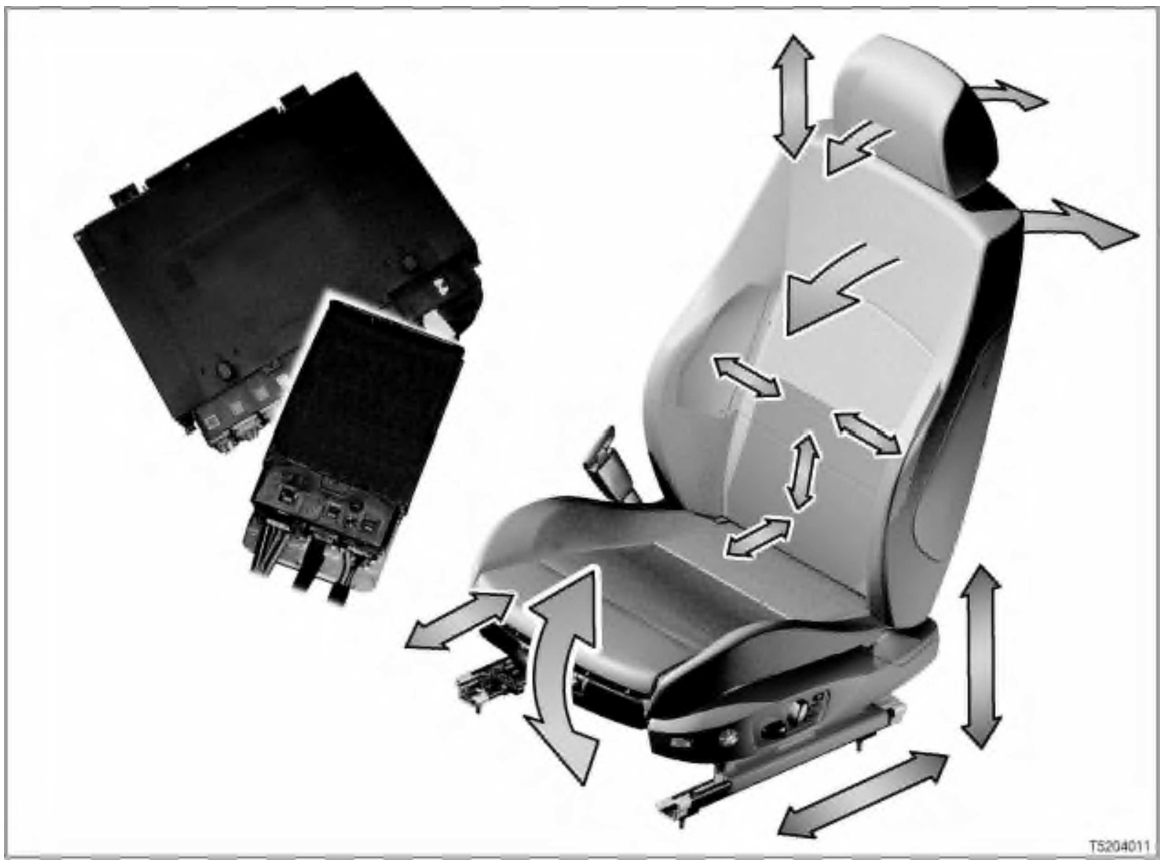
Electrically adjustable seats

E87, E90, E91



Introduction

With the basic variant, manually adjustable seats are fitted on the E87, E90, E91. Electric seats are available with the following special equipment packages:

- Option 488 "Lumbar support for driver's seat and front passenger's seat"
- Option 494 "Seat heating for driver's seat and front passenger's seat"
- Option 481 "Sports seats for driver's seat and front passenger's seat"
- Option 459 "Electric seat adjustment for driver's seat and front passenger's seat with memory for driver's seat"

The sports seat option includes electric seat back width adjustment.
[system overview]

Brief description of components

The system features the following switches and sensors:

- **Seat adjustment switch block**

  The buttons for seat adjustment are installed on the outside edge of the seat cushion.
  The number of buttons and their functions depend on the options fitted.

- **Switch for lumbar-support adjustment**

  If lumbar support is fitted, the seat will have a rocker switch on the outside of the front.

- **Switch for seat back width adjustment**

  If sports seats are fitted, the seat will have a rocker switch on the outside of the front.

- **Seat memory button**

Only the driver's seat features additional memory buttons for the seat memory.

- **Seat heating switch**

  The switches for the seat heating are located in the centre console switch cluster.

- **Hall sensors**

  Hall sensors are provided for identifying of the position of seats with seat memory.
  The sensors are integrated in the seat drive units.

- **Temperature sensor for seat heating**

  A temperature sensor is installed in each of the seat cushions for the seat heating.

The seats are controlled by the following control units and bus systems:

- **Seat module**

  The driver's seat module (SMFA) control unit is fitted with the special equipment "Electric seat adjustment for driver's seat and front passenger's seat with memory for driver's seat".
  [more ...]

- **Seat heating module**

  If there is no seat module installed, the seat heating module takes over control of the seat heating.
  The seat heating module is not recognised as a control unit in its own right. In other words, the seat heating module is also capable of diagnosis.
  [more ...]

- **JBE: Junction box electronics**

  The junction box electronics is the central gateway in the vehicle. The junction box electronics controls the seat heating

  [for further information, please refer to SI Technology (SBT) 61 05 04 095]

- **K-CAN: Body controller area network**

  K-CAN is a two-wire bus for communication between all control units connected to the K-CAN.

The following actuators are driven to perform the seat functions:

- **Seat heating**

  The seat cushion heating and backrest heating are installed such that they cover the entire area. Even the side sections and thigh supports are heated.

- **Seat adjustment drive units**

  The following drive units are installed in the seat:

  - Drive unit for fore-and-aft adjustment
  - Drive unit for seat height adjustment
  - Drive unit for seat cushion tilt adjustment
  - Drive unit for backrest angle adjustment

- **Lumbar support and seat back width adjustment**

  Seat back width adjustment and lumbar support each comprise the following components:

  - 2 air cushions (with lumbar support, the air cushions are called lumbar cushions)
  - Electrically controlled valves.

  Seat back width adjustment and lumbar support have the same electric lumbar support pump.
  [more ...]

The following displays provide seat status information:

- **Seat heating LEDs**

  3 light emitting diodes (LEDs) in the centre console switch cluster indicate the switched status of the seat heating system.

System functions

The system functions of the electrically operated seats include:

- Seat adjustment
- Seat heating

Seat adjustment

The seats fitted offer the following seat-adjustment options:

- Fore-and-aft adjustment (manual or electrically driven)
- Seat height adjustment (manual or electrically driven)
- Seat depth adjustment (manual only, sports seat only)
- Backrest angle adjustment (manual or electrically driven)
- Seat back width adjustment (electropneumatic using air cushions, sports seat only)
- Head restraint height adjustment (manual only)
- Head restraint angle adjustment (manual only)
- Adjustment of upper lumbar support (electropneumatic using lumbar cushion)
- Adjustment of lower lumbar support (electropneumatic using lumbar cushion)

All these functions are actuated by the buttons on the outside of the seat cushion. Signals from the respective button trigger seat adjustment in the required directions.

Each drive unit is switched off when a certain threshold has been reached in order to reduce the load on the electric drive units to a minimum.

With the special equipment "Electric seat adjustment for driver's seat and front passenger's seat with memory for driver's seat" the end stop is calculated for each drive unit. Hall sensors integrated in the drive units register the adjustment distances which are processed in the seat module. In the event of the drive unit blocking, the detected position value is interpreted as the end stop. All subsequent adjustments are interrupted just before this point.
Once the obstruction has been removed, adjustment can again extend beyond the newly detected end stop For this to happen, the seat adjustment button must be pressed again.

If the "Seat memory" option is not installed, there will be neither a seat module nor Hall sensors fitted. End stops are not stored with this equipment variant. The seat is adjusted until it reaches an end position. The junction box electronics (JBE) recognises the increased power draw of the respective drive unit at the end position. If the power draw exceeds a defined limit value, the JBE will switch this drive unit off.

A separate rocker switch is used to operate the lumbar support. An electric lumbar support pump supplies the lumbar cushions with compressed air. The individual air chambers are filled or emptied via several valves in order to vary the height and thickness of the lumbar support.

The seat back width adjustment is controlled by an additional rocker switch in the same way as lumbar support. An electric lumbar support pump supplies the air cushions with compressed air. The individual air chambers are filled or emptied via several valves
In this way the seat back width can be adjusted.

Seat heating

The seat heating system heats the seat cushion and backrest including the side sections.
The driver's seat and front passenger's seat each have a seat-heating switch in the centre console switch cluster (SZM).

The junction box electronics (JBE) actuates the seat heating. The seat heating is activated by a pulse-width modulated signal (PWM signal) from the seat heating module. The seat heating module records the temperature in the seats via a temperature sensor. The seat heating module regulates the heat output according to the selected heater level.

In the event of fault developing, the seat heating module will report the fault to the JBE. The seat heating module indicates this with a pulsed short-circuiting in the signal wire. If the JBE detects a fault message, the heated seat will be switched off. The JBE will store a fault memory entry.

Switching on again will reactivate the heated seat.

With the option "Electric seat adjustment for driver's seat and front passenger's seat with memory for driver's seat", the seat heating module for the driver's side is replaced by the seat module. The seat module is connected to the K-CAN via the junction box electronics. The seat module automatically assumes control of the seat heating.
If a seat module is fitted, the junction box electronics is not responsible for adjusting the driver's seat.

The seat heating is operational as from terminal 15 ON.

3 LEDs located above the seat heating switches indicate the heating stage currently active in the seat heating system.

Notes for service staff

Service staff should note the following points:

- General information: ---
- Diagnosis: ---
- Encoding/programming: ---
- Car and Key Memory: ---

  Almost all Car & Key Memory functions are programmed inside the vehicle itself.
  (See "Personal Profile" in the Owner's Handbook: Individual settings for a maximum of 3 remote control units via the display in the instrument cluster or via the Central Information Display)

  [for further information, please refer to SI Technology (SBT) 00 08 04 108]

Subject to change.