

B S D

Blind Spot
Detection System
User Manual

77Ghz Microwave Sensor

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I. Introduction of Product

Thanks for choosing the blind spot monitoring lane-merging assistant driving system produced by our company. The product is composed of two 77Ghz microwave sensors, two indicators (or special vehicle blind-spot-type rear view mirror), one buzzer and connecting harness.

This set of product will give pre-warning signals when targeting objects enter in adjacent lanes. The product can provide BSD, LCA, RCT and AOA assistance. The major characteristic is microwave sensor is unaffected by bad weather. It could be used normally in all weather and all time, even in foggy, rainy, snowy days or at night. It can detect the speed, angles and relative displacement at the same time for total 32 objects in signal area. Its farthest detection distance is 50 meters, can output level 1 and level 2 warning signals.

II. Product List

Name	Quantity
77-81Ghz microwave sensor	2
In-vehicle pre-warning indicator	2
Power line with buzzer	1
Power extension line	1*(5m)
Extension line of indicator lamp	2
Sensor line	1
Accessories package	1 bag
Bevel protractor	1
User Manual	1

III . Technical Parameter

No.	Item	Specification
01	Working voltage	9- 16V
02	Working frequency band	77 Ghz
03	Working temperature	-40℃ ~ +85℃
04	Power consumption	< 2W
05	Water-proof level	Ip67
06	Distance resolution	0.5m
07	Range accuracy	Superior to 0.18m
08	Detection distance	50m

IV. Production Function

Working mode:

Level 1 Warning: Indicator lamp is always on

Level 2 Warning: Indicator lamp flashes + Buzzer sounds

1. BSD Blind Spot Detection Pre-warning

Detection range: Horizontally 4 meters, longitudinally 15 meters

When vehicle's own speed is faster than 10Km/H, BSD pre-warning mode started:

- A. Targeting object enters the sensor signal area with the relative faster speed (the turn signal lamp does not turn on), it will trigger Level 1 Warning until the target object leaves the alarm area.
- B. Targeting object enters the sensor signal area with the relative faster speed (the turn signal lamp of this vehicle turns on), it will trigger the Level 2 Warning until the target object leaves the alarm area.

2. LCA Lane changing assistance Pre-warning

Detection range: Horizontally 4 meters, longitudinally 50 meters

Working principle: Start when power on, the targeting object enters the alarming range and the relative collision time $< 4.0s$. LCA pre-warning mode started:

A. When targeting object enters the detection area (the turn signal doesn't turn on), it will trigger the Level 1 Warning until the target object leaves the alarm area.

B. When targeting object enters the detection area (the turn signal lamp of this vehicle turns on), it will trigger Level 2 Warning until the target object leaves the area.

3. AOA Overtaking Pre-warming

Detection range: Horizontally 4 meters, longitudinally 15 meters

Working logic: Vehicle's own speed is faster than 10km/H, AOA overtaking pre-warning mode started:

A. This vehicle positively overtakes the other vehicles and the target object is within the alarm area, it will trigger Level 1 Warning until the target object leaves the warning area.

B. This vehicle positively overtakes the other vehicles, the target object is within the alarm area and the turn signal lamp on the corresponding side turns on, it will trigger Level 2 Warning until the target object leaves the alarming area.

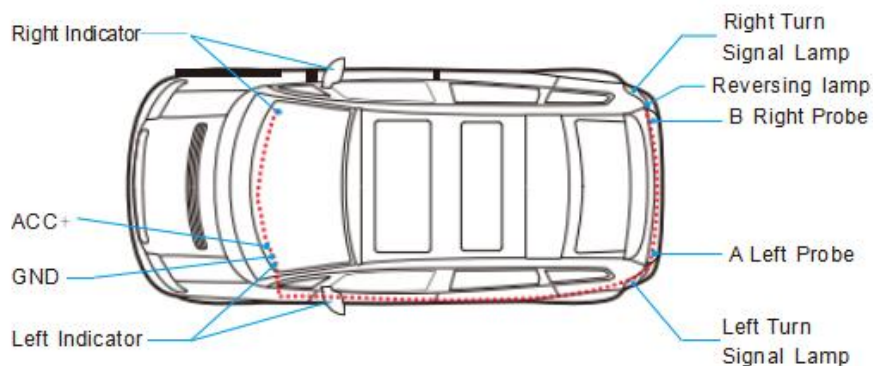
4. RCT Reverse-cross Pre-warning

Detection range: Horizontally 5 meters, longitudinally 5 meters

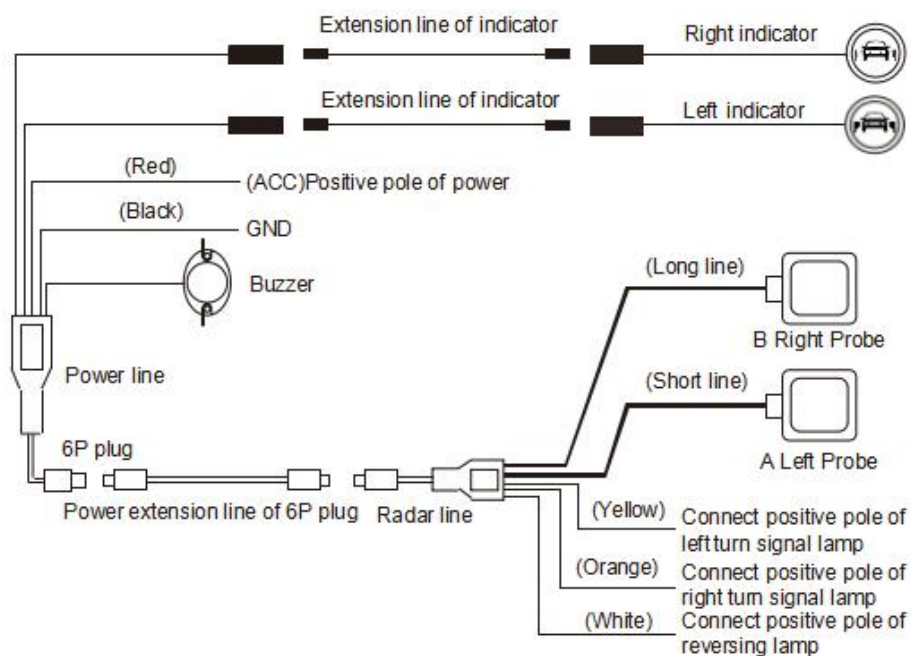
Working logic: Put into R (reversing gear), RCT mode started.

* When the targeting object enters the alarm area, it will trigger Level 2 Warning.

五. Diagram of installation



六. Diagram of line connection



1. Power line connection:

- A. Connect the black line with the negative pole of vehicle or bondstrap.
- B. Connect the red line with ACC power of vehicle (vehicle starts with normal power/stops with no power).
- C. Correspond the extension line of indicator lamp with the indicator lamp, plug in the male and female for connection.

2. Power extension line connection:

Lay out the power extension line from the vehicle head to vehicle tail. Plug in with the power line at the vehicle head, and plug in with the sensor line at the vehicle tail.

3. Sensor line connection:

- A. Plug in with the power extension line.
- B. Plug in with the right and left sensor plugs respectively. Pay attention to the snap of interface, it should be tightened.
- C. Connect the yellow sensor line with the positive pole of vehicle's left turn signal.
- D. Connect the orange sensor line with the positive pole of vehicle's right turn signal.
- E. Connect the white sensor line with the positive pole of vehicle's reverse lamp.

VII . Sensor installation

1. Sensor installation direction





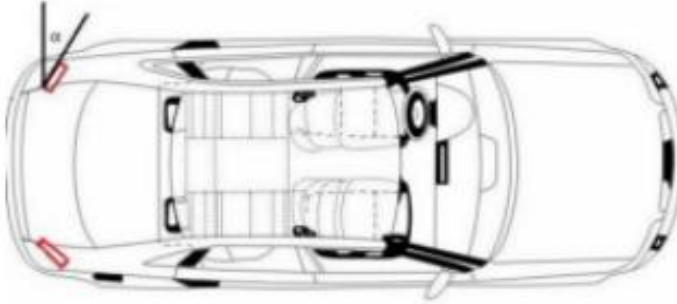
2. Installation Position

- A. It is recommended to install sensor with the height of 0.4-1.0m from the ground.
- B. The installation angle shall strictly comply with the instruction. the angle ruler's arrow is at a 20-degree angle to the sensor;
- C. the straight bar of the angle ruler is parallel to the body of the Vehicle.

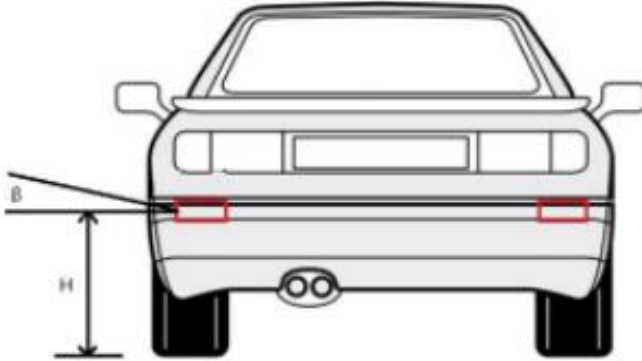
Installation parameter :

	Minimum Value	Maximum Value	Recommended Value
Azimuth α	19°	21°	20°
Pitch angle β	-1°	1°	0°
Installation height H	0. 3m	1m	0. 5m

The diagram for installation is shown as below:



Top View of Radar Installation



Front View of Radar Installation

VIII. Operation Instruction

1. After vehicle ACC powers on, sensor enters working mode.
2. If the vehicle does not turn on the turn signal and double-flash warning lamp, the system will stay in the Level 1 warning status.
3. If the vehicle turns on both the turn signal and double-flash warning lamp, and putting into the R reverse gear, the system will stay in the Level 2 warning status.

IX. Notice

Warninging

Before changing the lanes at the practical lane, please visually check the surrounding areas.

This system is only used to assist you to detect the vehicles behind when changing lanes. Due to some limitations in the actual working environment, sometimes the vehicles have stayed in the adjacent lanes, but the warning signal lamp of system doesn't flash or may delay to flash. Please don't complete rely on this system, and this company shall not take any responsibility for the incident occurred due to this.

Under the following circumstances, the sensor may not warn you:

- a. The vehicle is located at the rear blind spot of adjacent lanes and keeps the relative same speed for long time.
 - b. The adjacent lanes where vehicle is located are extremely wide, which exceeds the computation range of sensor signal.
 - c. When driving through the hills or top of hill roads.
2. If the roads are narrow, it is possible to detect the vehicles of two lanes.
3. The pre-warning signal lamp of this system may be turned on to the stationary objects on the road or roadside.
(e.g. guardrails/walls/tunnels/greenbelts etc.)

