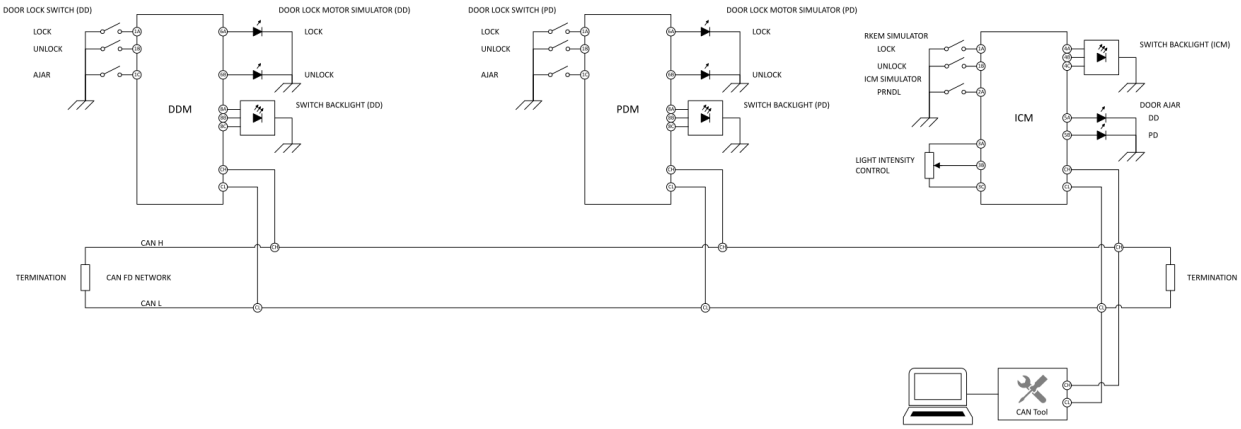
Door Lock System - Requirements

Description

The Door Lock System consists of three nodes: the DDM, PDM, and ICM.

The nodes are connected using a CAN FD bus.



DDM Requirements

1. The DDM shall monitor the local Lock and Unlock switches.
2. The DDM shall control the local Lock and Unlock motor.
   If the lock switch is pressed, the DDM shall active the Lock motor.
   If the unlock switch is pressed, the DDM shall activate the Unlock motor.
3. The activation time of the motor shall be limited to 500 ms.
4. The Lock and Unlock switch of the DDM shall also control the Lock motor of the PDM.
   When one of the switches is pressed, the DDM shall transmit a CAN message.
5. The DDM shall receive the Lock and Unlock messages from the PDM and RKE module and control the motor accordingly.
6. The DDM shall receive a status message of PRNDL switch changes.
   When the PRNDL is put in Drive, the DDM shall lock the driver door.
   When the PRNDL is put in Park, the DDM shall unlock the driver door.
7. The DDM shall receive an RGB message from the ICM and control the local RGB LED for the backlight of the switches.

PDM Requirements

1. The PDM shall monitor the local Lock and Unlock switches.
2. The PDM shall control the local Lock and Unlock motor.
   If the lock switch is pressed, the PDM shall active the Lock motor.
   If the unlock switch is pressed, the PDM shall activate the Unlock motor.
3. The activation time of the motor shall be limited to 500 ms.
4. The lock and unlock switch of the PDM shall also control the Lock motor of the DDM.
   When one of the switches is pressed, the PDM shall transmit a CAN message.
5. The PDM shall receive the Lock and Unlock messages from the DDM and RKE module and control the motor accordingly.
6. The PDM shall receive a status message of PRNDL switch changes.
   When the PRNDL is put in Drive, the PDM shall lock the driver door.
   When the PRNDL is put in Park, the PDM shall unlock the driver door.
7. The PDM shall receive an RGB message from the ICM and control the local RGB LED for the backlight of the switches.

ICM Requirements

1. The ICM shall monitor the RKE commands.
   When the Lock switch is pressed, the ICM shall transmit a Lock All CAN message.
   When the Unlock switch is pressed once within 500ms, the ICM shall transmit a Unlock Driver Door CAN message.
   When the Unlock switch is pressed twice within 500ms, the ICM shall transmit a Unlock All CAN message.
2. The ICM shall monitor the PRNDL switch.
   When the transmission is put into Drive or Park, the ICM shall transmit a CAN message.
3. The ICM shall receive a status message from the driver door and passenger door Ajar switches and shall display the Ajar status.
4. The ICM shall monitor a local Potentiometer and control the local RGB LED for the backlight.
   The ICM shall transmit a CAN message in case the backlight color of the DDM and PDM needs to be updated.

CAN FD Network Requirements

1. The Nominal Bitrate shall be 500 kbit/s.
2. The Data Bitrate shall be 2 Mbit/s.
3. The CAN FD clock frequency shall be 40 MHz.
4. The CAN FD clock frequency tolerance shall be less than 0.3 %.
5. Nominal bits shall be sampled at 80%.
6. Data bits shall be sampled at 75%.
7. The total bus cable length shall be less than 10 m.
8. The stub cable length shall be less than 1 m.