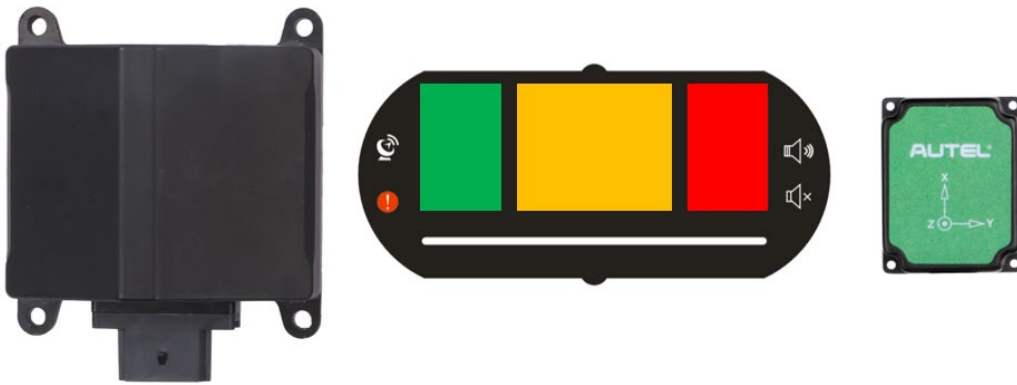


Moving Off Information (R159) System User Guide



R159 Front Radar – FR-001R159

For technical support in all other markets please contact your local distributor.

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1. Moving off Information System Description

Moving off Information System is a smart radar-based detection system with precise target recognition and vehicle blind spot warnings. This system fulfills the MOIS UN ECE R159 safety requirements.

The system components are as follows: a millimeter wave radar with an operating frequency of 76-77Ghz, a warning screen, a GPS and IMU module, and the cable. The millimeter wave radar can accurately measure object distance, speed, angle and other information through the difference in echoes between the transmitting and receiving electromagnetic waves. It is an all-weather and all-day blind spot warning assistant with a working temperature of -40°C - 85°C. The warning screen warns the driver of a dangerous object in the blind spot and reminds the driver to make timely adjustments on the road to avoid collisions.

The Moving off information system covers 180° on one side, no blind spots, with a target detection range of up to 4.2m x 4.2m.

Note: The actual radar detection range is much more than 4.2m x 4.2m. For the MOIS application 4.2m x 4.2m is sufficient.

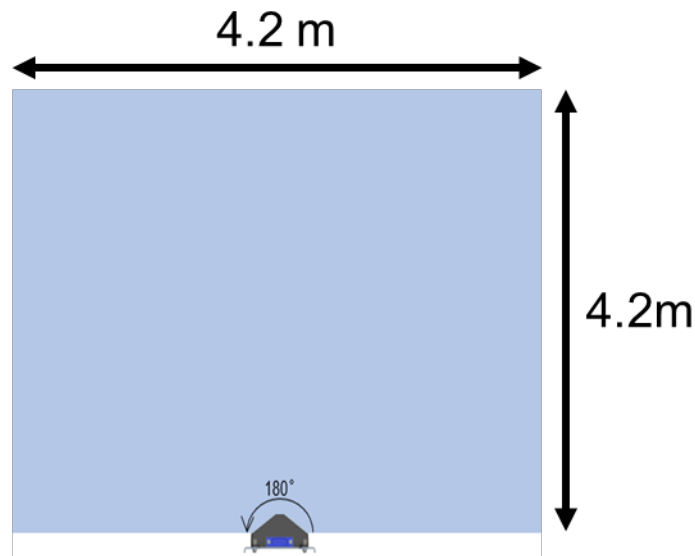


Figure 1-1 ASR100 radar coverage

1.1 ASR100 Radar Introduction

The ASR100 77 GHz millimeter wave radar is a compact, rugged radar sensor designed and manufactured by Autel Intelligence Vehicle® in China to warn heavy duty trucks/buses etc. of side blind spots with IP69K protection housing, in line with the environment for commercial vehicle use.

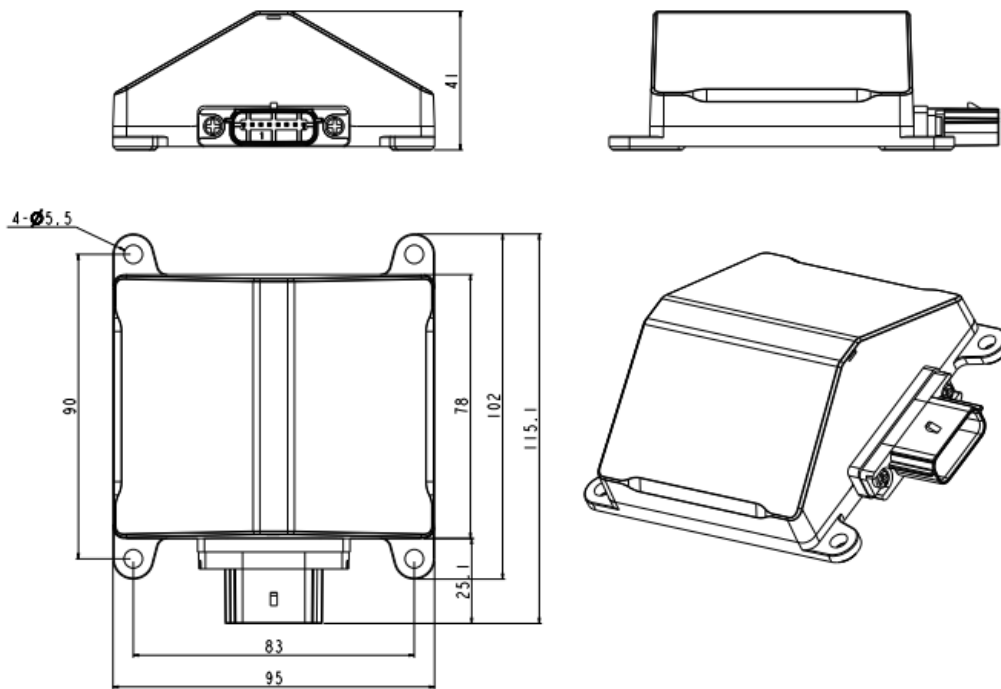


Figure 1-2 ASR100 dimensions

Performance parameters:

working frequency	76-77GHz	
Maximum detection range	±80 m (vehicle) ±40 m (pedestrian/bicycle)	
working mode	slow speed	High speed
minimum detection range	0.25m	0.9m
distance resolution	0.31 m	0.96 m
distance accuracy	±0.16m	±0.5m
speed range	±60km/h	±150km/h
speed accuracy	±0.43km/h	
speed resolution	0.86km/h	

horizontal angle	180°
angular accuracy	±0.8°

General parameters:

size	115mm x 95mm x 41mm
weight	2 30g
power consumption	6.5W
communication interface	CAN2.0
operating voltage _	8V - 32V; Passenger car 12V , Commercial vehicle 24V
operating temperature _	-40°C ~ 85°C
storage temperature	-40°C~105°C
installation angle redundancy	-2°~2°
protection rating _	IP69K
operating cycle	60ms

1.2 Warning display

The warning display is divided into 3 different segments, see picture below. The middle segment represents the front area (front zone) of the vehicle, 2.5meter (width) x 4.2 meter (length). The left and right segment represents the left and right corridor (left and right zone) next to the vehicle. It represents a rectangle area of 1 – 1.5meter(width) x 4.2 meter (length).

The brightness of the warning display adapts automatically to its ambient light environment.



Figure 1-3 Warning Display

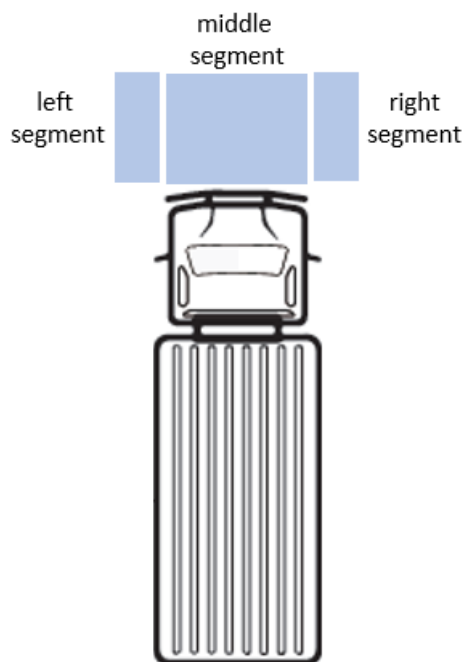


Figure 1-4 Representation of the segments

The warning function is divided into two levels as follows: (Note: Conditions for activating the warning function: The vehicle speed is less than or equal than 10km/h.)

- **Level 1 warning:** The vehicle is static. A red, yellow, or green light is shown if there is an object, for example a VRU (vulnerable road user) inside the left, middle or right zone. A light is shown if there is a static or moving object in middle zone. In the left and right zone, only moving object which is crossing the middle zone

will trigger a warning. A red light is shown if the object is less than 80cm away from the vehicle. A yellow light is shown if the object is between 80cm and 180cm from vehicle. A green light is shown if the object between 180cm and 420cm away from vehicle.

- **Level 2 Warning (collision warning):** The level two warning, or the collision warning once the vehicle is starting to move off and there is an there is an object which has the risk of an imminent collision with VRUs inside the left, right or middle zone. This results a blinking light and an acoustic sound.

Please note that the audible collision warning when moving off is subject to the acceleration of the vehicle.

The driver can get the approximate location of the object based on the segment of warning display.

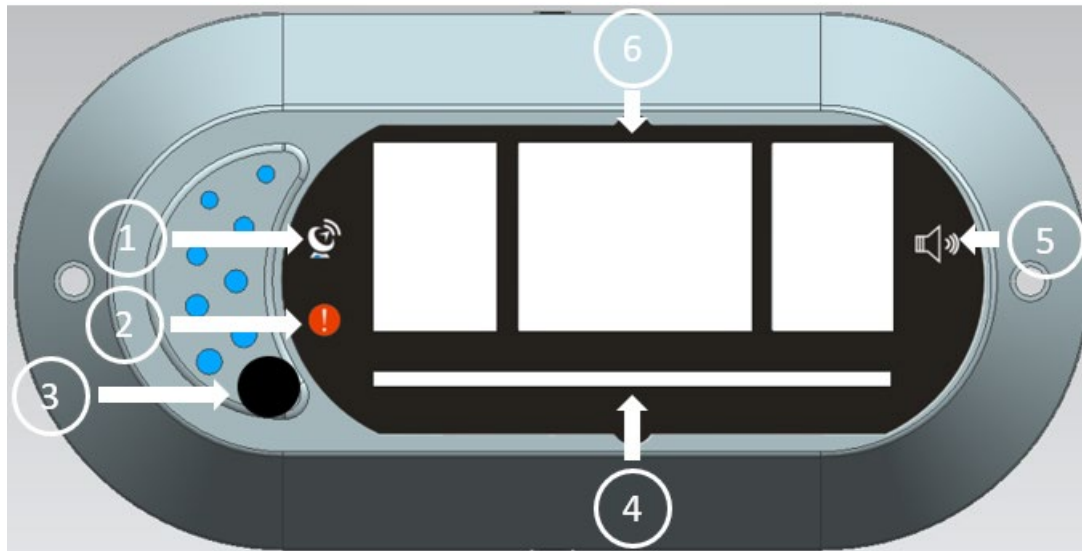


Figure 1-5 Warning display description

- ① GPS error indicator: lights up when the GPS sensor has no signal (temporarily), flashes when the GPS sensor has a permanent error signal.
- ② System error indicator: This indicator flashes when system has a malfunction.
- ③ buzzer sound volume adjustment button
- ④ Power indicator: lights up when the display has power.

- ⑤ buzzer sound: lights up when the warning sound is turned on.
- ⑥ warning zone indicator: light up or flashes if there is an object inside the zone, according to level 1 and level 2 warning logic.

1.3 GPS&IMU module

This module integrates a high-precision gyroscope, an accelerometer and a GPS module. With this module, no input signal such as speed and acceleration from vehicle is needed.

1.4 System connections and the wiring harness

Connect each connector of the radar, display, GPS and IMU module harness as shown below.

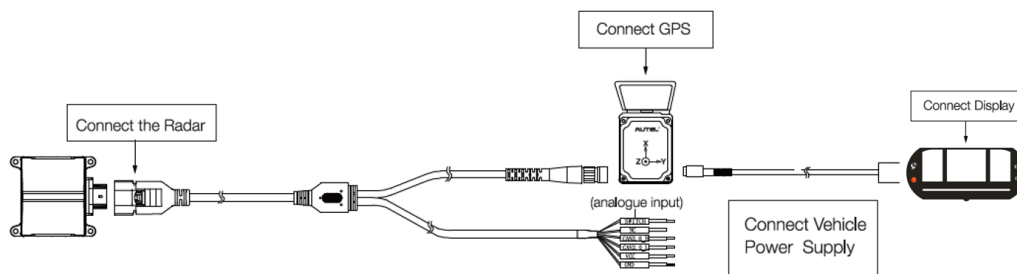


Figure 1-6 System Connections Schematic

2. Installation Guide

2.1 Radar installation

Notes on installation

- The radar should be mounted on a low-vibration component. Strong vibrations will affect the detection function.
- The radar should be installed on the most protruding level in the front of the truck to prevent it from being blocked by other parts and affecting its detection performance.
- The radar installation height should be between 60cm and 120cm.
- The radar should be installed in the center of the vehicle, see figure 2-1.

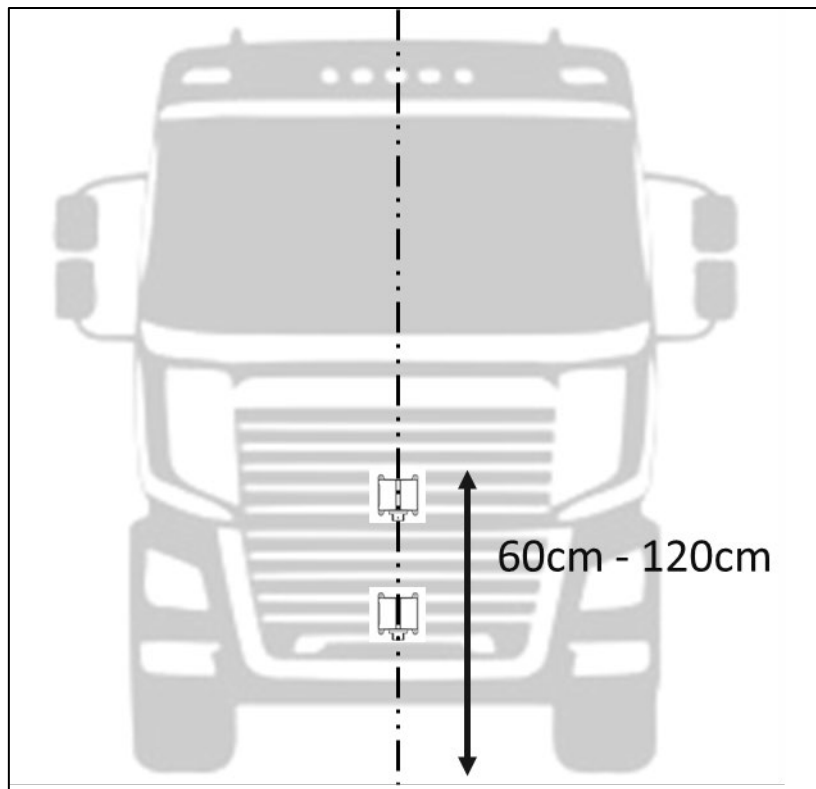


Figure 2-1 Radar Center Installation

Installation Deviation: To ensure detection accuracy, the horizontal angle error of the radar installation should be within $\pm 1^\circ$ at best. The vertical angle error when installing is best within 2° .

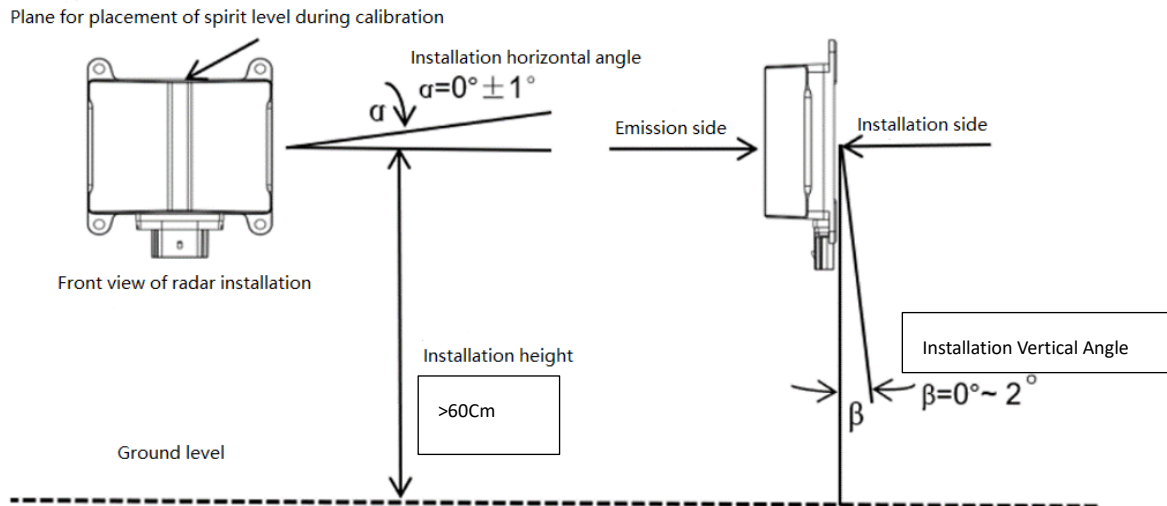


Figure 2-3 Radar Installation Deviation Chart

2.2 Power Access

The radar must be supplied via KL15 or terminal 15 (12V or 24V). We recommend you find KL15 on the main fuse board and connect the radar to it.

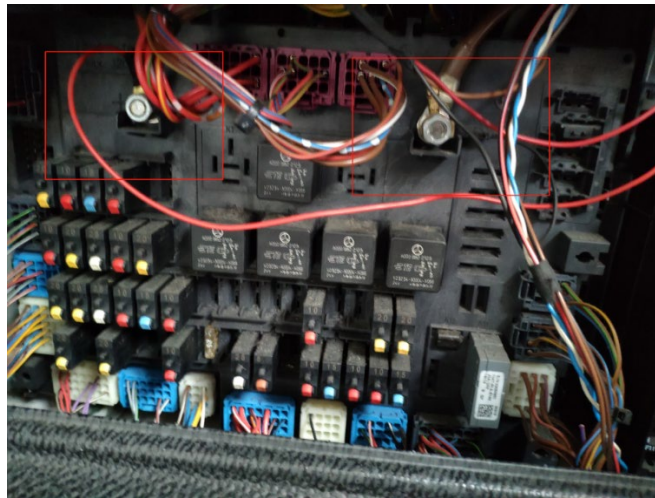


Figure 2-3 Power Access

2.3 Installation of GPS and IMU module

The GPS/IMU module can be placed anywhere in the driver's cabin, the preferred position is behind the windscreen and somewhere in the middle of the cab.

- Place the GPS&IMU module horizontally, noting that the X-axis direction is the same as the vehicle's forward direction.
- The module can be fixed with screws or double-sided tape.
- Connect the two harnesses at the end of the GPS&IMU module to the radar and the

display respectively.

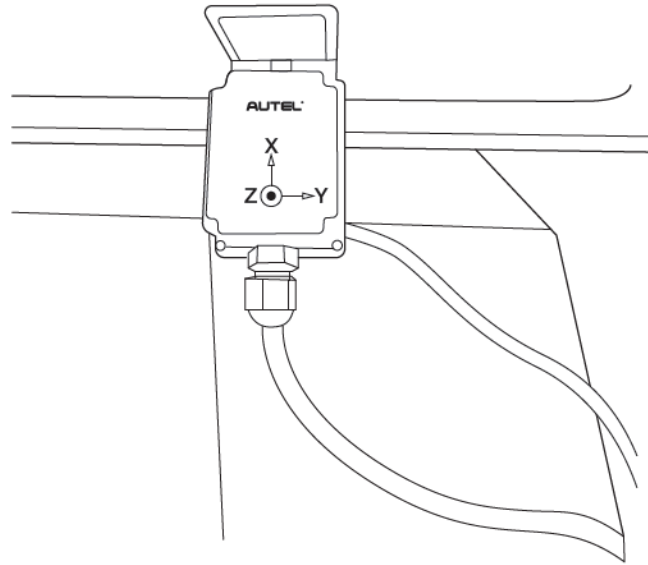


Figure 2-4 GPS&IMU Module Installation