

User manual

1 Basic Information

1.1 General

The PMRGEN2.1 Peripheral Monitoring Radar sensor (PMR) is a system element of an automatic opening and closing vehicle side door. PMR will radiate when the higher-level control unit sends a request radar to report obstacles that may collide with vehicle door. If the sensor detects obstacles in the swing volume of the door, it will send obstacle information to the higher-level control unit allowing the control system to stop the movement before colliding with the object and thus assist the users in their care to prevent colliding during the opening movement. The sensor receives the information that the door will open from the vehicle and starts a cyclical measurement (25 cycles per second) and monitors the periphery up to a range of 2.9 m with opening angles of $\approx 140^\circ$. If an obstacle is detected in this range, the ECU calculates the maximum opening angle of the door to avoid a collision (with a certain safety margin). However, doors equipped with a sensor are not guaranteed to detect all objects. Object detection is only an aid and cannot replace the vehicle occupant's attention to the immediate surroundings when opening and closing the doors. The responsibility for safe opening and closing of the doors always lies with the vehicle occupants. Device is equipped with a single-chip FMCW (Frequency Modulated Continuous Wave) radar with frequency range 77 - 81 GHz band.

1.2 Environmental Conditions

Various environmental influences can negatively affect the reliability of the sensor's performance: Snow, ice, heavy rain, or dirt may reduce the performance of the sensor to failure of the system. A message may be displayed if the system limits are reached.

To ensure maximum performance of the sensors, keep them clean and free from obstructions and dirt. Occasionally, remove any buildup or dirt by wiping the cover material with a soft, damp cloth. Avoid using a high-pressure power washer to prevent damage of vehicle door.

1.3 State of the Vehicle

Full performance of the sensor can only be guaranteed if the vehicle is in its original condition. This includes but is not limited to:

- Aftermarket paintwork applied incorrectly near the sensor
- Scratches in the paint near the sensor
- Defects in the plastic covering the sensor
- Misalignment of sensor
- Vehicle attachments (i.e., door patches)

1.4 Technology Related Limitations

Radar technology has the following limitations:

- The sensor may be affected by other electrical equipment, especially devices that generate high-frequency electromagnetic waves.
- The sensor can only monitor objects that are within its field of view. The field of view may not cover the whole swing area.
- An object outside the field of view or at the edge of the field of view may not be monitored.
- An object with a low Radar Cross Section (RCS) may not be monitored.
- An object with high velocity may not be monitored.
- If an object is moving towards the door, the door can be stopped but the sensor cannot prevent a collision with the object if it continues to move towards the door. (Example: shopping cart moving towards stopped door)

2 Repair Shop Instructions

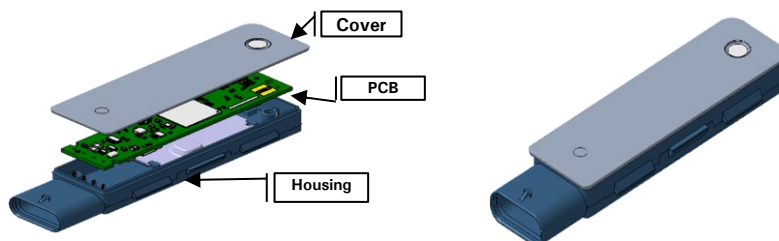
When repairing the vehicle door or replacing the sensor on a vehicle, there are a few points to keep in mind to ensure proper sensor function and maximum performance:

- Do not repaint the areas near the sensor.
- If the cover of the sensor is defective or the paint is scratched, the component must be replaced.
- To ensure that requirements for material, paint, and paint film thickness are met, the replacement part must be obtained from the OEM. If the cover is defective, it can be assumed that the sensor has also been damaged, and replacement of the sensor should be considered.
- Sensor assembly inside the handle must be in accordance with assembly requirements.

2.1 General Handling

- The sensor is an electrostatic discharge (ESD) sensitive component and must be handled accordingly.
- Personnel must use suitable ESD gear and equipment to prevent damage to electronics.
- Personnel must be trained and follow appropriate ESD practices and procedures.
- Transport ESD sensitive parts only in proper ESD packaging.
- Workstations must be kept clean and organized to prevent damage from contamination of the product.
- Reduce Handling of the device to a minimum to minimize the risk of damage.
- Check and replace gloves regularly to prevent damage from contamination caused by dirty gloves.
- If there is mechanical damage to the housing or the housing is contaminated, the sensor can no longer be installed.
- If there is mechanical damage to the retaining clips, the sensor can no longer be installed.
- Do not use components that have been dropped due to risk of damage or deformation.

2.2 Assembly



- Handle the sensor by touching only the case without touching the connector pins and cover. Use suitable ESD equipment.
- Special care must be taken to avoid touching the covering of sensor electronics.
- The label must be scanned to ensure the correct hardware and software version is built in the corresponding vehicle.
- Use a suitable tool for positioning and fixing the sensor without mechanical shocks or stress. Do not apply high mechanical force during mounting process.
- Position the sensor correctly in its mounting location to ensure the proper performance.
- The sensor must be connected to the original wiring harness of the vehicle with a suitable tool.
- Ensure that there are no failure conditions caused by short circuits to ground or battery voltage.
- Ensure successful connection of the connector before powering the sensor.
- Ensure that the sensor cover is positioned correctly and not damaged.
- A special calibration of the sensor function does not need to be performed.

2.3 Disassembly

- Remove the ECU with suitable tools.
- Avoid mechanical shocks, stresses, and high mechanical forces to prevent damage during the disassembly procedure.
- Ensure that the retaining clips are not damaged. If they are, the sensor mounting must also be replaced.
- Only disconnect the ECU when it is not powered

2.4 Mandatory country specific user manual legal statements

All the legal statements in this section shall be accurately reprinted in the vehicles user's manual.

2.4.1 Canada

NOTICE:

This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's license-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

1. L'appareil ne doit pas produire de brouillage;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This equipment complies with ISSED radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Cet équipement est conforme aux limites d'exposition aux rayonnements ISSED établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps. Ce transmetteur ne doit pas être placé au même endroit ou utilisé simultanément avec un autre transmetteur ou antenne.

2.4.2 United States of America

NOTICE:

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
2. This device must accept any interference received, including interference that may cause undesired operation.

Radio frequency radiation exposure Information: This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Changes or modifications made to this equipment not expressly approved by Brose Fahrzeugteile SE & Co. Kommanditgesellschaft, Bamberg may void the FCC authorization to operate this equipment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

NOTE:

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 residential installations.

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 the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult with the dealer or an experienced radio/TV technician for help.