages between the engine control unit and the alternator are exchanged via the alternator interface. This follows the master-slave principle. The engine control unit is the master and the alternator acts as the slave. The alternator only sends when it is requested to do so by the master. The following tasks are performed:

- Switching on of the alternator after the engine has been started, and regulation of the alternator according to the information stored in the engine control unit. To do this, the control voltage is preset by the engine control unit.
- Protecting the alternator against overheating.
- Delayed adaptation of the regulation voltage in the case of a major change in alternator load.
- Generation of terminal 61 (information "alternator is turning") in the engine control unit.

The alternator constantly performs self-diagnosis and sends the results when requested to the engine control unit. The engine control unit compares them with other signals (e.g. engine speed, battery voltage and time after engine start) and detects the following faults:

- Electrical and mechanical faults at the alternator (regulator or diodes defective, stator interruption or short circuit, exciter interruption, regulation voltage and charging current may not be achieved, regulation voltage too high, cracked or loose poly-V belt).
- Short circuit or open circuit at output terminal 61 of engine control unit.
- Line for the alternator interface interrupted between engine control unit and alternator. With this fault, the alternator operates using its fixed parameters. A regulation voltage of approx. 14.3 V is predefined.

The DFM connection outputs a signal which indicates the capacity utilization of the alternator.

This signal is used for electrical control of the engine heater booster. In model series 211, the AAC [KLA] control and operating unit evaluates the signal and regulates the heater booster according to the alternator load condition.

Networking
The engine control unit uses the alternator interface to control the control response of the alternator in order to reduce, in idle, the generator torque which is produced at a high power output. As a result of the reduced engine load, less fuel is injected and the exhaust characteristics are optimized.
Terminal 61 is simulated in the control unit using the information which the ME-SFI [ME] engine control unit or CDI engine control unit receives via the alternator interface. This information is supplied to the driver-side SAM control unit with fuse and relay module via Controller Area Network bus class C or via a signal line.

The driver-side SAM control unit with fuse and relay module conditions the signal and makes it available to the instrument cluster via Controller Area Network bus class B.

i The upper limit value of the regulation voltage can be up to approx. 15 V.

Engine speed
Depending on the variant, the pulses from the Hall sensor or position sensor on the crankshaft are read in by the ME-SFI [ME] control unit or CDI control unit.
The control unit relays the "engine speed" (in rpm) message onto the CAN-C.

Diagnosis
The following faults are detected after "ignition ON" and may be stored as a fault entry in the ME-SFI [ME] engine control unit or CDI engine control unit:

- Alternator interface defective
- Line interruption (circuit 30)

The following faults are detected after "engine start" and may be stored as a fault entry in the ME-SFI [ME] engine control unit or CDI engine control unit:

- Electrical fault at alternator
- Mechanical fault at alternator
- Line interruption (circuit 30)
- Undervoltage and defective alternator interface

The "battery symbol" and the "Visit workshop" message also appear in the multifunction display in the instrument cluster.

This fault message in the multifunction display in the instrument cluster can also be triggered by information from the following control units:

- Battery control unit (N82)
- EIS [EZS] control unit (N73)

i If malfunctions occur, always perform an alternator diagnosis using the diagnosis assistance system (DAS).

Emergency running
If the communication between the alternator and engine control unit is interrupted, the alternator continues to run at its fixed default parameters during normal engine operation.

The test prerequisites for the alternator test are listed in the DAS and must always be observed. The test itself is a test routine and is menu-assisted.

Emergency start
The alternator has an emergency start function. If the communication between the alternator and engine control unit is interrupted, the alternator can, depending on the rotational speed, generate a voltage from the residual magnetism.
If, on the basis of the voltage and frequency, the regulator detects that the alternator is rotating, it automatically begins energization of the field and enters regulation mode.
Limitations:

- The "regulation OFF" command from the control unit interrupts this emergency running state.
- Precise specification of the starting speed for the emergency start function is not possible.

	On-board electrical system power supply Location of components		GF15.40-P-0001-02AA
	Component description for the alternator		GF15.40-P-2000A