JINWEI HIRAIN SRR520 Short-Range Ranging Sensor Instruction Manual

JINWEI HIRAIN SRR520 Short-Range Ranging Sensor

Contents

Introduction

Purpose

This document introduces the Rear short-range ranging sensor (SRR) that designed and manufactured by Beijing Jinwei Hirain Technologies Co., Inc.

Scope

This document is used for reference only to the Rear short-range ranging sensor customers of Beijing Jinwei Hirain Technologies Co., Inc.

Terminology

SRR: Rear short-range ranging sensor
BSD: Blind Spot Detection
RCTA: Rear Cross Traffic Alert
DOW: Door Open Warning
RCW: Rear Collision Warning

Product

Rear short-range ranging sensor is installed right in the side of the vehicle, intended to detect, measure, track and identify obstacles in the target region. SRR mainly supports the functions of BSD RCTA FCTA DOW LCA for ADAS with L2 and above.

Radar Principle

SRR520 uses the pulse doppler (PD) scheme as basic principle for its measurements. Compared with frequency modulated continuous wave (FMCW), it avoids the serious coupling between range and doppler domains,

because these are mapped to a 2-dimensional frequency range by two succeeding fast Fourier transformations (FFTs), that are calculated in the processing unit of the sensor.

Antennas

SRR520 uses 3 Tx antennas and 4 Rx antennas to radiate the microwave signals generated by radio frequency (RF) chip into the air and receive echoes reflected by targets. The gain is 16dBi for both antennas and 13dBi for single antennas

FOV

FIG. 1 shows the beam coverage area of passenger car after the Rear short-range ranging sensor.
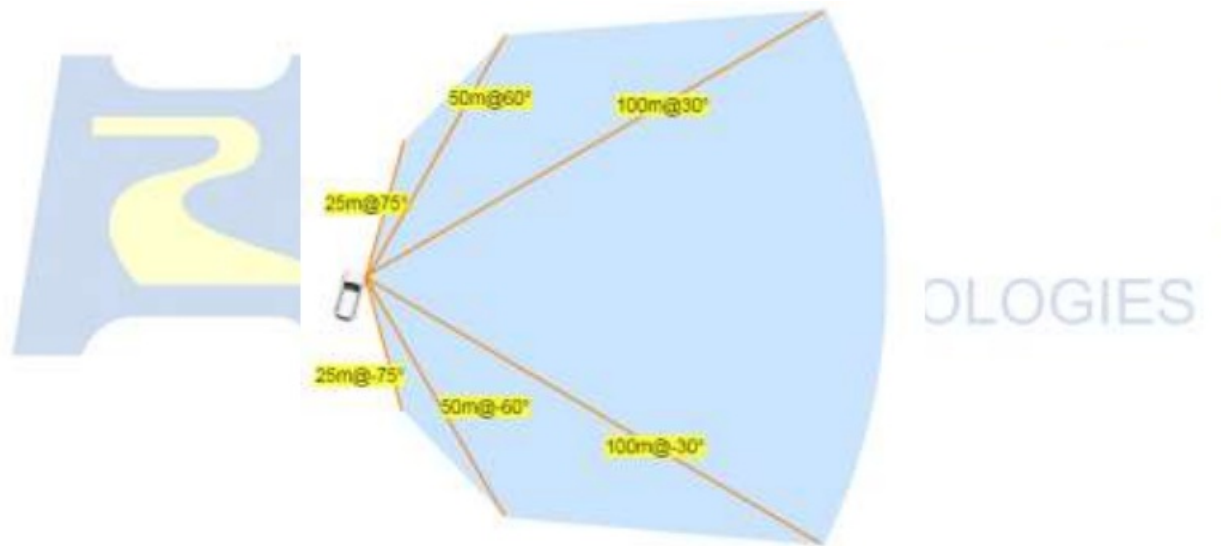

Figure 1 Schematic diagram of FOV

Parameters

Table 1 Performance index of Rear short-range ranging sensor system

Parameters	Value
System Characteristics	
Frequency	76~77 GHz
Operating voltage	9V~16V
Weight	120g
Update Rate	50ms
Functional Safety Level	ASIL B
Range	
(Range-Azimuth Plane)	±75°
Range	0.5~100m
Velocity	-110 m/s ~50 m/s
Elevation	±10°
Target Detection Ability	
	500h
Multi-Objects Discrimination Ability	
Range Resolution	< 0.4 m
Velocity Resolution	< 0.14m/s
Angular Resolution	< 7°
Parameter Precision	
Range Precision	< 0.1 m
Velocity Precision	< 0.05 m/s
Azimuth Precision	< 1°
Output Number of Tracking Targets	64
Output Number of Point Cloud (Optional)	<=200
transmitted power	< 33.9dBm
Power Consumption	< 5W
Nominal Voltage	12V
Operating Temperature	-40~ 85 ℃
Storage Temperature	-40~ 105 ℃
International Protection	IP6K9K
Interface	2xCAN/CAN-FD 1xEthernet

Geometric Structure

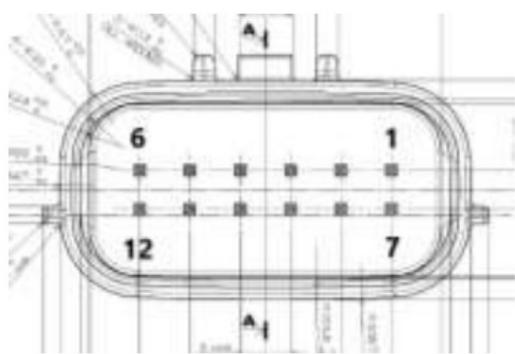Rear short-range ranging sensor size is: 70mm * 65mm * 31mm (with connector

Figure 2 Structure diagram

Model No. of Harness Connector

Table 2 Model No. of Harness Connector

Connector Type	Model No.	Supplier
12 Pin Connector	6189-8374	Sumitomo
Terminal	6188-6387	Sumitomo

(a) Connector in PCB

(b) Connector in Harness

Figure 3 Views of the Connector

Pin Definition of the Connector

Table 3 gives the measured pin value of the SRR operating in 12 Voltages.

1	N.C	
2	POS1	
3	CAN1_L	CAN1
4	CAN2_L	CAN2
5	POS2/ High Side Driver1	
6	POWER	
7	N.C	
8	GND	
9	CAN1_H	CAN1
10	CAN2_H	CAN2
11	IGN/High Side Driver2	
12	High Side Driver3	

Label

FCC ID: 2A7MKSRR520
Label size 30mm*20mm
Software version number sw.1.00.00
**hardware version number** hw.1.00.00 IP6K9K

1.5±0.2
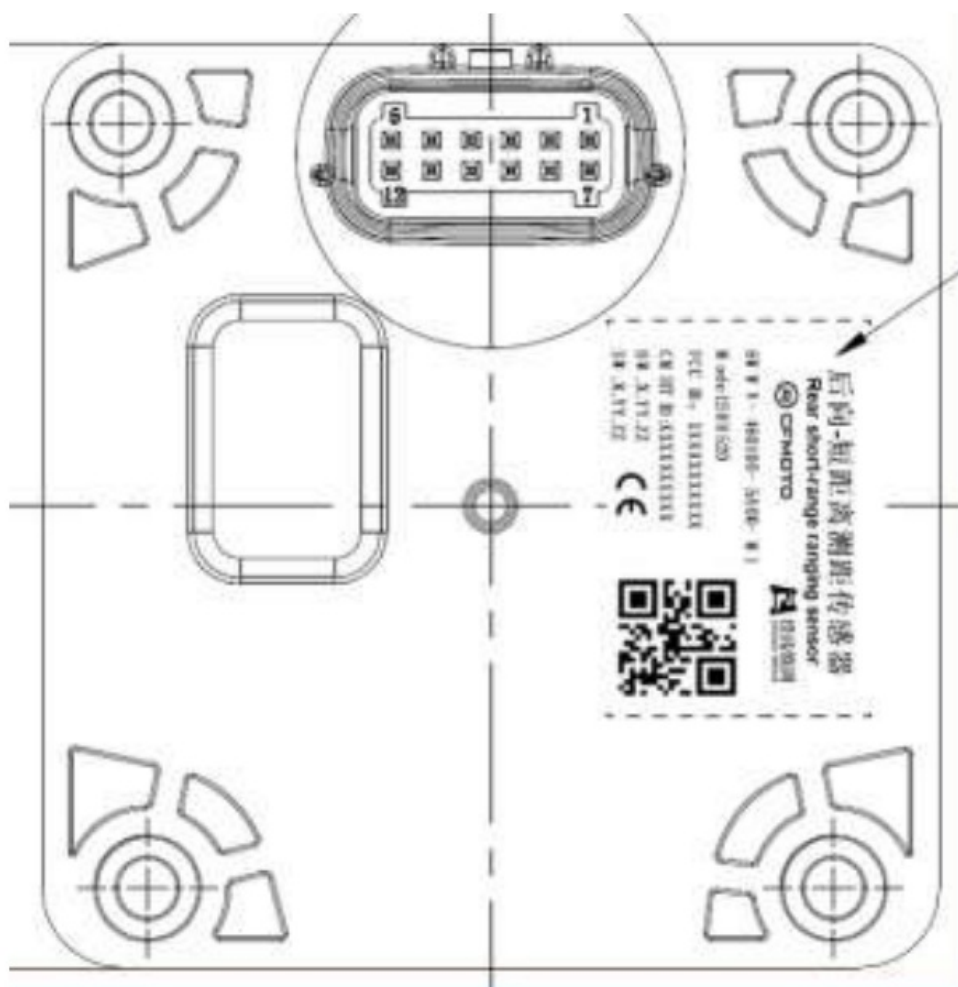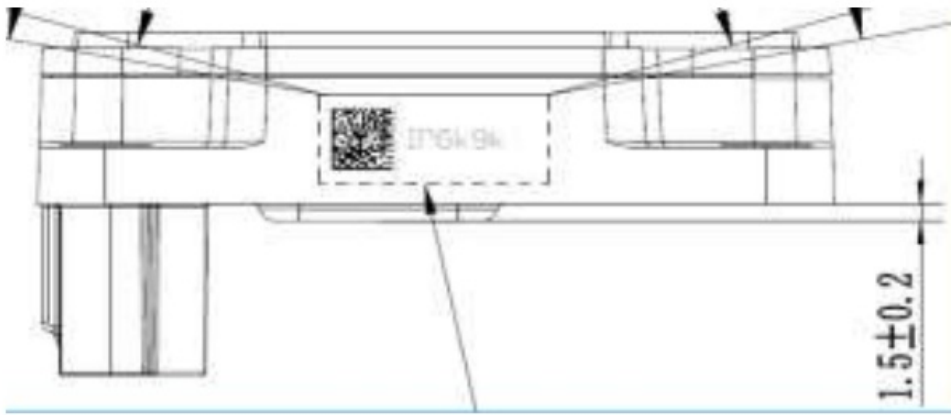
Radar function

BSD

The function is defined as real-time monitoring of the driver's visual field blind area and warning information when other road users appear in the specified blind area.

The main function of the blind area monitoring system is to monitor other traffic participants in the blind area of the driver's visual field, and to give early warning to the driver. The blind spot monitoring function covers adjacent areas on the left and right sides, and the target vehicles are ordinary mass-produced vehicles or motorcycles. System functions are realized by judging the following information:

1. The relative distance between the car and other traffic participants;
2. The relative speed of the car and other traffic participants;
3. Whether other traffic participants are located in the blind area monitoring range.
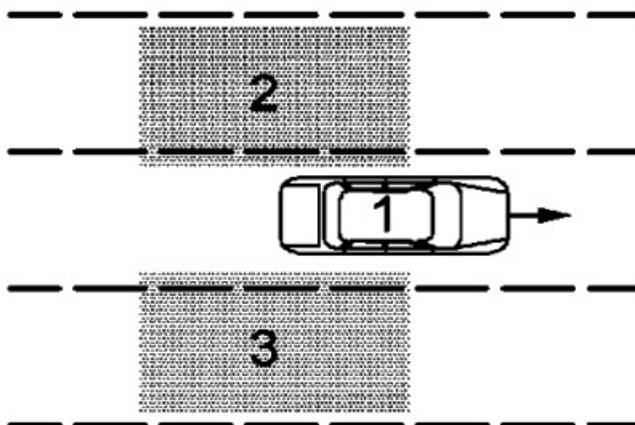
DOW

The function definition is to monitor the rear of the vehicle which may endanger the safety when the door is about to be opened in the parking state, and to issue warning information when the risk of collision may occur due to the door opening.

The door opening reminder system has an alarm function. If there is a risk of collision with other traffic participants when the driver and passenger open the door,the system will send an alarm to the driver and passenger. System functions are realized by judging the following information:

1. Vehicle speed

2. The relative speed between the car and other traffic participants

3. Whether other traffic participants are located in the DOW alarm area

4. The relative distance between the car and other traffic participants Based on the above information, an alarm is issued to the driver and passenger according to the risk of collision.
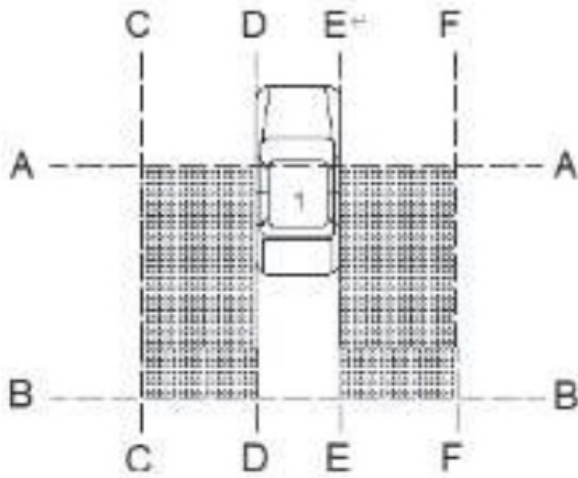

RCTA

The function is defined as monitoring the situation that may endanger the safety in the rear lateral of the vehicle under the state of reversing, and issuing warning information when the risk of collision may occur.

The main function of the vehicle rear lateral traffic warning system is to send an alarm to the driver when there is potential conflict danger between the vehicle and the vehicle. System functions are realized by judging the following information:

1. The relative distance between the car and the coming car;

2. The relative speed between the car and the car;

3. Whether the autonomous vehicle is located on the front track of the incoming vehicle. Based on the above information, the controller sends an alarm to the driver according to the degree of driving danger.
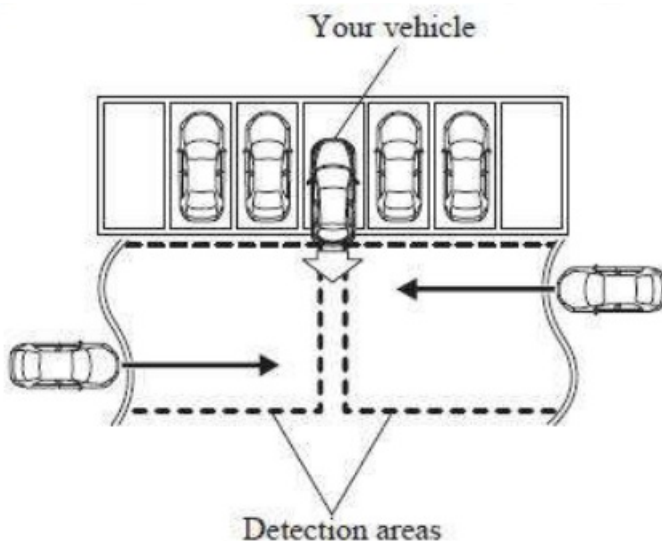
MANUFACTURER INFORMATION

Manufacturer Beijing Jingwei Hirain Technologies Co., Inc.

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NOTICE

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

To maintain compliance with the RF exposure requirement, a separation distance of 20 cm between the device and the human should be maintained.

Beijing Jinwei Hirain Technologies Co., Inc.

HIRAIN TECHNOLOGIES

Documents / Resources

后向短距测距传感器（雷达） 产品介绍 Introduction to Hirain's Rear Short-range Ranging Sensor (Radar) 北京经纬恒润科技股份有限公司 Beijing Jinwei Hirain Technologies Co., Inc.	**JINWEI HIRAIN SRR520 Short-Range Ranging Sensor** [pdf] Instruction Manual SRR520, SRR520 Short-Range Ranging Sensor, Short-Range Ranging Sensor, Ranging Sensor, Sensor