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### **System description**

The IMM is designed to prevent starting the main engine and moving of the vehicle without a valid key. The Driver-ID & Immo inhibits the starter motor by interrupting the connection between ignition lock and starter with a high side switch (HSS) and blocks the gear box via CAN communication to the VDC (vehicle drive control).

Each Driver-ID & Immo comes with a factory paired master key. With this key starting the engine is not possible but teaching user keys. The owner of the fleet is able to teach and delete user belonging keys to different vehicles with the ignition lock inside the cab (BASIC mode) or via a fleet management software running on a farm PC (REMOTE mode).

All keys are equipped with up-to-date RFID cryptographic transponder to ensure secure operation and protection against misuse.

To increase the security level the Driver-ID & Immo once installed in a vehicle automatically pairs with the VDC and finally can't be used with different VDCs anymore. The communication is AES128 crypted.

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### Functional description

The IMM module IMM function is based on application of master and user keys combined with the communication to other modules. Only one master key is valid for each IMM which is paired at CLAAS production. For security reason the master key data are stored inside the microcontroller's E<sup>2</sup>PROM. Up to 50 user keys can be taught to each IMM and will be stored into the external E<sup>3</sup>PROM (see chapter „Teach-In procedure“).

The IMM starts working on turning a key in the ignition-lock. Transponder reading is directly started to check for a valid master or user key for about 1.5 seconds, CAN transmission is disabled during this process. In case no transponder is found the IMM waits for deactivation of clamp 15. If a valid user key is detected, the IMM waits for signal input on clamp 50 and then activates clamp 50 output (HSS 1). At the same time CAN authentication procedure with the gear-box module (VDC) is started and after successful CAN authentication HSS 2 is activated. In case clamp 50 becomes active but clamp 15 isn't any more, the IMM switches off.

If an invalid key is detected, all actors are deactivated and no authentication process to VDC is started. Cyclic CAN state messages inform other bus members about the actual IMM status.

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### Vehicle keys

To the Driver-ID & Immo generally belong two kinds of keys with different color, different key identifier (MASTER / USER) and always unique transponder IDs. The mechanical cutting is uniform for the customer fleet.



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The green key is the master key and paired to a specific IMM irrevocable during the vehicle production in line. With this key starting of the engine is not possible by definition but teaching and deleting user keys to the IMM. In case the master key gets lost the IMM has to be exchanged and disposed. A maximum of two master keys with equal rights are valid for each IMM.

The black key is the user key which belongs to a fixed driver and not to a specific vehicle. The key can easily be taught to different vehicles within a fleet and also deleted. The assignment can be done directly at the vehicle or dynamically managed from the farm PC via remote access. The user key comes with a plastic tab with TBD information on it and a number calculated from the CLAAS secret key, unique ID and key identifier. The number will also be available as a bar code.

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### FCC Regulation

Due to the FCC regulation the user manual needs to add the warning and label below:

#### (Section 15.105) FEDERAL COMMUNICATIONS COMMISSION INTERFERENCE STATEMENT

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: -Reorient or relocate the receiving antenna. -Increase the separation between the equipment and receiver. -Connect the equipment into an outlet on a circuit different from that to which the receiver is connected. -Consult the dealer or an experienced radio/ TV technician for help.

(Section 15.21) CAUTION: Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment.

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 any interference received, including interference that may cause undesired operation.

**FCC Standards**

**Model: CANIMMO0216**

**FCC ID: QLXCANIMMO0216**

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