Functional Description / User Manual

for

SIEMENS

Keyless access control system and immobilizer

Type KESSY

1. Functional Description - Keyless access control system and immobilizer, type KESSY

1.1. General functional description

The keyless access control system, type Kessy, enables convenient utilization of the vehicle. To use the vehicle, the driver only needs to take the key along with him/her. The vehicle communicates with the system inductively via antennas. These antennas are located in the outside door handles, in the rear bumper, in the gearshift - lever housing , in the center console, in the central rear arm rest and in the backlite shelf. These antennas are driven inductively with a frequency of 125 kHz. The system's range is limited in a defined fashion by damping the body sheet metal. In the vehicle interior, the ranges of the various antennas overlap, which enables location of the key.

1.2. Keyless access control (maximum assembly variant M-Option)

The handle of the driver's door and the boot lid are equipped with contacts to ensure the locking and unlocking functions. If the door handle of a locked vehicle is pulled, the control unit activates the antennas on the vehicle's side where the handle has been pulled. These antennas generate an inductive field of 125 kHz which enable identification of the transponder located in the key. In case of successful evaluation by the KESSY control unit and with the outside door handle actuated, the command "Open door" is issued, i.e. the door opening assistant and the central locking system are activated.

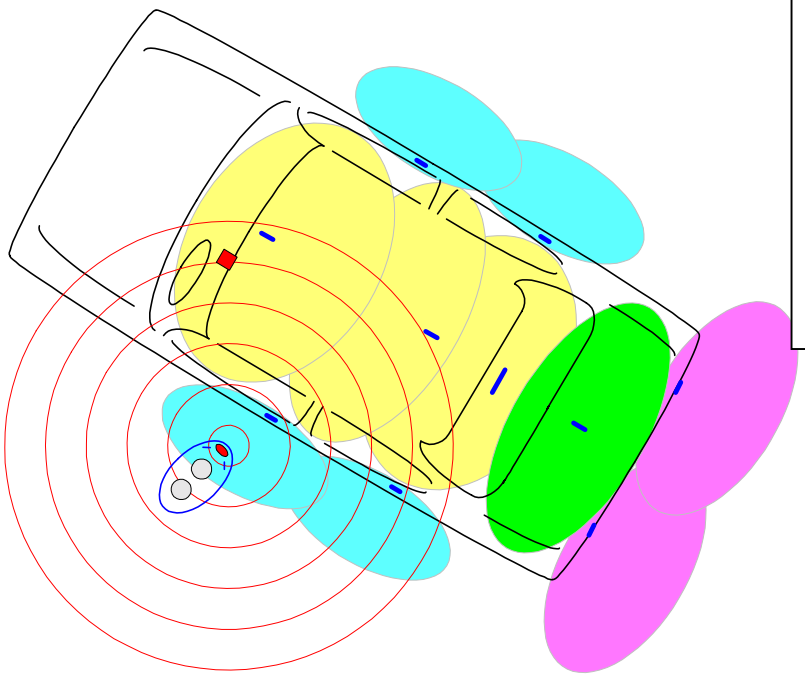
If the "locking button" is pushed while the vehicle is unlocked, the identification process is started, i.e. the KESSY control unit starts a request for a valid key. The key returns a corresponding response to the KESSY control unit. If the key has been activated successfully by the KESSY control unit, the central locking system is activated and the vehicle is locked.

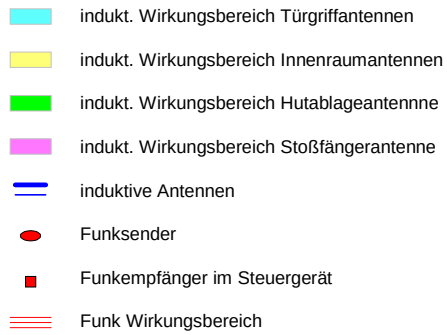
1.3. Keyless start/stop (maximum assembly variant M-Option)

The system provides the function which enables starting/stopping the engine without key actuation.

The prerequisite for starting the vehicle is a key allocated to the vehicle, which is taken along by the user and is clearly inside the vehicle. By actuating the starting device, the driver starts the identification process, i.e. the KESSY control unit issues a request for a valid key inside the vehicle. The key returns an appropriate response to the KESSY control unit. In case of successful identification of the key, the vehicle is started and the immobilizer is deactivated.

Block diagram Fig. 1
- inductive range of action of outside door handle antennas
- range of action of center console / rear arm rest antennas
- inductive range of action of antenna in backlite shelf
- inductive range of action of bumper antenna
- inductive antennas
- key
- radio receiver in control unit
- range of radio action

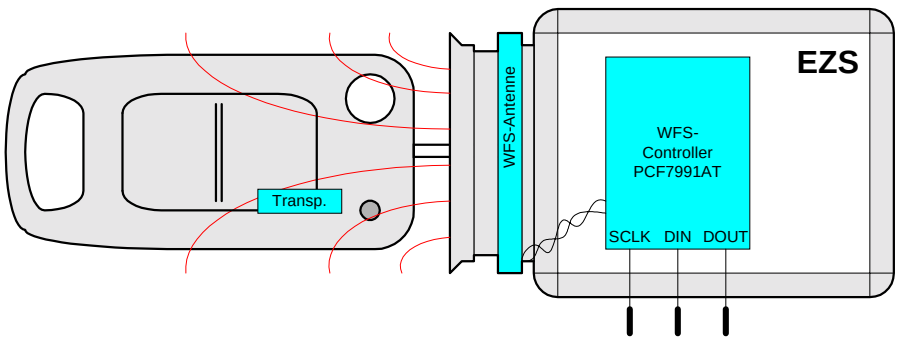




Prinzipdarstellung Fig. 1

1.3. Immobilizer (reduced assembly variant Basic-Option)

The immobilizer is deactivated on vehicle start: the key is identified by the integrated transponder which communicates via inductive transmission with the electronic ignition lock (EZS). The EZS supplies the transponder with inductive energy. The magnetic field is modulated with data which are sent to the electronic ignition lock by the control unit. This data transfer operates at an operating frequency of 125 kHz. The response returned by the key is demodulated in the electronic ignition lock, and sent back to the control unit. If identification was successful, the immobilizer is disabled.

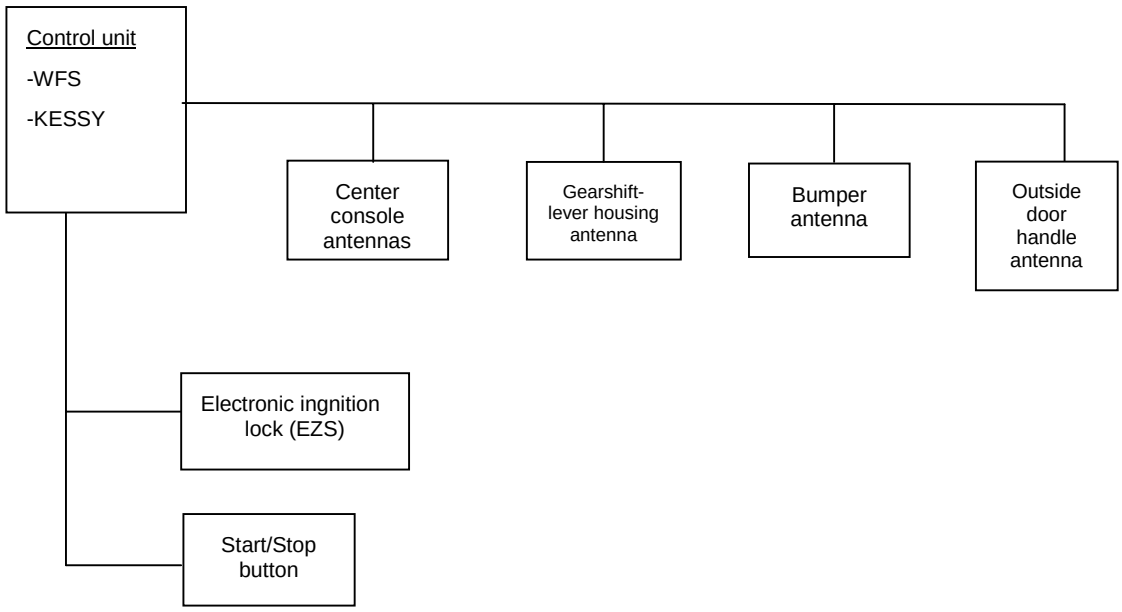


WFS-Antenne - immobilizer antenna

2. List of variants

5WK4 7026	Control unit – maximum assembly (M-Option)
5WK4 7025	Control unit – reduced assembly (Basic-Option) only immobiliser function
5WK4 5014	Center console antenna / rear arm rest antenna
5WK4 5015	Gearshift-lever housing antenna
5WK4 5016	Bumper antenna
5WK4 5017	Backlite shelf antenna
3D0 905 865	Electronic ignition lock (EZS) antenna
3D0 837 205/206	Outside door handle antenna

3. Block diagram



4. Technical Description

Carrier frequency:	125 kHz
Field strength:	< 42 dBµA/m in 10 m
Modulation:	ASK
Band width:	123,13 kHz – 126,88 kHz
Baud rate:	4 kBd
Supply voltage:	13,5 V
Battery type	Car battery
Range:	1,5 m – 2,0 m

Duty Cycle:

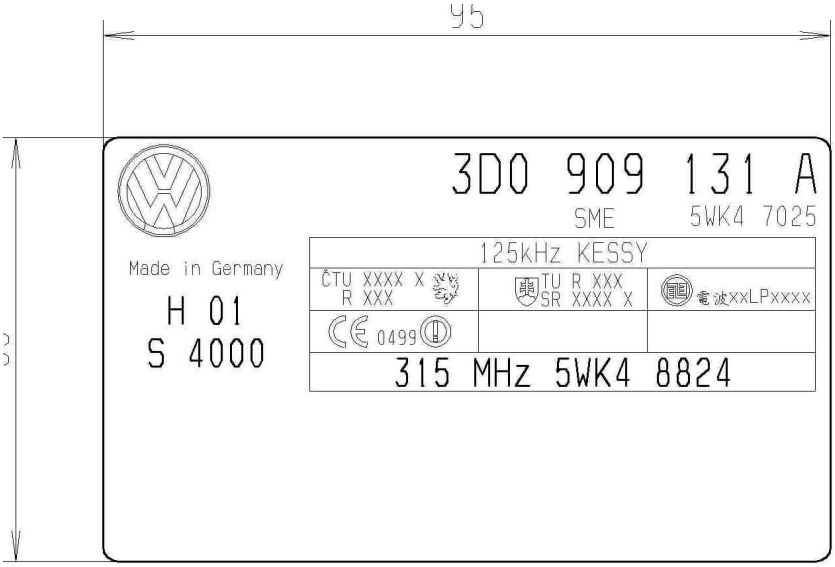
27 actuations of immobilizer/access control system within 24 hours with a typical transmission time of 1.5 seconds

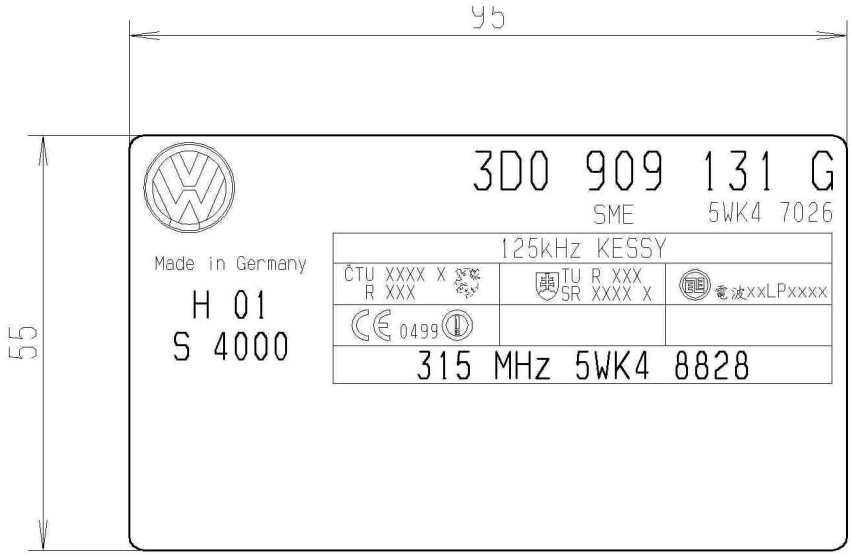
Transmission time T_{ON} 40,5 seconds / 24 hours

Off time T_{OFF} 86.359,5 seconds / 24 hours

Duty Cycle: $T_{ON} / T_{(ON+OFF)}$ x 100% = 40,5 / 86.400 x 100 % = 0,05 %

5. Label Design





FCC Declaration:

FCC ID: KR5KESSY

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept interference received, including interference that may cause undesired operation.

6. Power up of test samples

6.1. Test sample "Keyless access control system"

The test setup consists of the following components:

- Control unit 5WK4 7026
- Test box "antenna change-over switch"
- Wiring harness "Test box – Control unit"
- Wiring harness "Test box – Antennas"
- Antennas: 1 Gearshift-lever housing antenna 5WK4 5015 (antenna 2.3)
  2 Center console/ rear arm rest antennas 5WK4 5014
  (antennas 2.1 and 2.2)
  1 backlite shelf antenna 5WK4 5017 (antenna 4)
  2 outside door handle antennas 3D0 837 205/206 (antennas 3.1 and 3.2)
  2 bumper antennas 5WK4 5016 (antennas 1.1 and 1.2)
- 12V Car battery **(not supplied)**

Design:

Connect the control unit to the test box. Connect the test box to the antennas supplied with the system, taking careful account of the designations on wiring harness and antennas. More precise allocation of connector– socket is not necessary, as all connections are mechanical or color-coded.

Turn master switch of test box "OFF".

During climatic tests, the test box should definitely be located outside the climatic cabinet.

The entire test set up is connected to power via the two banana jacks on the test box:

Banana jack, red	: +12V
Banana jack, blue	: GND (ground)

The power consumption in case of operation amounts to max. 10A.

Operation:

The four-level rotary switch in the test box enables selection which antennas are driven.

The following combinations are possible:

1. Backlite shelf antennas (antenna group 1)
2. Interior antennas (antenna group 2)
3. Door handle antennas (antenna group 3)
4. Bumper antennas (antenna 4)

Before changing over to a different antenna, the testing staff should change the master switch on the test box to "OFF", and subsequently to "ON".

Select the desired mode via the switch "modulation – no modulation". To change the mode, turn the master switch to "OFF".

In the "modulation" mode, a telegram modulated to the carrier frequency is emitted. The modulation-free carrier frequency is sent in the mode "no modulation".

Turn the main switch on the test box to "ON". Thus, the selected antenna will transmit (telegrams with a duration of approx. 40ms at intervals of 500ms), until the switch is turned back to "OFF".

This procedure does not correspond to the normal operating mode of the antenna drivers! This procedure is only used to simplify emission measurements.

6.2. Test sample "immobilizer"

The test set-up consists of the following components:

- Control unit 5WK4 7025
- Electronic ignition lock (EZS) 3D0 905 865
- Wiring harness "Control unit – electronic ignition lock (EZS)"
- Wiring harness "EZS – power supply"
- 12V car battery **(is not supplied with the system)**

Design:

"No modulation" mode: Connect the EZS to the power supply via a wiring harness "EZS – power supply".

"Modulation" mode: Connect the control unit to the EZS and the power supply via the wiring harness "Control unit – electronic ignition lock (EZS)".

Operation:

After connection has been established, the immobilizer antenna emits in the selected mode. In "no modulation" mode, the carrier frequency is sent permanently. If "modulation" has been selected, the system emits a modulated telegram at intervals of 1.6 seconds.

This procedure does not correspond to the normal operating mode of the immobilizer! This procedure is only used to simplify emission measurements.

Should you encounter any problems or have any queries, please do not hesitate to contact:

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