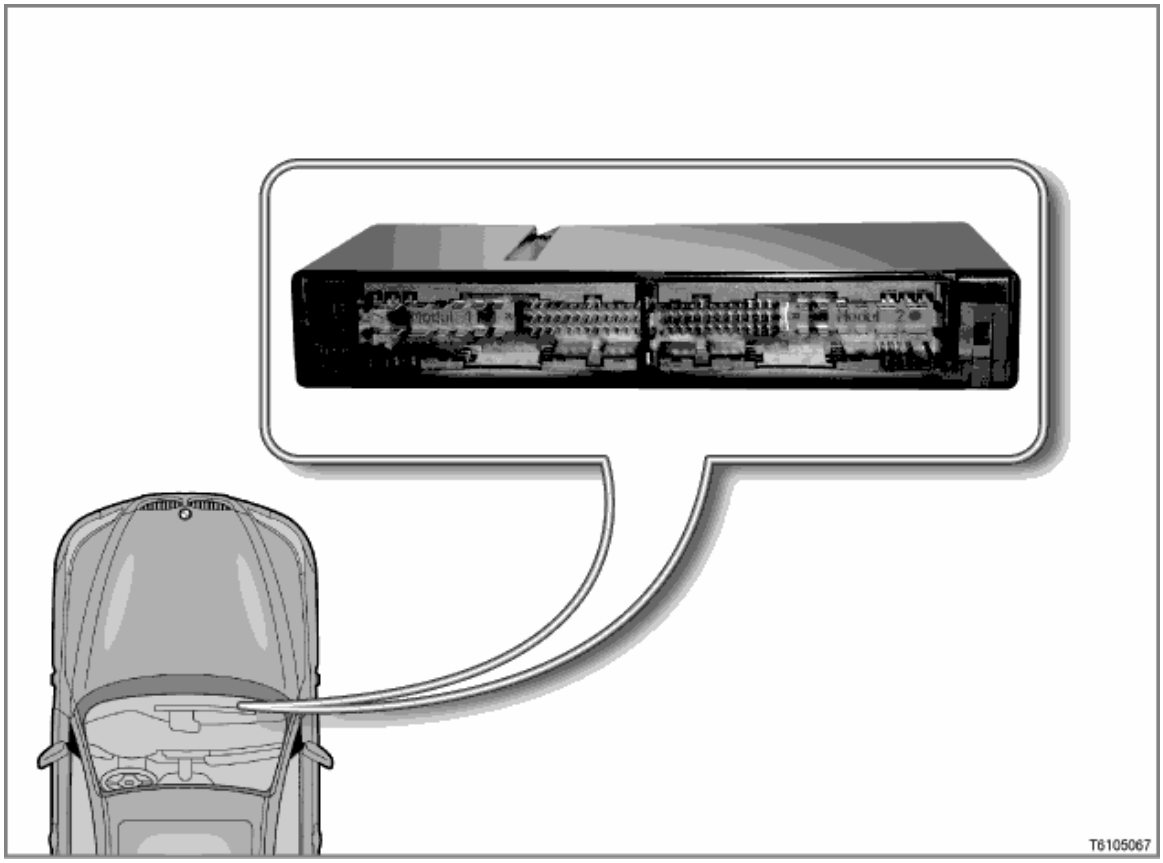
Body-gateway module

E60, E61, E63, E64



Introduction

The system network of the E60, E61, E63, E64 will change as from 09/2005.
As a result of the change, some control units will no longer be installed and some control unit functions will be integrated in new control units.
The new body-gateway module (KGM) replaces the safety and gateway module (SGM), the door modules and the micro-power module installed to date.
[System overview ...]

Brief description of components

The body-gateway module (KGM) combined many functions in one control unit.
Control functions for following systems are integrated in the body-gateway module:

- Exterior mirrors
- Entrance light, front
- Power windows, front
- Micro-power module
- Servotronic
- Central locking, front

[more ...]

System functions

Depending on the equipment configuration, the body-gateway module can control the following functions or register signals (in alphabetical order):

- **Door mirrors**

  The body-gateway module (KGM) controls the functions of the outside mirrors in the basic version and with optional additions.

  - Basic version of outside mirror
    (only mirror heating and mirror adjustment)

    The body-gateway module directly activates the motors for horizontal and vertical mirror adjustment.

    The body-gateway module directly actuates the mirror heating.
  - Outside mirror with optional equipment
    (mirror memory, automatic kerb viewer, electrochromic outside mirror, mirror folding function, courtesy lighting)

    The body-gateway module controls the control electronics in the outside mirror via the LIN-bus if the outside mirror is equipped with one of these items.

  [more ...]

- **Bistable relay**

  The bistable relay and micro-power module have been integrated in the body-gateway module. In the event of closed-circuit current transgressions, the body-gateway module disconnects the electric loads from terminal 30g-f via the bistable relay (closed-circuit current transgression: when the vehicle does not assume the rest status).

  The following electric loads are connected to terminal 30g-f (power supply, front, fuses F34 to F41):

  - CA: Comfort Access
  - CDC: CD changer
  - JNAV or KNAV: Navigation system Japan or navigation system Korea
  - COMBI: Instrument cluster
  - M-ASK / CCC: Multi-audio system controller / Car Communication Computer
  - SZL: Steering column switch cluster
  - TCU or ULF: Telematics Control Unit or universal charging and hands-free device

  Switch-on conditions:

  The bistable relay is activated (contact closed) under one of the following conditions:

  - Connecting the battery
  - Unlocking the vehicle
  - Change in status of door contacts or boot lid
  - Terminal R ON

  Conditions required for switch-off:

  A CAN message requests the loads to switch off if the closed-circuit current is too high and the starting capability limit of the battery is reached (afterrunning time approx. 2 minutes).
  If the closed-circuit current is still too high after the afterrunning time has elapsed, a reset is performed for approx. 10 seconds prior to final shut-down. This reset is performed to eliminate any malfunctions in the control units connected to the bistable relay.

  The closed-circuit current is monitored again after the reset. The bistable relay is no longer activated (contact opened) if there is still a closed-circuit current transgression.

  Shut-down or reset is entered in the info memory of the body-gateway module.

- **CAS: Car Access System**

  The CAS controls the access options to the vehicle. The CAS control unit is, amongst other things, the master for the central locking system, the electronic immobiliser and the electrical steering lock.

  The CAS is connected via the K-CAN to the body-gateway module (KGM).

- **Door entry lighting**

  Control of the door entry lighting at the front is distributed over two control units (KGM, KBM). The basic body

module (KBM) is the master control unit for the door entry lighting. The KBM sends a CAN message to the body-gateway module (KGM).
In turn, the KGM activates the door entry lights at the front (driver's and passenger's side).

The door entry light is located in the bottom area of the front door. The door entry lighting illuminates the ground outside the vehicle in the area of the front door. The door entry lighting switches on or off when the front door is opened or closed.

- **Electrochromic rear-view mirror**

The electrochromic rear-view mirror has 2 sensors that measure incident light from the front and the rear. A voltage signal is output (the strength of which depends on the difference in intensity between the light from the front and the rear) if the light from the rear is more intense. The greater the voltage signal the more the interior rear-view mirror and the outside mirrors are darkened. The body-gateway module (KGM) receives the voltage signals. The electrochromic outside mirrors are controlled by the KGM via the LIN bus.

Signal path:

Electrochromic interior rear-view mirror -> direct cable -> KGM -> LIN-bus -> Electrochromic outside mirror

- **Energy history memory**

The energy history memory is important for energy diagnosis.

The energy history memory records vehicle operating cycles, e.g. every time control units are woken or wake up, sleep mode is prevented etc.
The vehicle operating cycles are stored together with the kilometre reading, time and cause, making it possible to identify the defective control unit in the case of closed-circuit current transgressions.

- **Front power windows**

All the power windows can be operated via the switch cluster in the driver's door. The body-gateway module (KGM) controls only the front power windows. The rear power windows are controlled by the basic body module (KBM).

The car access system (CAS) is the master control unit for the power window function. The KGM is connected to the CAS via the K-CAN.

The KGM evaluates the signals from the front power window switches and the signals from the switch cluster in the driver's door.

The KGM controls and monitors the front power windows.

The KGM receives signals from following components:

- Power window switches in the switch cluster in the driver's door (via LIN-bus)
- Power window switch in the front passenger door

  The power window switch is connected directly to the KGM.
- Hall sensors in the power-window motors

  2 Hall sensors are integrated in each of the power window motors at the front. The direction of rotation, speed and position can be determined through these.
- Remote control (auto-remote opening and auto-remote closing)

  The windows and slide/tilt sunroof can be opened and closed with the remote control. The radio signals from the remote control are received by the remote control receiver and transferred to the CAS control unit. The CAS is connected to the KGM via the K-CAN.

The KGM controls following actuators:

- Power window motor in the driver's door
- Power window motor in the front passenger's door

- **Gateway (= date interface)**

The KGM is the data interface for following bus systems:

- Body CAN
- Powertrain CAN

- LIN-bus

The diagnostic cable is connected to the KGM.

- **Driver's door switch cluster**

The driver's door switch cluster is connected to the KGM via the LIN-bus (LIN-bus stands for "Local Interconnect Network Bus"; KGM stands for "Body-gateway module"). All the power windows as well as the outside mirrors can be operated via the switch cluster in the driver's door.

- Child safety lock switch

  The child safety lock is activated/deactivated by the child safety lock switch in the switch cluster. The child safety lock inhibits operation of the rear power windows via the rear power window switches.

  The child safety lock of the power windows is controlled by the CAS. The KGM only reads in the status of the child safety lock switch and activates the LED in the child safety lock switch (LED ON = child safety lock activated).

- **Servotronic valve**

The body-gateway module (KGM) control the Servotronic valve.

The Servotronic controls the degree of assistance provided by the hydraulic steering as a function of the vehicle's speed. The flow of hydraulic fluid is restricted to a greater or lesser extent depending on how the Servotronic valve is actuated. Restriction of the flow depends on the current actuating the Servotronic valve.

The Servotronic valve is activated only when the engine is running.

Note: On vehicles with active steering.

In connection with the option SA 217 "Active steering", the control unit for the active steering activates the Servotronic valve.

- **Door contacts (Hall sensors)**

The KGM receives signals from the door contact of the driver's door and from the door contact of the passenger's door. The KGM makes available the signals to other bus users in the system network. The antitheft alarm system (DWA), for instance, requires the signals for the purpose of monitoring the doors.

- **Courtesy lighting**

The courtesy lighting is integrated in the outside mirror.

The request to switch the courtesy lighting on and off is sent in the form of a CAN message

from the basic body module (KBM) to the KGM. The body-gateway module (KGM) actuates the courtesy lighting via the LIN-bus.
The courtesy lighting switches on when the door is unlocked via the remote control. The courtesy lighting also switches on every time the door is opened.

After closing the door, the courtesy lighting switches off via an automatic timing function. The courtesy lighting is no longer activated as from terminal R ON.

- **Central locking, front**

Control of the central locking is distributed over three control units (CAS, KGM, KBM). The car access system (CAS) is the master control unit for the central locking. The body-gateway module (KGM) controls the central locking of the front doors. The body basic module (KBM) controls the remaining central locking functions.

The KGM receives signals from following components:

- Central locking button

  The central locking button allows the vehicle to be locked/unlocked from the passenger compartment. The fuel filler flap is not locked.

  The central locking button is located in the centre console between the central air vents.

  Signal path:

  Central locking button -> Direct cable -> CAS -> K-CAN -> KGM

- Remote control

  The remote control can be used to unlock and lock/deadlock the vehicle via an interface. The radio signals from the remote control are received by the remote control receiver and transferred to the CAS control unit.

Signal path:

Remote control -> Remote control receiver -> Direct cable -> CAS -> K-CAN -> KGM

- Driver's door lock barrel

  The driver's door lock barrel allows manual locking/deadlocking and unlocking of the vehicle. If the vehicle's electrical system fails, the driver's door can be unlocked manually using the key integrated in the remote control.

The KGM controls activation of all central locking drive units at the front.

Two motors for the central locking drive units are integrated in each door lock (high-speed motors with connected gear unit).
The locking mechanism can be brought into the following position by the motors:

- Lock: The door can still be opened from the inside
- Deadlock: The door cannot be opened from the inside or from the outside
- Unlock: The door can be opened from the inside and outside

Notes for service staff

Service staff should note the following points:

- General information: ---
- Diagnosis: ---
- Encoding/programming: ---

Subject to change.