E63/E64 Seat heating

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Installation location

The heating mats of the heating system are integrated in the seat cover. The electronic circuits and push-buttons necessary for operating the seat heating system are integrated in the centre console switch cluster (SZM).

Construction

The seat heating system consists of a carbon fibre net integrated in the seat covers. The heating mats are also integrated in the thigh support and side sections of the seats. The head restraint (headrest) is not heated. There is a direct line from the centre console switch cluster (SZM) to the heating mats for control purposes. A temperature sensor in the seat measures the current temperature.

Key	Explanation	Key	Explanation
1	Temperature sensor in seat cushion	2	Heating mat in seat cushion
3	Heating mat in thigh support	4	Heating mat in side sections of seat cushion
5	Heating mat in side sections of backrest	6	Heating mat in backrest
7	Seat upholstery and backrest upholstery	8	Head restraint
9	Seat frame	10	Thigh support

How it works

The heating mats for the driver's seat and passenger's seat are controlled separately. The heating stage is selected with the seat heating switches in the centre console switch cluster. The seat heating is operational as from terminal 15 ON. The heating stage is selected by pressing the seat heating switch several times. 3 green light emitting diodes (LEDs) above the seat heating switches indicate the status of the seat heating system.

Operate the seat heating systems as described in the Owner's Handbook.

Note: The seat heating is interrupted when steering column adjustment is activated.

The seat heating is interrupted in order to protect the centre console switch cluster (SZM). The current at

the centre console switch cluster would be too high if the seat heating and steering column adjustment were operated simultaneously, posing a risk of irreparable damage to the electronic circuitry.

The seat heating system features the following functions:

- Seat heating ON and OFF
- Seat heating temperature control
- Monitoring of temperature sensor
- Seat heating output management
- Overvoltage/undervoltage detection
- Short-circuit detection
- No-load detection
- Plausibility check of temperature profile

Seat heating ON and OFF

Separate seat heating switches (push-buttons) in the centre console switch cluster (SZM) control heating stages for the driver's seat and passenger's seat as follows:

- Switch briefly pressed 1x: Seat heating stage 3 ON > 3 LEDs ON
- Switch briefly pressed 2x: Seat heating stage 2 ON > 2 LEDs ON
- Switch briefly pressed 3x: Seat heating stage 1 ON > 1 LED ON
- Switch pressed 1x long: Seat heating OFF > LEDs OFF
  The seat heating can be switched off in any stage by pressing the button for longer than 1.2 seconds.
  The LED indicators are located above the seat heating switch.

Seat heating temperature control

An electronic temperature control circuit is integrated in the centre console switch cluster (SZM). A temperature sensor is integrated in the heating mat for the purpose of registering the seat temperature.
The seat heating is deactivates at terminal 15 OFF. The selected heating stage remains stored for a further 15 minutes. The seat heating is activated and operated at the heating stage last selected at terminal 15 ON.
The heating stage currently activated is indicated by the number of illuminated LEDs.

Monitoring of temperature sensor

The temperature sensor is permanently monitored. The seat heating and LEDs are switched off immediately if a short circuit or line break (open circuit) is detected. The system can be switched on only by means of the seat heating switch.
The seat heating is deactivated when a short-circuit or an open circuit is detected in the temperature sensor. The LED lights briefly before the electronic module switches off. The seat heating can then be reactivated. The temperature sensor is checked again.
Temperature and resistance values (in °C and KΩ):

- R > 255 k Ω (Temperature = -40 °C) => sensor open circuit
- 0.398 k Ω < R <255 k Ω => sensor OK
- R < 0.398 k Ω (temperature = 100 °C) => short-circuit

Seat heating output management

If there is a drop in the vehicle's system voltage, the heating output is correspondingly adapted in 4 stages as follows:

- "No reduction", normal unrestricted operation
- "25 % reduction", when heating stage 3 is set the system uses heating stage 2. However, the LED indicating stage 3 remains on. The system switches back to heating stage 3 when the heating output management signals "no reduction".
- "50 % reduction", seat cushion and backrest with side sections are heated at half capacity. The system switches back to 100 % heating output when the heating output management signals "no reduction".

- "Heating deactivated", the LED for the selected heating stage remains switched on. The seat heating is reactivated when the heating output management signals "no reduction".

Overvoltage/undervoltage detection

- **Behaviour in the case of undervoltage**
  The seat heating is switched off when the supply voltage for the centre console switch cluster (SZM) drops below a value between 11.0 V and 11.8 V for more than 5 seconds. The current seat heating setting is retained. The seat heating can be switched on again only when the voltage value is higher than 11.8 V to 12.6 V for longer than 4 seconds. The seat heating switch can be used to select the heating stage and switch off the system.
  The LED remains on. The time limit of 5 seconds restarts when the seat heating is deactivated as the result of undervoltage being detected and then reactivated.

- **Behaviour in the case of overvoltage**
  The seat heating is deactivated immediately when the supply voltage for the centre console switch cluster (SZM) exceeds a value between 15.9 V and 16.7 V for longer than 0,1 seconds. The seat heating LED is switched off.
  The seat heating and the LED indicator are not switched on again automatically when the normal voltage range from 11.8 V to 16.6 V is re-established. The LED may light briefly before the electronics is switched off when the seat heating is deactivated as the result of an overvoltage and then switched on again.

Short-circuit detection

Actuation of the seat heating system is short-circuit-proof with respect to terminal 30 (battery positive terminal). The heating mats and LEDs are deactivated in response to a short-circuit. They can be switched on again only by means of the seat heating switch. The seat heating is also switched off as the result of increased power intake due to a defective heating mat.

No-load detection

The LED cannot be activated when a heating mat is not connected or there is a break in the wiring (open-circuit).

The LED lights briefly when the seat heating is deactivated and briefly reactivated in the event of a short-circuit, the heating mat not connected or a break in the wiring. Consequently, the electronic circuitry switches off the seat heating system.

Plausibility check of temperature profile

A plausibility check is performed only at a seat temperature of 30 °C or less. This prevents the temperature in the backrest increasing to impermissibly high levels.
After the seat heating has been activated, the electronic circuitry expects a temperature increase at the temperature sensor. The seat heating is switched off immediately when the seat temperature is lower than 30 °C and no increase in the temperature value is measured within 255 seconds.
The LED is also switched off.