

User Manual for 76 - 77 GHz Adaptive Radar Sensor ARS4-C



1. Purpose

In this document an operational description of Continental's 77 GHz Advanced Radar Sensor ARS4-C is given. Sufficient information is provided to understand the operation principle, the set up and the tuning of the radar sensor.

2. General information

The ARS4-C sensor measures independently the distance and velocity (Doppler's principle) to objects without reflector in one measuring cycle on the basis of FMCW (Frequency Modulated Continuous Wave) with very fast ramps. A special feature of the device is the simultaneous measurement of large distances up to 250 meters, relative velocities between ± 300 km/h and the angle relation between two objects.

The sensor is mounted in the front or rear or behind the grill or in the backside behind the bumper.

The sensor performs in alternation a Short Range (SR) Scan cycle and a Far Range (FR) Scan cycle. The Short Range Scan covers angles of ± 90 degrees in front of the sensor. The Far Range Scan covers distances up to 250 meters with angles of ± 9 degrees.

The sensor allows a detection of objects in the given Field of View (FoV) and evaluates the current constellation under consideration of all detected objects and among others the following information:

- Vehicle Dynamics Data (e.g. Velocity, Acceleration, Yaw Rate of the host vehicle) which is transmitted to the sensor from the car via the vehicle bus

ARS4-C is designed for comfort/safety applications in passenger cars and trucks like Adaptive Cruise Control, Emergency Brake Assist, Occupant Safety Support, Collision Mitigation, Distance Warning/Monitoring etc.

In dependence of the overall information the sensor outputs specific messages, which may then be used by other vehicle components (braking system, power train, door modules etc.).

3. ARS4-C Sensor Component Description

The ARS4-C sensor consists of the following components:

- Plastic housing with sensor Data Interface connector
- Radio Frequency (RF) Printed Wiring Board (PCB) including the antenna which is plugged into the housing
- Low Frequency (LF) PWB incl. Board-to-Board (B2B) Connector (connector between RF and LF unit)
- A plastic molded radome through which the radar beams are emitted.

4. ARS4-C Sensor Software Operation

Several operational modes based on vehicle speed exist where the sensor measures continuously with pulse frequency modulation (FM). The sensor operates in this mode over its life time in the vehicle, being powered by the vehicle power supply.