

1 Description of operation

1.1 Comfort Access

Comfort Access system is for making vehicle access and vehicle start as comfortable as possible for the customer. Comfort Access makes use of special ID transmitters (keys). The user, it only needs to carry the ID transmitter to enter into the vehicle (Comfort Entry) and to start the vehicle (Comfort Go).

Main triggers for CA system are:

1. Start-Stop button -> for starting engine with valid IDG inside the vehicle
2. Door Handles (TAGE) -> for locking or unlocking the door with valid IDG outside the vehicle

Apart from the above two main triggers, CA key search is activated by Schlüsseldaten, IDG button press and diagnostic requests.

CA system is broadly divided into following modules (software modules):

- **CA Master:** It is responsible for analyzing different inputs required for triggering authentication and command CA Integration to perform the authentication.
- **CA Integration:** It is responsible for performing key search, locate the key position, authenticate the key (using challenge-response method) and return the results when requested by CA Master.

Whenever any trigger is given, it is passed to CA master component that validates the trigger. After validating the trigger, it communicates with CA integration component to start the key search. Key search is requested to know the authenticity of the IDG and also the position of the IDG.

For “Comfort Go” trigger, key should be in the interior part of the vehicle. CA integration first sends the proper LF telegram to locate all available keys in the LF region. Once any IDG is detected, further communication is done with that IDG on RF to know its position. RF communication is done by FBD receiver who communicates with FEM via LIN and with IDG via RF. If the position is correctly located as inside vehicle, it sends valid authentication and key position to CA master which then communicates further with Terminal Control module to start the engine.

For “Comfort Entry” trigger, key should be outside of the vehicle and also to the side of the trigger. If driver side lock or unlock capacitive sensor on TAGE is activated, the telegram sent by TAGE is read by CA integration component and passed to CA master for validating. As mentioned in the above case for CG, same sequence is repeated for CE. Only difference is that the key should be located outside of the vehicle. Once a valid key is detected outside, CA master communicates with Central Locking component to lock/ unlock the corresponding door.

Apart from capacitive lock and unlock sensor, there is also a hall effect unlock sensor available on TAGE.

1.2 Immobilizer

Immobilizer is responsible for authentication of valid vehicle user when IDG is placed on the transponder coil. Terminal control synchronizes key search between CA and TRSP in case of SST button press. The key authentication (IDG search by CA and the transponder coil) is controlled as follows:

1. Whenever Key Search gets started after SST press, the CA-function has the key search priority before transponder.
2. If CA authentication fails, then IDG key search is started at the transponder coil by transponder
3. The IDG-search at the transponder coil takes a maximum of 10 s and is repeated within this time cyclically every 320ms (codable)
4. Re-operation of the start-stop button again starts the CA authentication