

On-Board Monitor Control Panel (BMBT)

General

While the instrument cluster mainly indicates to the driver all important vehicle statuses, the on-board monitor is designed as an additional display for the driver and occupants. The indication and display system on-board monitor is intended to relieve the driver in selecting the most important indications/displays. The driving safety is not impaired since moving picture information (such as TV pictures) can only be seen when the vehicle is stationary. A further monitor for TV reception can be connected in the rear compartment.

Information relating to the vehicle, navigation, television, video recorder, video text, radio, telephone and sound can be shown in the on-board monitor.

The novel, additional display field contains following components:

- On-board monitor control panel (BMBT): The on-board monitor control panel consists of the individual parts keypad and cassette assembly. Keys and rotary knobs operated on the keypad are converted into I-bus signals. The cassette drive is controlled by the radio via I-bus commands. The on-board monitor control panel is additionally connected to the LCD monitor. The sole electrical connection between the on-board monitor and on-board monitor control panel consists of a connection line (PL line) serves the purpose of switching ON/OFF and brightness control of the monitor.
- On-board monitor (BM): The on-board monitor consists of an LCD screen mounted in the on-board monitor (BMBT). This screen serves to display on-board computer, navigation, TV, video and additional information. The on-board monitor receives all picture information from the video module (VM).
- Video module (VM): The graphic stage produces picture signals from various input signals (I-bus, navigation, TV/video) and transfers these signals to the monitor.

Note

Functionally, the LCD on-board monitor (BM) and the video module (VM) belong together. A separate diagnosis program "video module" is available to perform troubleshooting on these components!

Functions of the on-board monitor control panel (BMBT)

The electronic circuitry of the on-board monitor control panel (BMBT) collects information relating to key and rotary knob functions and makes it available on the I-bus.

During operation, light emitting diodes (LED) can be activated via I-bus data telegrams by the telephone, radio or by climate control electronics during independent heating.

The functions of the cassette drive are controlled by the on-board monitor control panel (BMBT). Activation of the cassette drive is triggered by I-bus commands from the radio.

The ambient brightness is measured by a phototransistor and, together with the information from the manual dimmer in the vehicle, the brightness of the LEDs and the button background lighting are controlled and a signal (PL signal) is produced for background lighting of the on-board monitor.

The on-board monitor control panel generates the operating voltages for keypad and cassette drive.

Operation of the on-board monitor control panel (BMBT)

Switching on:

The on-board monitor control panel (BMBT) is switched on as soon as the ignition lock is in position 1 or when the I-bus is active or when the "CLOCK" is pressed in ignition lock position 0.

Telephone button:

Sending and concluding a telephone call. Relevant LEDs:

- Yellow: Telephone ON
- Red: Telephone operation not possible. If LED lights the telephone is outside supply range. If LED flashes the telephone is within the network area but not registered.
- Green: Telephone in operation. Lights when telephone is in call status: After picking up the receiver up to replacing the receiver.

CLOCK button:

Switching ON/OFF on-board clock display in TV picture. The clock time can be selected also when the on-board monitor is switched off. The on-board heating/ventilation function can be switched off by pressing the button longer. The fan symbol above the button lights red if independent heating/ventilation has been

programmed. The symbol flashes when independent heating or ventilation is currently active.

MENU button:

Branch to main menu on LCS on-board monitor.

On-board monitor rotary knob:

Selection of functions on LCD on-board monitor by turning the rotary knob. The corresponding function is activated by pressing the rotary knob.

Display button:

Permanent overlay of window for radio and clock in LCD on-board monitor.

Volume control:

Setting radio and cassette drive volume by turning rotary knob. The radio is switched on and off by pressing the rotary knob. The radio LED lights orange when the radio is switched on.

TONE button:

The adjustments for fader, balance, base and treble can be selected with the TONE button. Adjustment takes place with the search rocker switch. All sound settings are set to the centre position if the TONE button is pressed for 2 s.

SELECT button:

Selection of search rocker switch:

- In radio mode: Selection between manual tuning, automatic search and scan search.
- In cassette mode: Selection between fast forward/rewind, scan search and automatic search.
- In CD mode: Selection between fast forward/rewind, track search, scan search and random play function.

Search rocker switch:

- Left side: Reverse search.
- Right side: Forward search.

Station buttons:

In radio mode: Selection of one of 6 stored radio stations

In CD mode: Selection of CD 1...6 in CD changer.

FM/AM button:

Selection of radio reception range between VHF and medium wave.

TP button:

Only road traffic radio stations are selected.

RDS button:

Digital station identification is displayed in radio window.

Dolby button:

Switching Dolby function ON/OFF. Selection between Dolby B and Dolby C by pressing button several times.

MODE button:

Selection between radio, cassette and CD mode.

Direction selection button:

Selection of direction of cassette drive.

EJECT button:

Cassette ejection.

Buttons on on-board monitor control panel (BMBT)

A data telegram is triggered on the I-bus when a button is pressed. If the button is pressed longer, after a short delay time, a further data telegram "button still pressed" is sent. After the button has been released, a data telegram "button released" is sent.

The CLOCK button is designed in such a way that it can switch on while operating the on-board monitor control panel (BMBT).

When the EJECT button is pressed, in addition to the data telegram, the cassette is immediately ejected by the on-board monitor control panel (BMBT).

There is no reaction on the on-board monitor control panel (BMBT) if several buttons are pressed

simultaneously.

In cassette mode, the radio buttons act as controls for the cassette drive. The button functions, however, still send the same data telegrams. The data telegrams are sent by the on-board monitor control panel (BMBT) to the radio. The radio evaluates the telegrams and responds also with data telegrams for operation of the cassette drive.

All buttons feature background lighting. The lighting is controlled directly with terminal 58g.

Rotary knobs on the on-board monitor control panel (BMBT)

- The rotary knobs can be turned and pressed.
- Both rotary knobs lock in 36 positions in one complete turn.
- Both rotary knobs can be turned without limit stops.

On-board monitor rotary knob:

Selection of functions on the LCD on-board monitor by turning the rotary knob. The corresponding function is activated by pressing the rotary knob.

Volume control:

Setting the radio and cassette drive volume by turning the rotary knob. The radio is switched on and off by pressing the rotary knob. The radio LED lights orange when the radio is switched on.

LEDs on the on-board monitor control panel (BMBT)

LEDs can have a steady light or flash.

The LEDs are switched on by I-bus data telegrams from the control units instrument cluster electronics (IKE), telephone and radio. After being switched on, the corresponding LED remains on until the on-board monitor control panel receives a corresponding I-bus data telegram to switch off the LED.

Telephone LED:

- Yellow: Telephone ON
- Red: Telephone operation not possible. If the LED lights, the telephone is outside the supply range. If the LED flashes, the telephone is within the network range but not registered.
- Green: Telephone in operation. Lights when telephone is in call status: After picking up the receiver up to replacing the receiver.

Radio LED:

The radio is switched on and off by pressing the rotary knob for volume control. The radio LED lights orange when the radio is switched on.

LED for independent heating/ventilation:

The fan symbol above the button lights red when independent heating/ventilation is programmed. The symbol flashes when independent heating or ventilation is currently active.

Cassette drive

The cassette drive is a standard part such as in radio sets with integrated cassette drive.

The on-board monitor control panel (BMBT) transfers pressed radio buttons as well as the status of the cassette drive in the form of I-bus signals to the radio. The radio set then decides whether driver functions are to be controlled and sends corresponding data telegrams back to the on-board monitor control panel (BMBT). In turn, the on-board monitor control panel (BMBT) triggers the required action on the cassette drive. Any change in the status of the cassette drive is sent to the radio.

Exception: The cassette is ejected immediately when EJECT button is pressed. The EJECT data telegram is additionally sent to the radio.

The sound signals from the cassette drive are amplified as standard and transferred at audio frequency outputs to the radio for further amplification. Short-circuits do not destroy the audio frequency outputs.

Connections at the on-board monitor control panel (BMBT)

The on-board monitor control panel features a 12-pin, blue ELO connector.

The lines for power supply, the I-bus link as well as the line for button lighting are routed to the on-board

monitor control panel with cassette drive.

The audio frequency lines of the cassette drive, designed as twisted, non-shielded lines, are assigned to a part of the connector.

Only one connection line for switching on and off and for brightness control of the LCD on-board monitor (PL line) is routed to the monitor.

Switching the LCD on-board monitor ON/OFF

The on-board monitor control panel switches the LCD on-board monitor on and off via the PL line. The PL signal also serves to switch the background lighting of the LCD screen on and off.

- LCD screen ON: As of ignition lock position 1 or after pressing button with alarm function (e.g. pressing CLOCK button).
- LCD screen OFF: By switching ignition lock to position 0 or when I-bus inactive or 30 s after pressing an alarm button.
- Undervoltage: The LCD on-board monitor is switched off at system voltages below 8 V at terminal 30 for longer than 10 s. The LCD on-board monitor is switched on again at voltages above 9 V.
- Overtemperature: Overtemperature is measured in the LCD on-board monitor. High temperature is signalled to the on-board monitor control panel (BMBT) via the PL line (by increase in current). The "overtemperature" status is recognized by the on-board monitor control panel (BMBT) and the LCD screen is switched off for approx. 5 minutes. After this period of time has elapsed, the on-board monitor control panel (BMBT) switches the LCD screen on again. The cutout procedure is repeated if the temperature is still excessively high.
- The background lighting of the LCD on-board monitor is set to full brightness when the PL line is switched to ground.