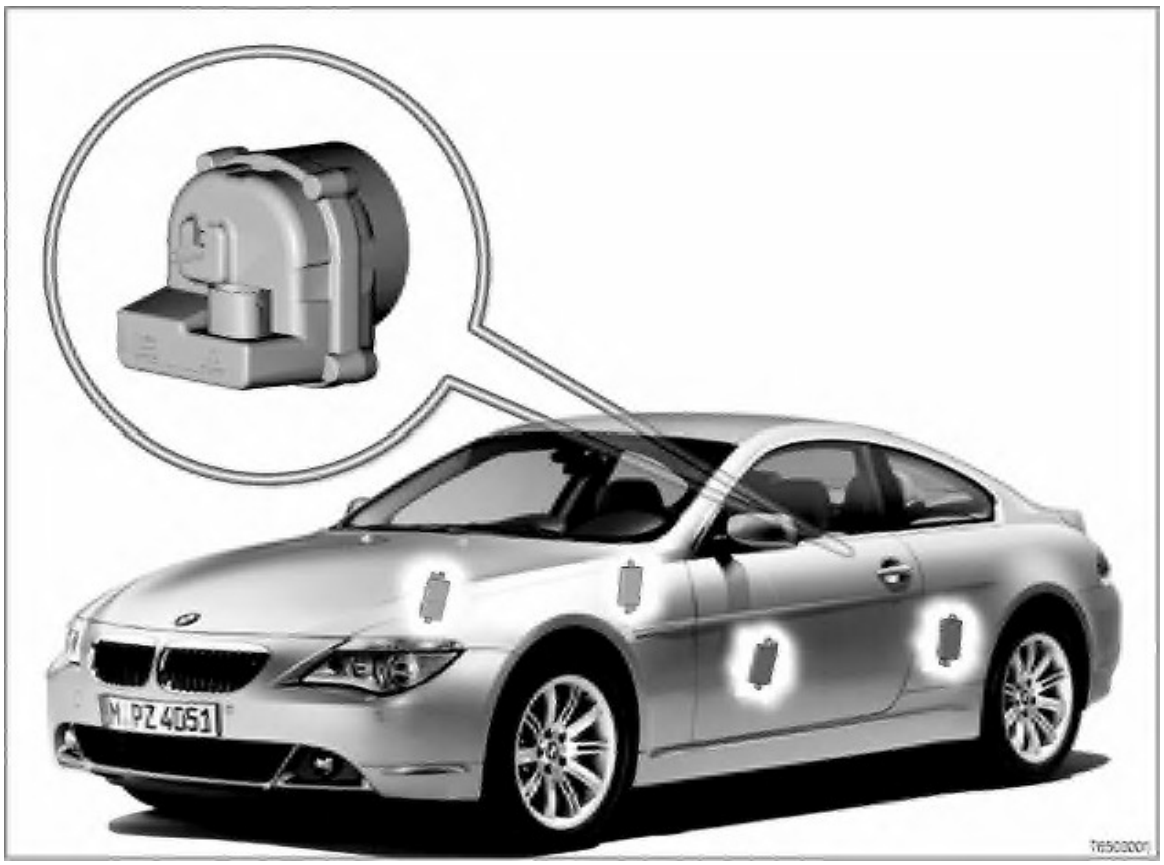
Anti-theft alarm system

E63/E64



Introduction

The anti-theft alarm system (DWA) detects and reports attempts at intrusion and tampering with the vehicle.

New features for anti-theft alarm on E63 and E64 vehicles:

- For the first time, not only the tilt alarm sensor, but also the software for the anti-theft alarm is integrated in the emergency power siren (SINE = siren and tilt alarm sensor). The DWA control unit used to date is no longer installed.
- The vehicle interior is monitored by microwave sensors.

  Advantage:

  The microwave sensors can be installed in hidden locations.

  The interior monitoring function works, for example, even when the side windows are open.
- The DWA control unit in the emergency power siren is connected to the microwave sensors by a sub-bus.
- When the boot-lid lock is mechanically unlocked with the key, the DWA alarm is triggered.

If an attempt is made to break into the vehicle and to enter the interior, the DWA alarm is triggered. The tilt alarm sensor (integrated in the emergency power siren) monitors the vehicle's tilt. The tilt alarm sensor detects if the vehicle is raised or towed away.
[system overview ...]

The DWA alarm gives both acoustic and visual warnings:

- Acoustic alarm via the emergency power siren (interval tone for 30 seconds)
- Visual alarm via lighting system (hazard warning lights)

The alarm can be encoded according to the country concerned.

Brief description of components

The anti-theft alarm system receives input signals from the following components:

- **4 microwave sensors**

  The microwave sensors monitor the vehicle interior. Movement is detected if the reflection (echo) of the microwaves changes. The sensitivity of the microwave sensors is adapted for different conditions (e.g. vehicle model, installation location of microwave sensors).
  [more ...]

- **Tilt alarm sensor**

  The tilt alarm sensor monitors the vehicle's horizontal position (inclination in longitudinal and lateral directions).

  The signal from the tilt alarm sensor is evaluated by the DWA control unit. The tilt alarm sensor detects when the vehicle is raised or towed away and triggers a DWA alarm.
  [more ...]

The following control units are involved in the anti-theft alarm system:

- **DWA control unit**

  The software for the DWA is integrated in the emergency power siren. The DWA control unit in the emergency power siren controls the anti-theft alarm.

  The microwave sensors are connected to the alarm system control unit by a single-wire bus (K bus). The DWA control unit is connected to the K-CAN.
  [more ...]

- **Car Access System (CAS)**

  The CAS monitors the central locking system.
  The bonnet contact switch is connected to the CAS. The bonnet is thus monitored (open or closed). The CAS feeds the signal to the DWA control unit in the emergency power siren via the K-CAN. The CAS supplies the following signals:

  - Boot-lid unlocking via remote control
  - Key in ignition starter switch or terminal 15 ON
  - Status of convenience opening/closing
  - Authentication by CAS as protection against manipulation

- **Driver's door module (TMFA) and front-passenger door module (TMBF)**

  The door modules provide information about the position of the door contacts. The signal is fed to the DWA control unit in the emergency power siren via the K-CAN. The driver's door module also provides the signal from the lock cylinder.

- **Body basic module (KBM)**

  The body basic module monitors the boot lid (open or closed). The signal is fed to the DWA control unit in the emergency power siren via the K-CAN.

  When the boot-lid lock is mechanically unlocked with the key, the DWA alarm is triggered.

- **Light module (LM)**

  The light module actuates the lighting system for the visual DWA alarm. The DWA control unit feeds the triggering signal to the light module via the K-CAN.

The following actuators are actuated for the anti-theft alarm system:

- **Emergency power siren with integrated tilt alarm sensor (SINE)**

  The emergency power siren emits the acoustic DWA alarm. In addition to the DWA alarm, the emergency power siren can also emit an acoustic confirmation signal when the system is activated or deactivated (can be set on the Central Information Display (CID) and controller).

- **DWA LED**

  The DWA LED is on the bottom of the inside rearview mirror.

  The DWA LED gives a visual indication of the status of the anti-theft alarm.

  The DWA LED is directly actuated by the DWA control unit in the emergency power siren via a wire.
  The following indications are possible:

- DWA LED off: DWA is deactivated.
- DWA LED flashes (frequency = 0.5 Hz): DWA is activated.
- DWA LED flashes with a frequency of 2 Hz for 10 seconds and then continues with a frequency of 0.5 Hz:

  DWA is activated but a door or hatch is not closed or a microwave sensor is defective.
- DWA LED flashes with a frequency of 2 Hz for 5 minutes and then continues with a frequency of 0.5 Hz: Alarm.
- DWA LED lights up for 2 seconds and then flashes with a frequency of 0.5 Hz: The microwave sensors and the tilt alarm sensor are deactivated.

System functions

The anti-theft alarm system incorporates the following functions:

- Activating and deactivating
- DWA alarm triggering (alarm-trigger signal)
- Undervoltage recognition, overvoltage recognition, car battery monitoring (positive and negative cables)
- Monitoring of sub-bus
- Deactivating interior motion sensor and tilt monitoring
- Emergency function for acoustic DWA alarm
- Combined operation with lock cylinder and remote control

Activating and deactivating

The anti-theft alarm system is activated when the central locking is locked/secured. Locking/securing requires:

- Drivers door to be opened and closed after terminal 15 is switched OFF.
- The emergency power siren is then immediately activated.
- 3 seconds after activation, the door and hatch contacts are monitored. This is conditional on the contacts being in their rest position (doors and hatches closed).
- The DWA LED starts to flash as a visual acknowledgement. The hazard warning lights flash once.
- Depending on the national version, a short acoustic warning tone may also sound from the emergency power siren (see national version).
- After the DWA has been activated, and after all doors and flaps have been closed, the microwave sensors start to monitor the interior. The interior can be monitored after approx. 20 seconds.
- The monitoring of the interior is interrupted if the side windows and/or the sliding/tilting sunroof are closed using the convenience closing function.

Like the interior monitoring, the tilt monitoring does not start until the doors and hatches are closed. When it is activated, the tilt alarm sensor first conducts a 30 second long reference run. Tilt monitoring does not start until the reference run has been completed.
If the luggage compartment is opened during the reference run, the reference run is interrupted. The reference run is then restarted when the luggage compartment is closed again. The monitoring function of the microwave sensors and the tilt alarm sensor have priority. If a faulty door or hatch contact is detected, this will automatically be assumed to be closed.

The anti-theft alarm system is deactivated when the central-locking system is unlocked. The DWA LED stops flashing and the hazard warning lights flash twice as a visual confirmation. Depending on the national version, a short acoustic warning tone (dual tone) may also sound from the emergency power siren (see national version).

The boot lid can also be unlocked and opened with the remote control without the alarm being triggered, even if the alarm system is activated. When the boot lid is opened, the interior and tilt monitoring functions are deactivated. The interior monitoring and tilt monitoring are reactivated as soon as the boot lid is closed again.

DWA alarm triggering (alarm-trigger signal)

The DWA alarm is triggered if an alarm status is detected while the alarm system is activated. The following will trigger the DWA alarm:

- Forced opening of a door: Bus signal from door module (door contact)
- Forced opening of boot lid: Bus signal from body basic module (boot-lid-contact switch)
- Forced opening of bonnet: Bus signal from Car Access System (CAS) (bonnet-contact switch)
- Movement in interior: signal from microwave sensors
- Vehicle in inclined position: signal from tilt alarm sensor
- Open circuit in sub-bus (between the alarm system control unit in the emergency power siren and the microwave sensors)
- Undervoltage, overvoltage, car battery monitoring (positive and negative cables)

When a DWA alarm is triggered, the DWA control unit activates the emergency power siren loudspeaker. At the same time, the DWA control unit transmits an alarm signal through the K-CAN. The light module activates the visual alarm via the lighting system.

The emergency power siren may also trigger an acoustic alarm if the anti-theft alarm is active and the emergency power siren is separated from the vehicle electrical system by manipulation (inbuilt power supply from batteries).

The DWA alarm is interrupted immediately under the following conditions:

- Anti-theft alarm is deactivated
- Message "Key in ignition lock" (from CAS) and terminal 15 ON

Undervoltage recognition, overvoltage recognition, car battery monitoring

When the anti-theft alarm is active, the DWA control unit monitors the on-board supply voltage in the range between 6.5 and 17 volts.

The DWA control unit recognises the following deviations:

- Undervoltage On-board supply voltage less than 6.5 volts
- Overvoltage On-board supply voltage greater than 17 volts
- On-board supply voltage drops from 7.5 to 6.5 volts within 40 minutes
- Battery positive or negative cable cut through

The voltage thresholds for overvoltage and undervoltage must be recognised for at least 250 milliseconds.

Monitoring of sub-bus for anti-theft alarm

The sub-bus between the alarm system control unit in the emergency power siren and the microwave sensors is monitored for open circuits.

Deactivating interior motion sensor and tilt monitoring

It may be advisable to deactivate the tilt monitoring and interior motion sensor under the following conditions:

- When the vehicle is being transported (e.g. rail, ferry)
- When the vehicle is parked in a two-level garage
- When persons or animals remain in the vehicle

The tilt monitoring and interior motion sensor are deactivated when the command "lock/secure" is executed twice within the space of 3 seconds (e.g. with the remote control).

The DWA LED indicates the deactivation by lighting up for 2 seconds.

The microwave sensors and the tilt alarm sensor can also be permanently deactivated (see Car and Key Memory).

Emergency function for acoustic DWA alarm

If the emergency power siren fails during an alarm, or if the sub-bus to the microwave sensors is interrupted, the acoustic alarm will be emitted through the fanfare horn. To do this, the DWA control unit transmits a message to the steering column switch cluster (SZL).

Combined operation with lock cylinder and remote control

The alarm system can be activated and deactivated by either the door lock or the remote control (= combined operation). In some countries, insurance requirements prohibit such combined operation.

In the event of the combined operation failing, the alarm system can still be activated at the door lock, but cannot be deactivated at the door lock. Deactivation is only possible with the remote control. The combined operation function can be encoded in the Car Access System (CAS).

Operation

The visual and acoustic confirmation for activation and deactivation is not a function of the Car and Key Memory. The customer is able to set the type of confirmation using the Central Information Display and the controller (menu "Settings" under "Vehicle settings").

Notes for service staff

Service staff should note the following points:

- General information: [more ...]
- Diagnostics: ---
- Encoding/programming: ---
- Car and Key Memory: [more ...]

National versions

DWA alarm output on different national versions

Differing registration requirements and other individual settings made with the Car and Key Memory can mean different alarms:

Function	National versions
Acoustic confirmation from emergency power siren when activation and deactivation	US and Canada only
Alarm tone	US and Canada: uninterrupted tone for 30 seconds
Duration of acoustic alarm	Great Britain: 5 minutes (8 cycles)
Visual alarm	European version: hazard warning lights US and Canada: hazard warning lights and main-beam headlights All other countries: hazard warning lights and dipped-beam headlights (not with xenon headlights)

Panic mode with national versions US and Japan

Panic mode enables attention to be attracted in the event of a threat from the outside or an accident (DWA alarm). Panic mode must be encoded.
In the national versions US and Japan, panic mode can be encoded instead of boot-lid unlocking. The button for boot-lid unlocking then works as a button for panic mode.
The button has to be pressed for 3 seconds.
Panic mode can be triggered regardless of DWA status (activated/deactivated). Panic mode is ended when any button on the remote control is pressed. If the emergency power siren fails during panic mode, the acoustic alarm is emitted from the fanfare horn (emergency function).

The duration of the alarm in panic mode is unlimited (until the vehicle battery is flat).

Subject to change.