# Commercial vehicle blind zone warning system CAR-B15
# Radar product manual

# Disclaimers

Thank for purchasing this product.

Before using this product, please read this statement carefully. Once used, it is considered to be an acknowledgement and acceptance of the content of this statement. Please strictly follow the manual to install and use this product. If there is any improper use, resulting in damage or injury, we will not bear the corresponding loss and compensation liability.

| Date | Version | Version update records |
|---|---|---|
| 2023/6/8 | 1.0 | release |
| 2023/8/25 | 1.1 | adjust format |

# Contents

# I. Introduction

The high incidence of commercial vehicle traffic accidents has become a serious potential safety hazard.

All large vehicles have a common characteristic, which is long wheelbase, large body, high seats, large internal and external wheel differences, etc., which together lead to large blind zones around the body. In the vicious traffic accidents caused by large vehicles, accidents caused by internal wheel differences account for more than 70%, and the mortality rate is over 90%. Therefore, in order to reduce the accident rate of large trucks, it is necessary to make the blind zone of large trucks "disappear".

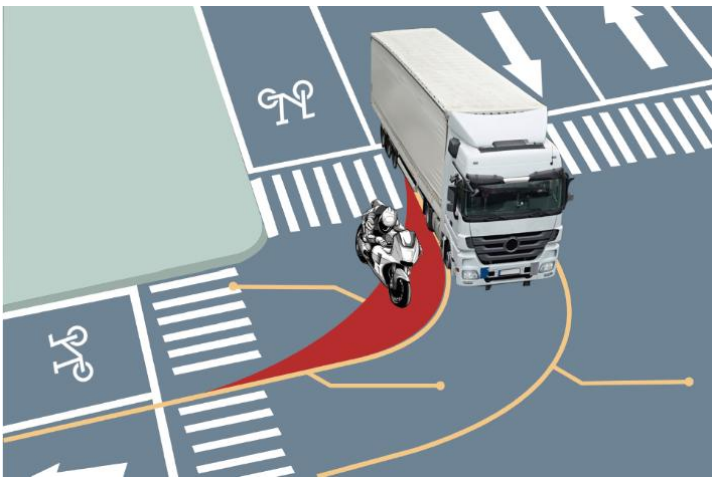

Figure 1.1 Right blind spot of large truck (red area)

Commercial vehicle blind spot monitoring radar is a radar that provides early warning for targets in the blind spot on the right side of the vehicle. With its unique ability to penetrate smoke, fog, and dust, it can be used in all weather and all-day applications.

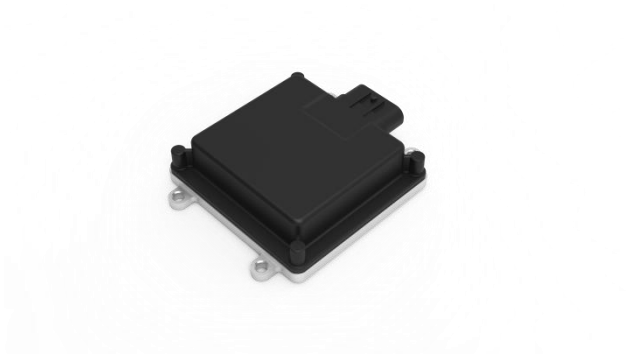

Figure 1.2 CAR-B15 commercial vehicle blind zone monitoring radar

# II. Radar parameters

- Working Frequency：77-78 GHz
- Dimension (L*W*H)：92.4*76.1*22.3mm
- Model：CAR-B15
- Weight：350g
- Water proof：IP67

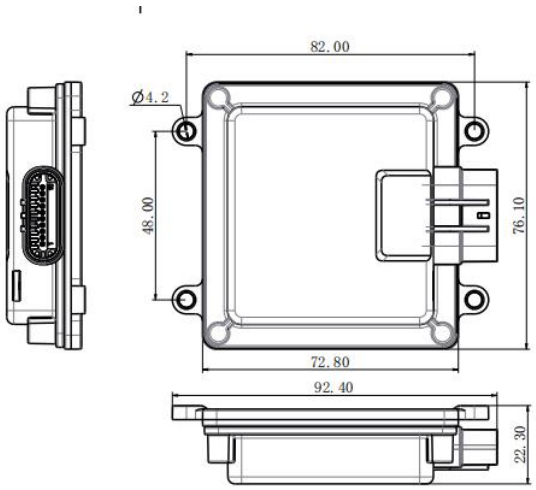


Figure 2.1 Dimension drawing of radar

Remarks:

Undeclared dimensional tolerance: When ≤10mm, the tolerance is ±0.3mm; when between (10~50)mm, the tolerance is ±0.5mm; when ≥50mm, the tolerance is ±0.8mm.

# III. Technical Data

Commercial vehicle blind spot monitoring radar uses a highly complex FMCW modulation mode, which can accurately measure the coordinates and speed of the target relative to the radar within the measurement range.

Table 3.1 Performance Parameters

| Performance | Parameters | Technical indicators |
|---|---|---|
| **Operating conditions** | Input voltage | 9-36V DC |
| | Operating temp of radar | -40℃~85℃ |
| | Operating temp of BOX | -10℃~65℃ |
| | Power consumption | <4W(12V DC) |
| | Measuring principle | FMCW |
| | Cycle time | 50ms |
| | Water proof | IP67 |
| | Radar operating Freq band | 77-78 GHz |
| | Dimension(L*W*H) | 92.4*76.1*22.3mm |
| | Weight | 350g |
| | Azimuth beam width（-6dB） | ±70° |
| | Elevation beam width（-6dB） | ±20° |
| **Measuring performance** | Resolution distance measuring | 0.5m |
| | Accuracy distance measuring | ±0.2m |
| | Distance range | 0.2~10m（Y） |
| | Velocity accuracy | ±2km/h |
| | Velocity resolution | 2km/h |
| | Accuracy azimuth angle | ±2° |

| | | |
|---|---|---|
| | Resolution azimuth angle | 15° |
| **Interface** | Interface of radar | CAN (500kb/s) |

## IV. Shipping list and Radar wiring instructions

Table 4.1 shipping list

| No. | Commodity | Quantity |
|---|---|---|
| **1** | Radar | 1 PCS |
| **2** | Control Box | 1PCS |
| **3** | Alarm& Buzz | 1PCS |
| **4** | Acousto-optic alarm | 1PCS |
| **5** | Main wire | 1PCS |
| **6** | Extension cord | 1PCS |
| **7** | Mounting bracket | 1PCS |
| **8** | Accessory screw package | 1PCS |

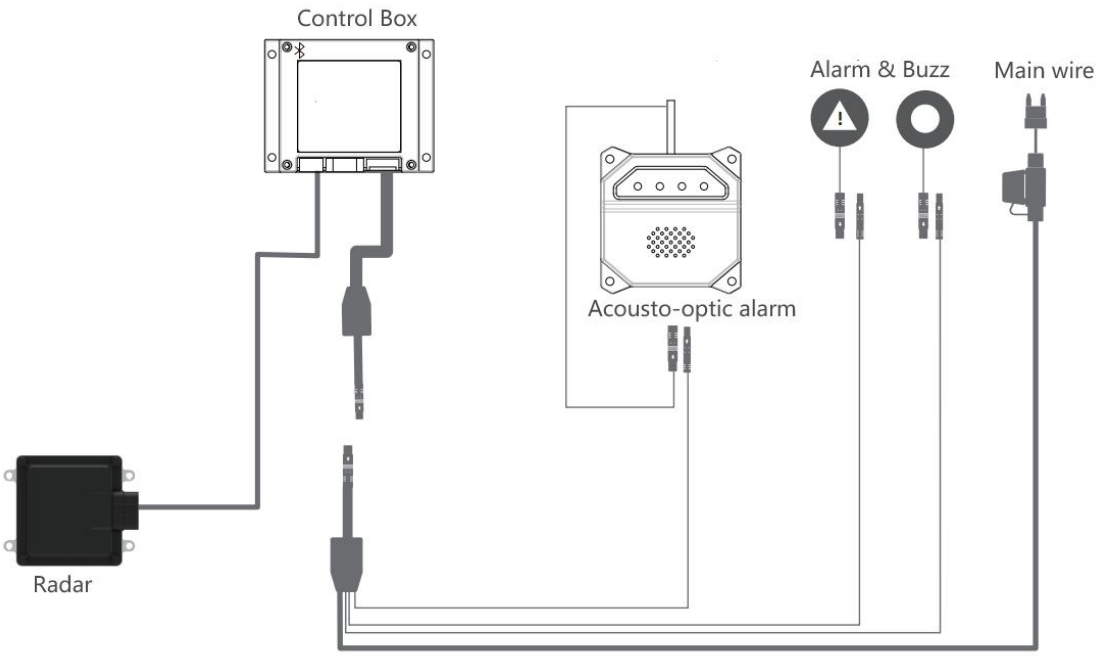


Figure4.1 Wiring diagram of radar system

Note: The wiring of the radar system needs to be strictly aligned with the jacks according to the instructions, otherwise it may have adverse effects on the radar alarm function.

Function description:

1. Power-on self-test of the control box: the buzzer sounds "2" and the alarm lamp flashes "2" times;

2. If the alarm light is always on, it means that the radar has not been successfully connected;

# V. Quick guide

## 4.1 Blind area monitoring and warning strategy

Install the radar on the right side of the vehicle body according to the recommended installation angle (or use the installation instructions), and connect the corresponding wire harness interface to the vehicle body. It is recommended to install the radar at a height of 1.1-1.5 meters above the ground, with a horizontal position of 1-2 meters from the front of the vehicle. The radar connector should face the rear of the vehicle. The installation diagram is shown below:

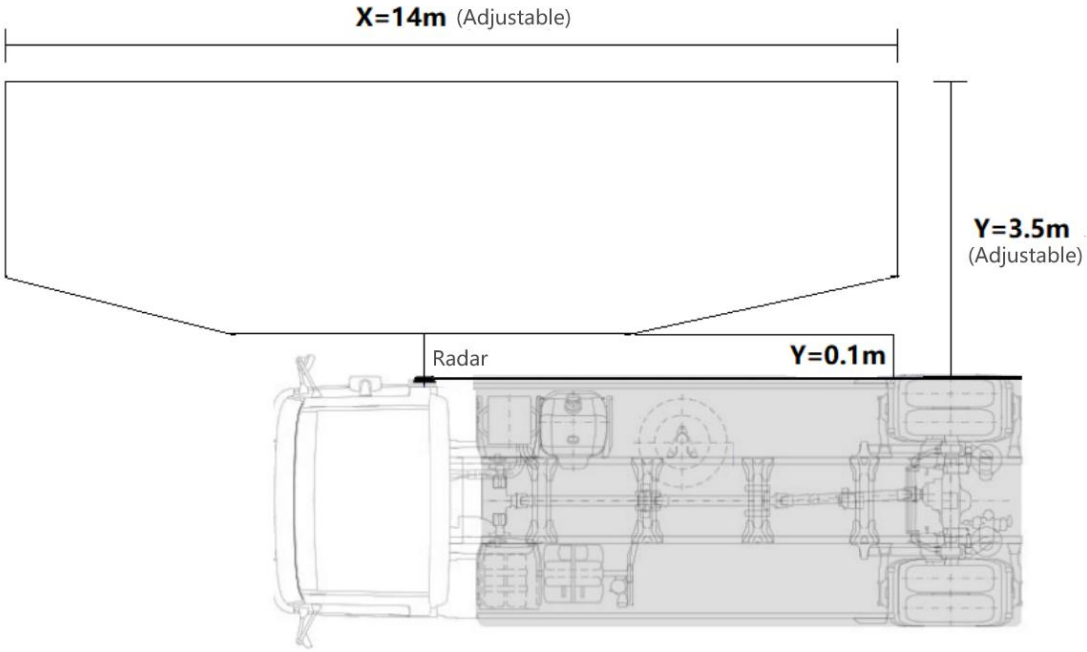


Figure5.1 Top view of radar detection area


Figure5.2 Schematic diagram of radar installation

# VI. Function description

## 6.1 Alarm area setting

The alarm range can be set by connecting the app or mini program through the Bluetooth function of the control box. The alarm range is shown in the figure.

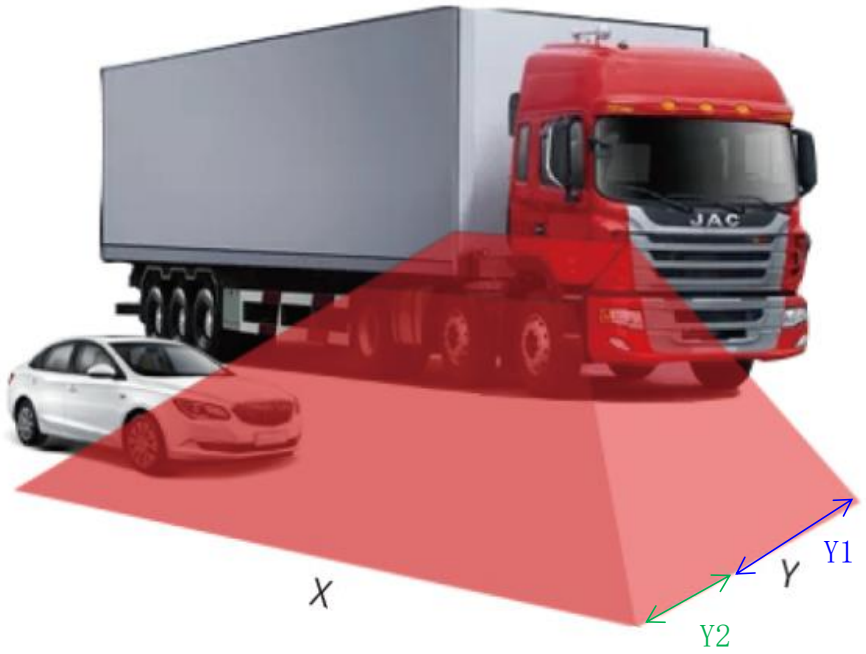


Figure6.1 Alarm range diagram

Alarm logic:

| **Detection area** | Self-speed | | Targets | **Alarm area** | |
|---|---|---|---|---|---|
| | Default speed | Speed setting | | Default area | Area setting |
| **Default parameters by factory** | Start alarm speed 10km/h | | Dynamic targets | X 14m，<br>Y 3.5m | |
| X1<br>Y1 | / | / | Static/Dynamic targets | X 14m，<br>Y 3.5m | Y1：0.5~2m<br>Buzz alarm freq：<br>0-3Hz adjustable |
| X2<br>Y2 | 10≤V<70km/h | 0~70km/h | Dynamic targets | | Y2：2~3.5m<br>Buzz alarm freq：<br>0-3Hz adjustable |

## 6.2 Blind area monitoring and warning logic

**A、Vehicle is stationary (self-speed=0km/h)**

When the commercial vehicle is stationary, the detection area on the side is 7 meters in front of the radar sensor and 7 meters behind the radar sensor, with a distance of 3.5 meters from the side of the vehicle (default setting), and the system warns all targets within the detection range;

**B、Vehicle driving (self-speed>0km/h)**

After the commercial vehicle is started, it will start to alarm for targets (people, bicycles, motorcycles, cars) on the right lane that meet the alarm conditions, providing better driving experience and danger warning prompts for the driver. At this time, the detection area on the side is located 7m in front of the radar sensor and 7m behind the radar sensor, 3.5m from the side of the vehicle (default setting), and the system will warn for moving targets (speed>10km/h) within the detection range. Note: To prevent false alarms, stationary targets on the roadside have been filtered.

## 6.3 APP setting

### 6.3.1 APP download

Please use your phone's browser to scan the QR code on the product packaging and download the app as instructed. During installation, some phone models (such as Xiaomi) may not allow the installation of external apps by default. In this case, please turn off the clean mode. Alternatively, search for "Radarbo" in APP store.

### 6.3.2 APP rights setting

When opening the app for the first time, select "OK" when prompted for permission. When prompted for permission to search for and connect to nearby devices, select "Agree", "Allow", or other buttons to allow the app to obtain permission.

### 6.3.3 Connecting devices

Click the "Connect Device" button. If Bluetooth is not currently turned on, a prompt will appear asking to turn it on. Click "Allow".

In the pop-up Bluetooth list, select and click the device you want to connect to. The Bluetooth of the

radar usually starts with radar. The closer the RSSI (signal strength) is to 0, the larger the absolute value is, and the closer the signal strength is. The App will automatically mark the nearest Bluetooth.

After successfully connecting to the Bluetooth device, the connection status of the left and right installed radars will be displayed. Green indicates that the radar in the current installation position (left or right) is in a connected state, while the radar in the status bar is red.

#### 6.3.4 Confirming Radar Connection

After clicking the reboot button, the radar will emit a "beep beep" sound as a prompt, which can be used to confirm whether the App has normally connected to the radar or to find the radar's location.

#### 6.3.5 Radar Parameter Settings

##### 6.3.5.1 Setting Radar Installation Position

When setting the radar installation position, please ensure that the current control box is connected and only connected to one radar. Click the "Set Radar Installation Position" button and follow the prompts in the pop-up window to set it up.

##### 6.3.5.2 Enter the radar parameter setting page

Clicking the currently connected radar will enter the parameter setting interface of the current radar.

##### 6.3.5.3 Adjusting the alarm parameters in the area:

A. Adjusting the "Area ID" allows for parameter adjustment for the corresponding area. In the debug interface, both red and blue indicate alarm areas, with red indicating the currently selected alarm area being adjusted.

B. Click the adjustment button of the corresponding parameter, and the alarm area in the schematic diagram will change according to the adjustment.

C. Click "Get Parameters" to obtain the parameters of the current alarm area.

D. Click "Restore Factory Settings" to restore the current radar parameters to the default state at the factory.

E. Click "Save Parameters" to save the parameters of the current alarm area.

# VII. Firmware update

Firmware updates are divided into control box firmware updates and radar firmware updates. The control box and radar firmware are independent and can be updated separately.

## 7.1 Control Box Firmware Update

Note: After the firmware update of the control box begins, it cannot be interrupted, stopped, or cancelled. The control box cannot be powered off or disconnected from Bluetooth.

Click on the advanced mode in the radar parameter interface, select the "control box firmware upgrade" button, and enter the administrator password.

selecting an update method,

A. Direct detection and update: Based on the current firmware version of the control box,

automatically detect whether there is an updated version, and if there is an updated version, prompt to download the update.

B. Download code update: The technical support staff will distribute the download code to the specified version through offline channels.

C. Update the local download directory: Select the bin file in the local download directory for updating. It is necessary to ensure that the source of the bin file comes from the manufacturer's official channel.

## VII. Precautions for product use

A.Use 3 PA3*12 screws or 3M glue to fix the radar.

B.Please keep the radar cover clean during installation. To clean the cover, wipe it with a soft, damp cloth and allow it to dry naturally.

C.During installation, please pay attention to the shape of the radar to ensure that the installed radar is not deformed, and do not squeeze, bump, or drop it.

D.During installation, try to stay away from high-power electrical equipment and motors that are frequently started and have strong magnetic field interference.

E.During the test, there should be no obstructions within the radar beam range, and the test environment should be as spacious as possible to avoid affecting the measurement results.

F.During installation, ensure that the radar is a factory-shipped part and do not disassemble it yourself.

G.If you encounter any problems that cannot be solved during the installation process, please contact our technical staff and we will be happy to serve you!