



ICON™ Digital Radar

USER MANUAL

Model: MRRICONV01
76-77GHz Automotive Radar Sensor

Magna Electronics Inc.
2050 Auburn Road
Auburn Hills, MI 48326 USA
www.magna.com

Table of Contents

1. Product Overview	3
2. Product Application Examples.....	3
3. Typical Installation.....	5
4. Hardware Description	5
5. Technical Data	6
6. Radio Frequency Radiation Exposure Information	6
7. Conformance Statements	6
8. Revision History.....	7

List of Terminology

ADAS	Advanced Drive Assistance Systems
CAN-FD	Controller Area Network Flexible Data-rate
dBm	Decibel milliwatts (power level)
EIRP	Equivalent Isotropically Radiated Power
FCC	Federal Communications Commission (US)
GHz	Giga-Hertz (10^9)
IC	Industry Canada (IC) Certification
MRR	Mid-Range Radar
PCB	Printed Circuit Board
RADAR	RAdio Detection And Ranging

1. Product Overview

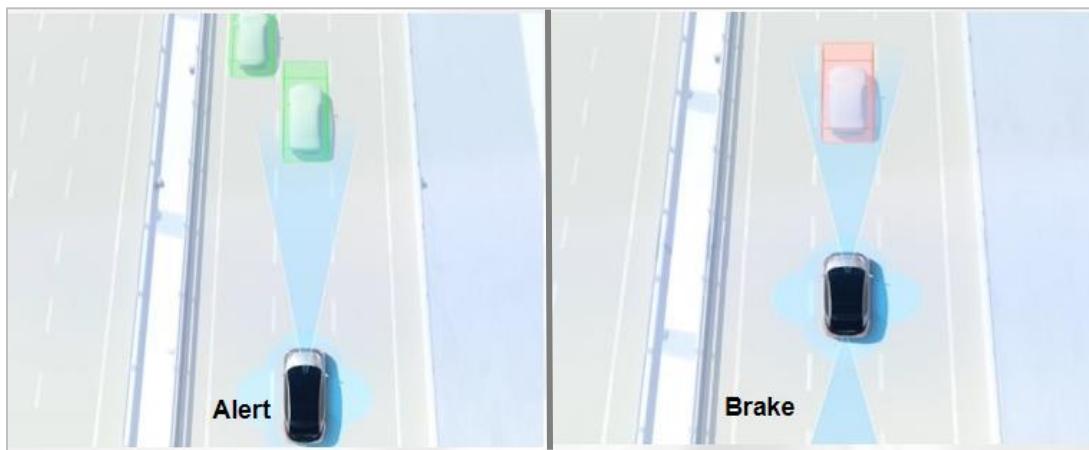
The Mid-Range Radar (MRR) described here is part of the family of ICON™ Digital Radar sensors offered by Magna Electronics. The MRR radar is part of our ADAS platform concept, based on 5 Mid-Range radars – located in the front bumper and all 4 corners of the vehicle – that are designed to enhance vehicle safety systems; support multiple ADAS features and various autonomous driving functions.

2. Product Application Examples

The MRR object, border and environmental detection are used in support of the many ADAS system features, some of the available functionality is shown below:

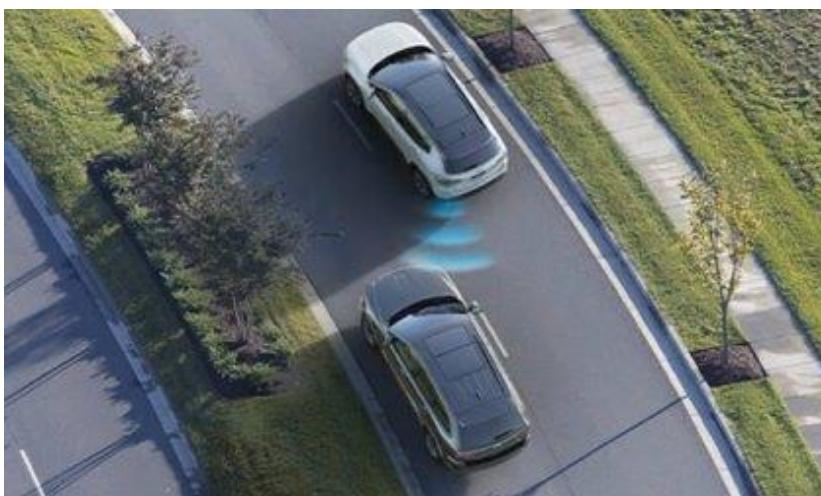
1. Automatic Emergency Braking (AEB)/ Forward Collision Warning (FCW)

AEB/FCW is a SAFETY feature which alerts the driver followed by automatic deceleration in case if a potential threat could lead to vehicle-to-vehicle collision.



2. Blind Spot Detection (BSD)

BSD is an ALERT feature that provides optical alert to driver if there is a vehicle in the blind spot of the Ego vehicle on either side or fast closing target.



3. Pedestrian & Bicycle Collision Warning/Mitigation

Safety feature that alerts the driver followed by automatic deceleration in case of a potential threat that could lead to vehicle-to-pedestrian collision in forward direction



4. Rear Cross Traffic Alert/Brake (RCTA/RCTB)

RCTA/B is a SAFETY feature that prevents collision due to driver distraction or unforeseen events while vehicle moves in reverse direction by providing alert followed by braking if situation becomes critical.



3. Typical Installation

The radar is typically installed in the positions of the vehicle depicted in Figure 1. The unit is mounted behind the front/rear bumper of the vehicle.

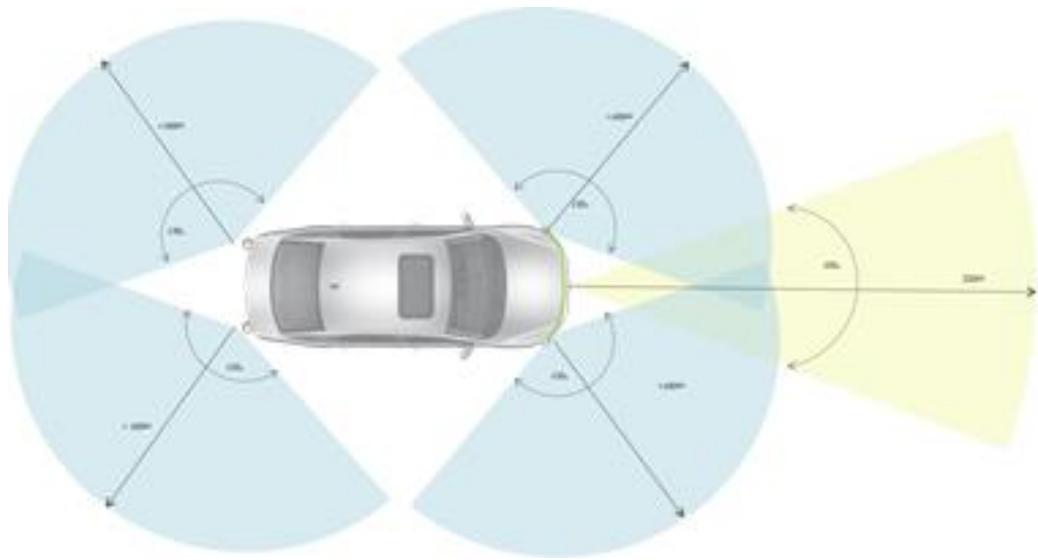


Figure 1: Typical Vehicle Installation

4. Hardware Description

The RADAR assembly consists of one PCB supporting all the electrical components and an RF Antenna assembly. The radar assembly is mounted between the radome (plastic front housing) and the aluminum back housing; the entire assembly is secured using screws.

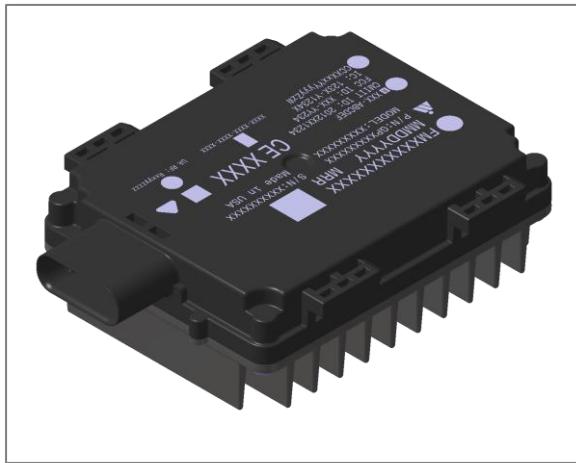


Figure 2: Sensor Front View



Figure 3: Sensor Back View

5. Technical Data

Sensor Specifications	Value
Frequency Band	76 – 77GHz
Modulation bandwidth	< 1000 MHz
Modulation	Digital Code Modulation (DCM)
Cycle Time	65ms
Supply Voltage	9 – 16V
Power Dissipation	9.8W
Vehicle Interface	CAN-FD
Size	93 x 72 x 32mm
Weight	<210g
Operating Temperature Range	-40° to +75°C

6. Radio Frequency Radiation Exposure Information

This equipment complies with FCC and IC 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 IC 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.

7. Conformance Statements

7.1 Canada

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.

7.2 European Union (EU)

Simplified Declaration of Conformity – RE Directive 2014/53/EU

Hereby, Magna Electronics Inc. declares that the radio equipment type MRRICONV01 is in compliance with Directive 2014/53/EU.

- Operation frequency: 76 - 77GHz
- Maximum Output Power: less than 55dBm peak EIRP

The full text of the EU declaration of conformity is available at the following internet address: <https://www.magna.com/type-approval>

7.3 USA

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.

CAUTION TO USERS Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Manufacturer and Address:

Magna Electronics Inc.
2050 Auburn Road
Auburn Hills, MI 48326 USA

Note: This Manual is not intended for the end user. The MRR ICON radar system is not sold separately from the vehicle. All compliance and legal text must be provided by the OEM and located in the Vehicle User Manual.

8. Revision History

Revision	Date	Author(s)	Description/comment
Original	18-Jan-23	CO'Neill	
V1.0	16-Feb-23	CO'Neill	Section 7.2 – added URL
V1.1	22-Feb-23	CO'Neill	Section 6 – added French translation
V1.2	01-Mar-23	CO'Neill	Section 5 – update operating temperature range