

Radio remote control ZKE III

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General

As of model year 1996, radio remote control is integrated in the general module of the ZKE III. The antenna used for this system is the radio antenna integrated in the rear window.

The radio signals are isolated in an antenna stop filter. The stop filter transmits the signals from the key transmitter via a data link to the general module.

All radio telegrams are coded and feature a constantly changing code so as to prevent manipulation and thus unauthorized opening of the vehicle.

General

Due to the different approval regulations for radio equipment in various countries, two different versions of the transmitter and stop filter are used.

433.92 MHz version

For all European countries (EUR version)

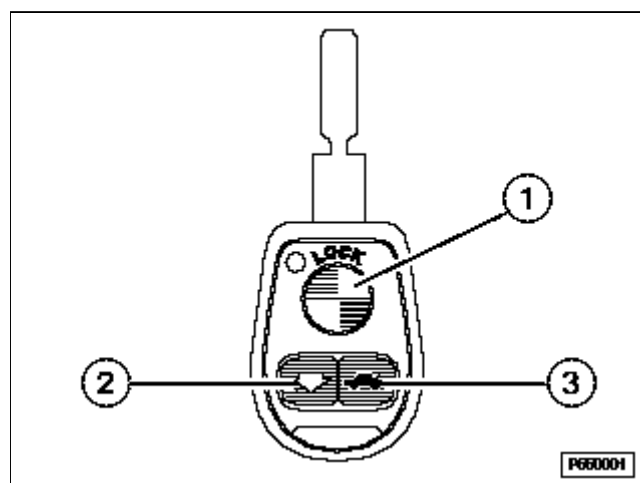
315 MHz version

Mainly intended for USA, Canada and Australia.

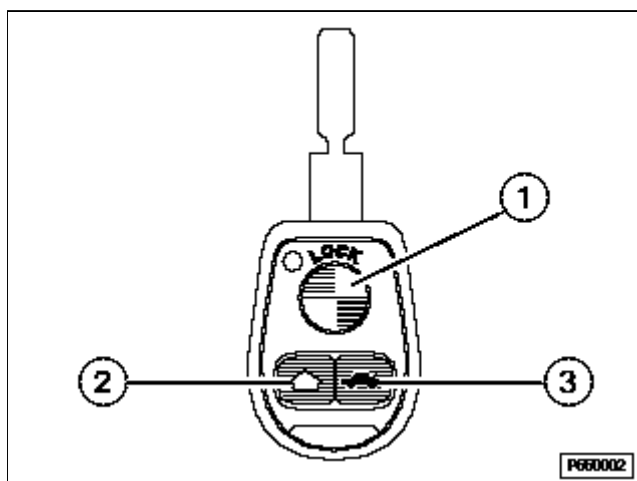
Key transmitter

A differentiation must be made between two basic versions of key-chain transmitter:

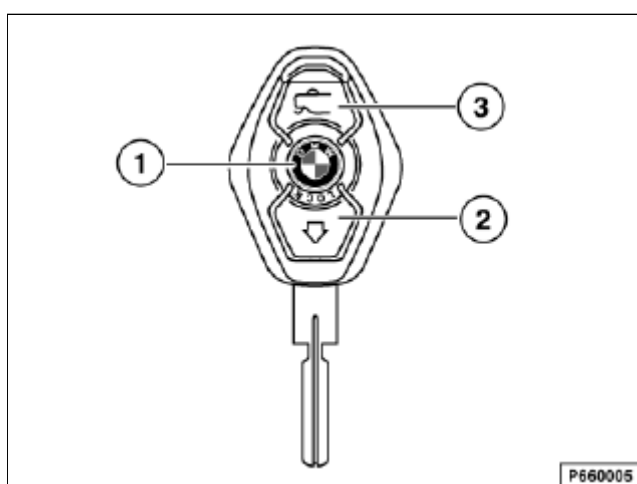
- Up to 9/99, key-chain transmitter with replaceable battery (commercially available lithium battery up to 9/96 two lithium batteries)
- From 9/99, key-chain transmitter with permanently integrated, rechargeable battery. The rechargeable battery is charged in the vehicle via the EWS loop antenna when inserted in the ignition lock and terminal R is switched on (ignition lock in position 1 or 2).



Key transmitter ECE version, 433 MHz



Key transmitter US version, 315 MHz



Key-chain transmitter with rechargeable battery. In appearance, same version for 433 MHz and 315 MHz. The applicable frequency is printed on the back.

Button assignments

The three buttons on the key transmitter trigger, depending on how long they are pressed, various actions in the vehicle.

- Button 1 "Lock"
 - Pressed briefly: Lock and arrest central locking and arm DWA.
 - Button pressed and held: Window and sunroof convenient closing function (codeable!)
 - Pressed briefly with vehicle locked: Switch on interior lights
 - Press briefly twice within 10 seconds with vehicle unlocked: Lock and arrest vehicle, arm DWA and switch off tilt alarm sensor and radio remote interior protection function (function for tilt-ramp garages and vehicle transport).
- Button 2 "Unlock" (button with arrow symbol)
 - Pressed briefly: Release central locking and disarm DWA
 - Button pressed and held: Window and sunroof convenient opening function (codeable!)
- Button 3 "Tailgate" (button with vehicle symbol)
 - Pressed briefly: Open boot lid
 - Button pressed and held: Trigger DWA alarm (panic mode) (function codeable).

All radio remote instructions are encoded by means of a constantly changing code in order to prevent tampering in the system.

If transmission of radio remote instructions is disturbed during convenient opening/closing of the power

windows, for safety reasons, the function is terminated immediately in the vehicle. The corresponding button on the key transmitter must be released and then pressed again in order to resume convenient mode functions.

Voltage monitoring

The charge status of the battery or rechargeable battery in the key transmitter is monitored every time a button is pressed.

The key transmitter signals the battery status to the general module if the voltage reaches a lower limit value. The general module processes this message as follows:

- The instruction "lock vehicle" is not carried out. All other functions are OK.
- Undervoltage is stored in the general module
The message is evaluated in the diagnosis program for radio remote control. It is deleted automatically when the voltage value in the key transmitter is found to be OK. again 5x in succession.
- The general module sends a telegram via the K-bus to the IKE. After opening the driver's door, a corresponding check-control message appears in the IKE display.

If undervoltage occurs:

- On key-chain transmitters with battery(ies) replace the battery(ies) (two batteries up to 9/96)
- The rechargeable battery in key-chain transmitters with a rechargeable battery must be charged via the ignition lock for at least 30 minutes
- As from 9/96, a voltage-independent memory in the key-chain transmitter ensures that the initialisation data is not deleted even when the battery is discharged. It may be necessary to re-initialise key-chain transmitters produced before 9/96.

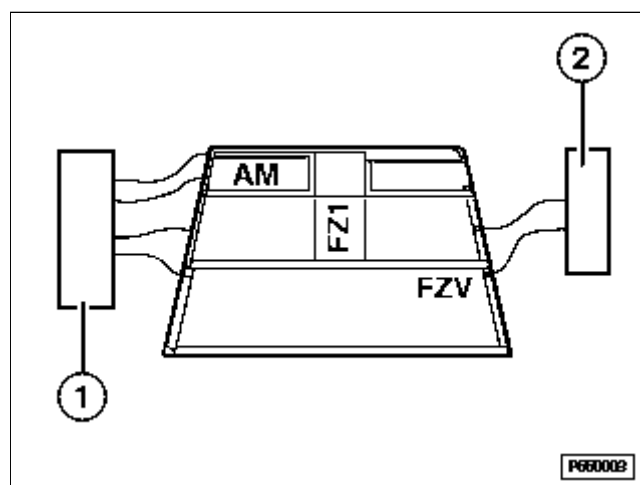
Note

In the case of key-chain transmitters with rechargeable battery as from 9/99 it should be noted that self-discharge, normal for rechargeable batteries, takes place while not in use. The rechargeable battery discharges after approx. 1 year. A fully discharged rechargeable battery must be recharged for approx. 30 hours until it has regained its full capacity.

Receiver

Receiving radio signals

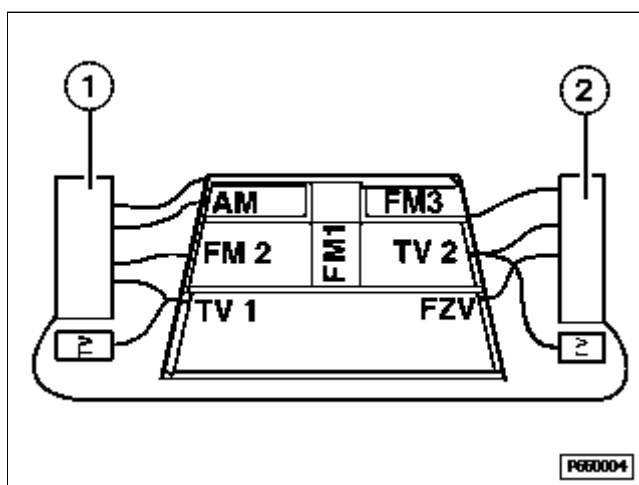
The data sent by the key transmitter are received by the receiver module via a radio/TV antenna. An antenna stop filter (rejector circuit) isolates these radio waves from other received radio waves and transmits them via a line to the general module of the ZKE III.



Rear window antenna with AM/FM and stop filter

1	AM/FM amplifier for radio reception
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2	Stop filter (rejecter circuit) for radio remote control signal
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Rear window antenna with antenna diversity (special option on E39), TV antenna (special option) and stop filter

1	Diversity box for radio reception
2	AM/FM amplifier for radio reception with integrated stop filter (rejecter circuit) for radio remote control signal.
TV	Antenna amplifier and stop filter for TV reception

The radio signals are checked and evaluated in the general module. Valid instructions are carried out (e.g. release central locking system and disarm DWA).

Range

The minimum range for instructions to the central locking system is 10 m.

The range is limited to a radius of approx. 5 m for the convenient opening and closing of the power windows and sunroof. The range is reduced for safety reasons.

During initialisation, the range is reduced to such an extent that this function must be carried out in the vehicle with the key transmitter pointing in the direction of the antenna.

Function indicator (key-chain transmitter from 9/96 with battery only)

A red LED indicates the function and battery status in the radio transmitter is integrated in the housing of key-chain transmitters from 9/96 to 9/99.

- The LED indicates that the voltage is OK and a radio telegram has been transmitted by **lighting briefly** every time a button is pressed.
- The LED **flashing** when pressing and holding a button indicates that radio telegrams for convenient window opening/closing are sent.
- The LED **not lighting** despite a button being pressed indicates that the battery in the transmitter is discharged.
- The LED **flashing** during initialisation indicates that the transmitter is sending out its initialisation data.

Transmitter self-test (key-chain transmitter with LED only)

The self-test is used to check whether the transmitter electronic control is operating correctly.

The self-test is started by pressing and holding "tailgate" button and "lock" button simultaneously.

If the transmitter is functioning correctly, the red LED will light for 1 second.

Initialisation

Function

The initialisation procedure allocates the key transmitter to the general module. During initialisation, a code is generated in the key transmitter and then transferred to the general module. The code is stored in the key transmitter and in the general module. The general module recognizes the keys belonging to the system on the basis of this code. Only commands from these keys are then carried out.

A maximum of 4 keys can be initialised for each vehicle. The codes of all other keys are deleted when a key is re-initialised. This means that all the keys of a system must be initialised simultaneously.

Initialisation procedure

Carry out key transmitter initialisation in the vehicle interior.

- Unlock vehicle via central locking and close driver's and passenger's doors.
- Briefly switch on terminal R in vehicle (maximum 5 seconds) and switch off again. => The system is now ready to be initialised.
- Press and hold "unlock" button on the key transmitter.
- Point key transmitter in direction of rear window antenna and, with the "unlock" button pressed, press "lock" button three times within 10 seconds. => A new code is generated in the key.
- Release "Unlock" button. => The general module signals that initialisation of the key transmitter was successful by locking and unlocking the central locking system.

Repeat the procedure as of Point 3 (= press and hold "unlock" button on key transmitter) to initialise the other keys. Terminal R must not be varied during this procedure.

The initialisation procedure is terminated if terminal R is switched on.

Note

In the case of key-chain transmitters up to 9/96 (with two batteries) the code stored in the transmitter will be lost if the key-chain transmitter has no voltage supply for a prolonged period of time. For this reason, the key batteries should be replaced within 1-2 minutes.