

# Reversing sensor manual (2 and 4 sensor version)

## 1.0 INTRODUCTION

The parking assistant system shall be an ultrasonic system for distance monitoring that electronically detects the area behind the vehicle and warns with acoustic signal and the digital display that an object behind the vehicle has been detected.

In addition, the display can be set manually with the PIP switches to customize the installation according to user's requirements. This system can operate within the temperature range from  $-40^{\circ}\text{C}$  to  $+80^{\circ}\text{C}$ .

## 2.0 Properties

1. Detection range: 0.3 -2.1 metres
2. Self-test feature started by switching the system on
3. Visibility range of display to the object: 0.3 to 2.1m
4. Advanced detection technology for lower non-detection area ( $170^{\circ}$ )
5. Operating temperature range:  $-40^{\circ}\text{C}$  ~  $+80^{\circ}\text{C}$ .
6. Sensor area available for washing and painting.
7. (Option) Multicolour display with LED bars/strips and numeric display.

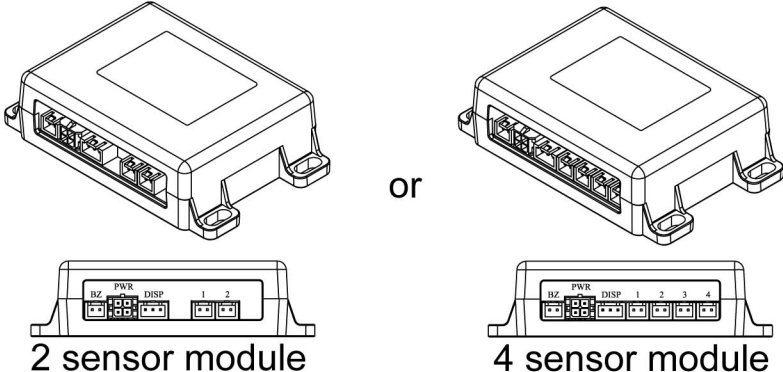
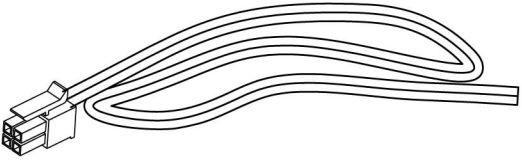
## 3.0 Specification




1. Supply voltage: DC 10V - 25V
2. Maximum current consumption: 100mA incl. display
3. Operating temperature range:  $-40^{\circ}\text{C}$  ~  $+80^{\circ}\text{C}$
4. Operating humidity range: up to 95%
5. Maximum detection range: 7 ft / 2.1m

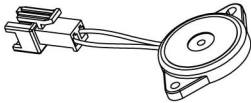

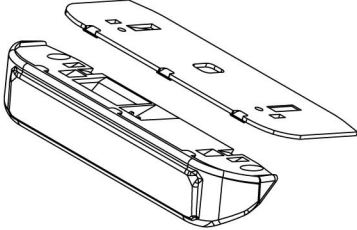

Dealer:



## 4.0 System components

Control module	Power cable
 <p>or</p> <p>2 sensor module</p> <p>4 sensor module</p>	 <p>Power cable</p>

Types of sensors	Sensor cable
 <p>Round sensor</p> <p>or</p>  <p>Angle sensor</p> <p>For non-metallic and non-swivelled bumpers</p> <p>For non-metallic and up/down swivelled bumpers</p>	 <p>Sensor cable</p> <p>4 sensors = Qty 4 pcs</p> <p>2 sensors = Qty 2 pcs</p>

Output	
 <p>Buzzer</p>	 <p>Buzzer cable</p>
and	
 <p>Display and console</p>	 <p>Display cable</p>
or	

## 5.0 Wiring diagram

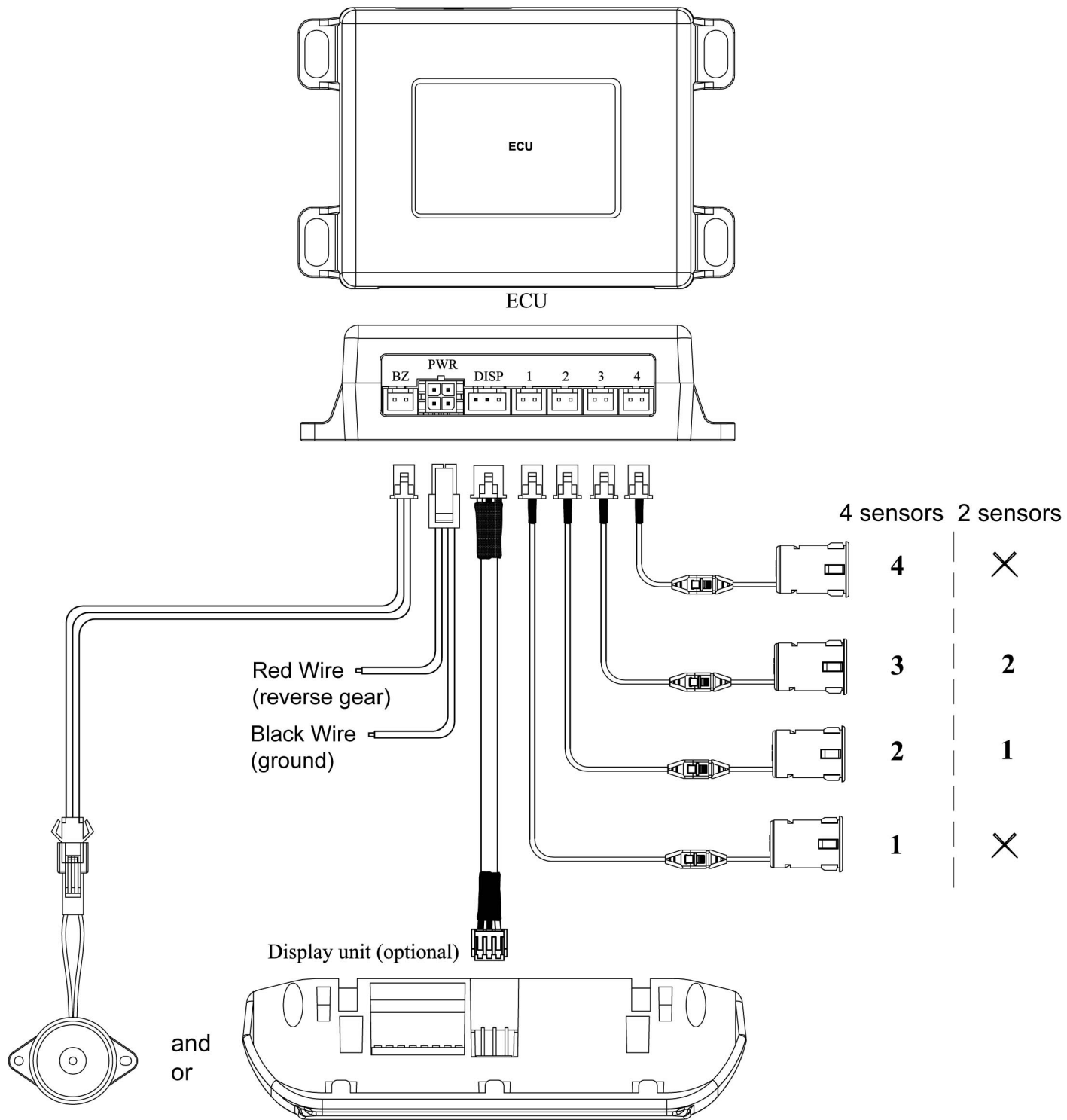


Figure 1.0 (wiring diagram)

### Remark:

Output of the rear system can use both display and (optionally) buzzer at the same time, or only display or only buzzer. To avoid confusion, it is recommended to use only buzzer or optionally display.

## 6.0 Installation

### 6.1 Sensor location

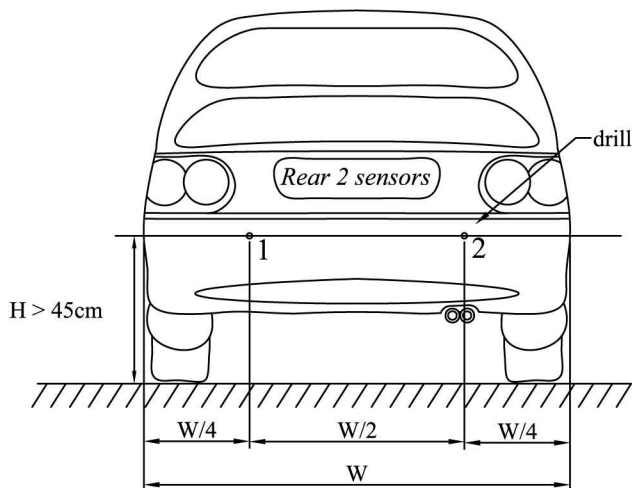


Figure 2.0 (2-sensor dimension)

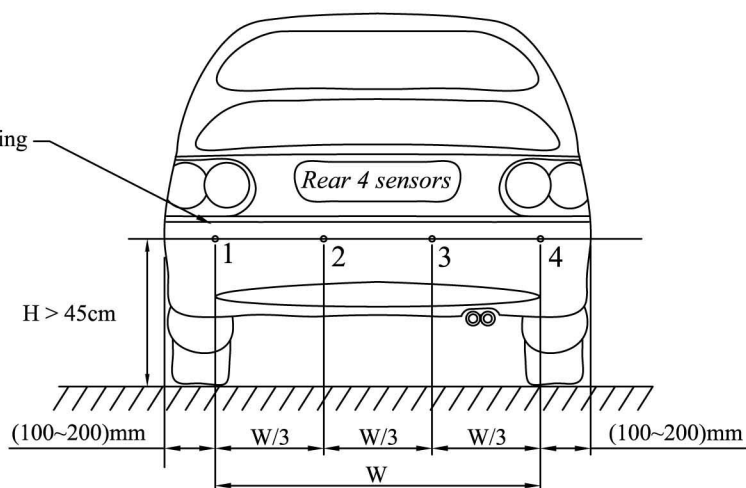


Figure 2.1 (4-sensor dimension)

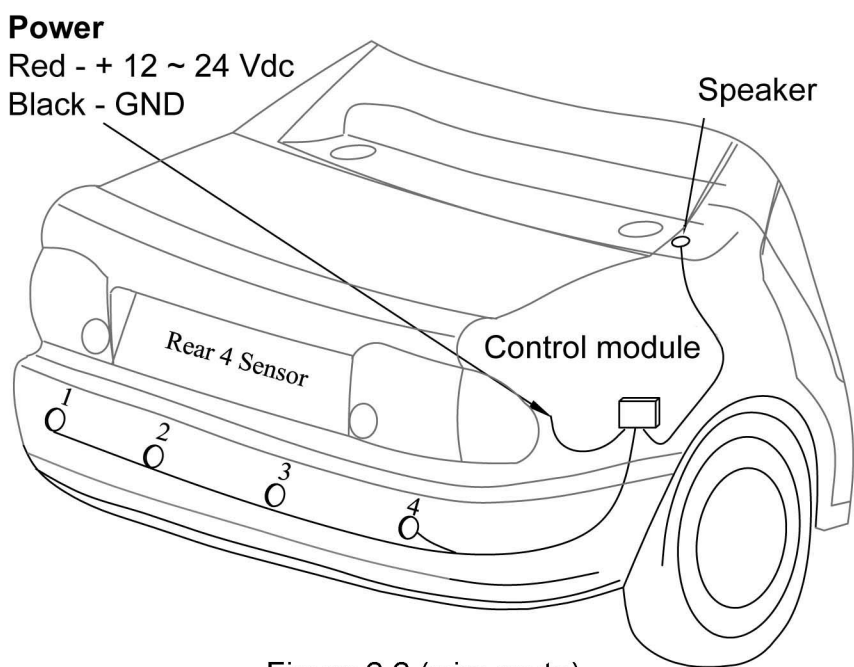
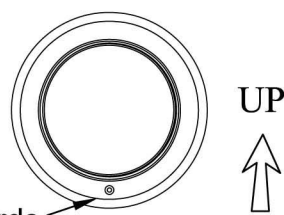


Figure 2.2 (wire route)

### Installation Caution



Dot pointing downwards

Figure 2.7

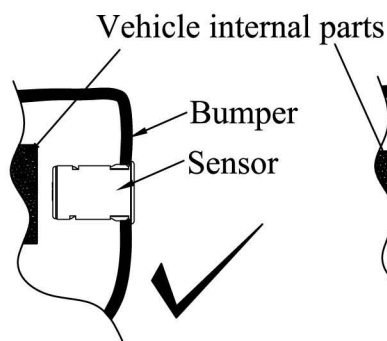


Figure 2.3

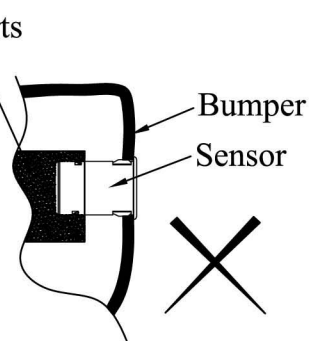


Figure 2.4

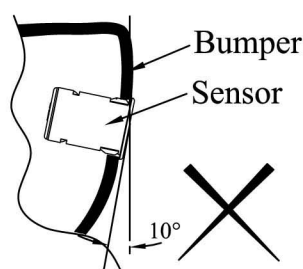


Figure 2.5

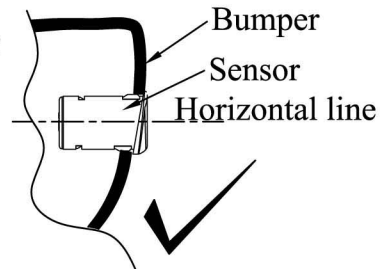


Figure 2.6

## Installation steps:

Step 1: Check the vehicle bumper to find a suitable area for sensor installation

a) Make sure there is no obstacle inside the bumper which may interfere in the sensor installation

Step 2: Measure and mark the position of the sensor

a) 4 sensor system - distance of sensor 1 and sensor 4 from the sides should be between 100 ~ 200 mm, and sensors 1, 2, 3 and 4 should be at equal distance from each other.

Step 3: Drill a 19 mm diameter hole at the marked locations

Step 4: Using a piece of soft cloth, push sensor in the drilled hole. The soft fabric protects sensor surfaces from scratches and damage. Do not push the sensor with a hard object.

Step 5: Install control unit in a proper location inside the vehicle, as shown in fig. 2.2.

a) Make sure that the control unit is installed in a dry place

b) Make sure that the control unit is installed in a place where temperature does not exceed 80°C.

Step 6: Connect power cable of the control unit parallel with reversing light.

The red cable of the control unit is positive (+12Vdc), the black cable is grounded.

Step 7: Install buzzer in a comfortable location. Make sure that the buzzer sound can be clearly heard by the driver (see fig. 2.2.)

Step 8: Make all necessary connection of the control unit. See wiring diagram in fig. 1.0.

Step 9: Perform a function/sensitivity test with a flat object. See Fig 6.0. Slowly move the flat object towards the sensor. The buzzer should give the sounds of frequency from low to high as the object approaches the sensor. In the final stage the buzzer should send continuous beeps.

Step 10: At the end make sure that the dot on the sensor is pointing downwards, as shown in fig. 2.7.

## 7.0 Display installation

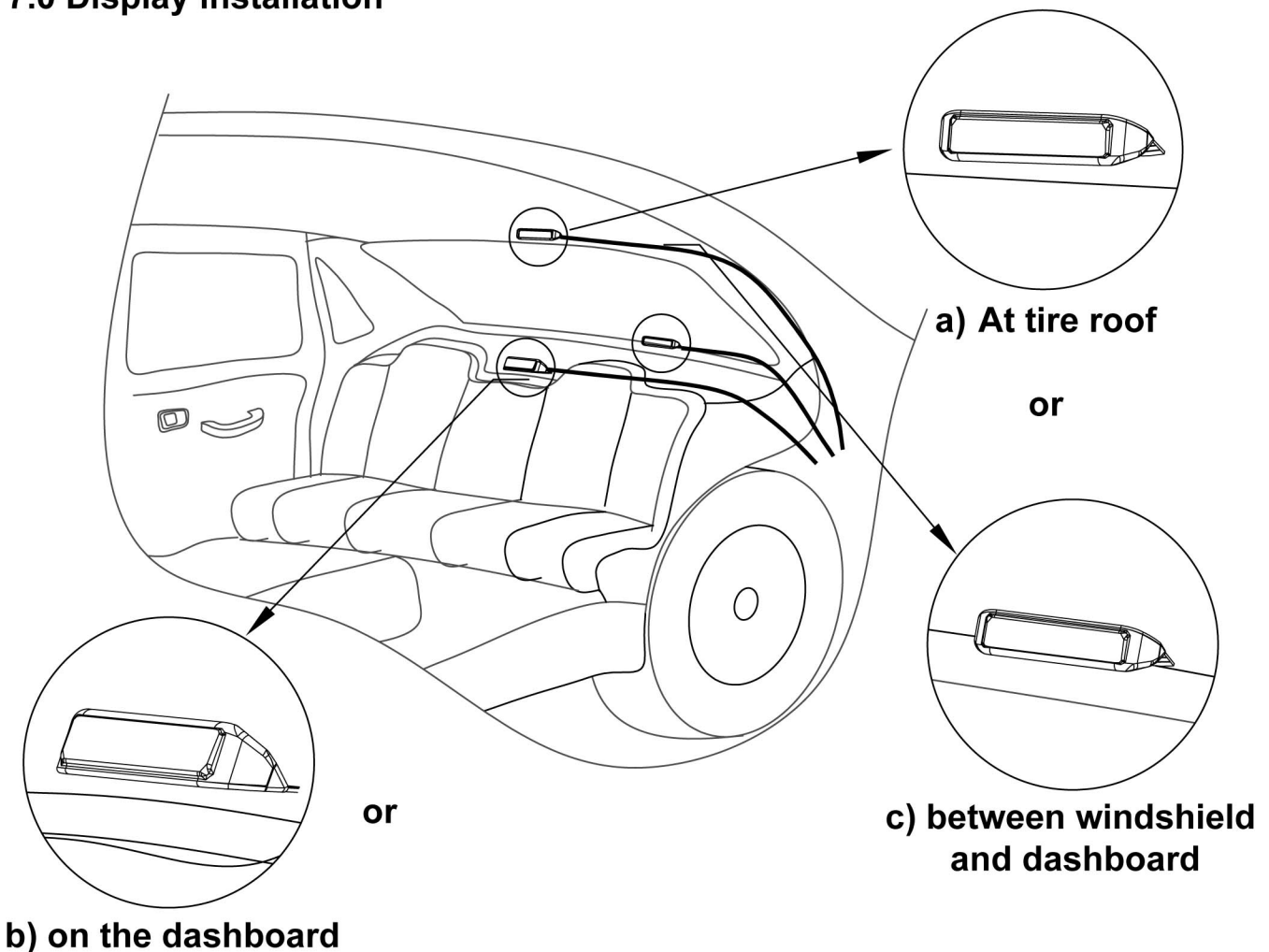


Figure 3.0 Suggested display locations

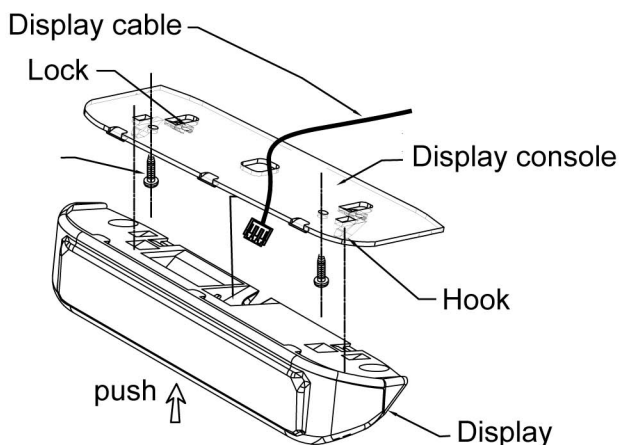


Figure 3.1

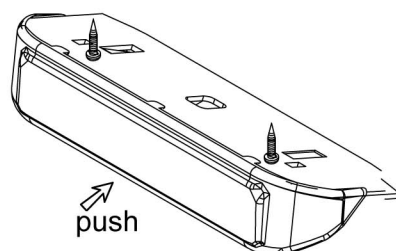


Figure 3.2

Installation steps:

1. Attach display console with double-sided adhesive tape. See Fig 3.1
2. Connect display cable with the display
3. Then adjust the display with the hook of display console.
4. Then push the display gently (see fig. 3.2) until it is fixed.
5. To pull the display out of console, push the latch (see fig. 3.1) and pull it gently (see fig. 3.2).
6. When connecting the display cable with the display, be careful to make sure that the red wire is on the left, looking from the side (see fig. 4.0).v

## 8.0 Display settings

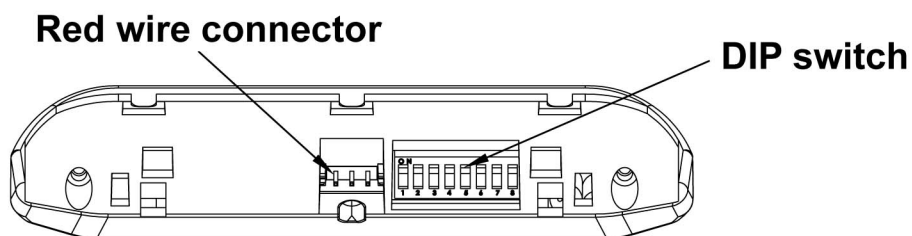


Figure. 4.0. Rear view

DIP switch number								Function	Remark
1	2	3	4	5	6	7	8		
ON	ON							Power and data	Always ON
ON	ON	X						Buzzer ON or OFF	ON: speaker ON, OFF – speaker OFF
ON	ON	ON	ON					Buzzer loudness	Volume up (medium level)
ON	ON	ON	ON	ON				Buzzer loudness	Volume up (maximum level)
ON	ON				X			Mirror view	Changing display appearance
ON	ON					X		Change left-right	Change to left bars/strips
ON	ON						X	Height change up-down	Dependding on display installation

**The display unit can be customized to maximum funtionality and usability.**

## 9.0 Selecting and setting properties of the ECU

Setting characteristics of the ECU and the sensitivity can be changed to suit all types of vehicles, including vehicles with a spare tire and a tow bar.

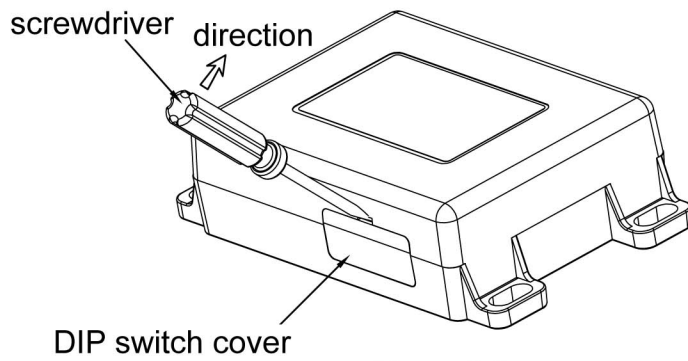


Figure 5.0

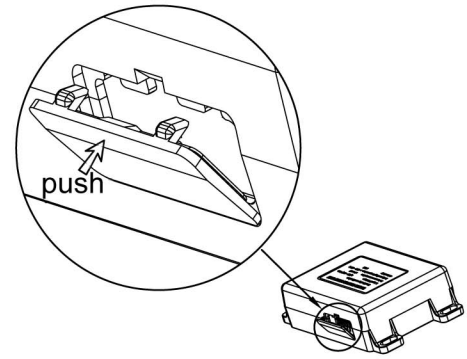


Figure 5.1

### 9.1 Sensitivity adjustment steps

1. Use small flat screwdriver to open the housing cover.
2. Rotate clockwise to increase the sensitivity, or rotate counter clockwise to decrease sensitivity (see fig. 5.2 a)
3. Normal sensitivity setting should occur when the arrow on the knob is vertical (pointing up from the base of the control unit, see. fig. 5.2a). No setting should be too far from the vertical position.

### 9.2 Selecting properties of the ECU

1. The ECU module has 8 different properties and can be changed by modifying the DIP switch adjacent to the sensitivity adjustment knob (see fig. 5.2b)
2. DIP switch No. 1 sets maximum range for all sensors. Switches No. 2 and 3 are for spare wheel and tow bar.
3. Figure 6.0a and 6.0b show test procedure for the option of present/absent offset/bypass.
4. After completing the setting, re-attach the cover by inserting bottom latch and pushing the cover until closed (see fig. 5.1)

No. of DIP switch			Maximum detection distance				Distance of offset	Note
1	2	3	Sensor '1'	Sensor '2'	Sensor '3'	Sensor '4'		
OFF	OFF	OFF	0,9	2,1	2,1	0,9	None	-
OFF	OFF	ON	0,9	2,1	2,1	0,9	1.0	-
OFF	ON	OFF	0,9	2,1	2,1	0,9	1.5	-
OFF	ON	ON	0,9	2,1	2,1	0,9	2.0	-
ON	OFF	OFF	2,1	2,1	2,1	2,1	None	-
ON	OFF	ON	2,1	2,1	2,1	2,1	1.0	-
ON	ON	OFF	2,1	2,1	2,1	2,1	1.5	-
ON	ON	ON	2,1	2,1	2,1	2,1	2.0	-

### ECU settings can be customized to achieve highest functionality and usability

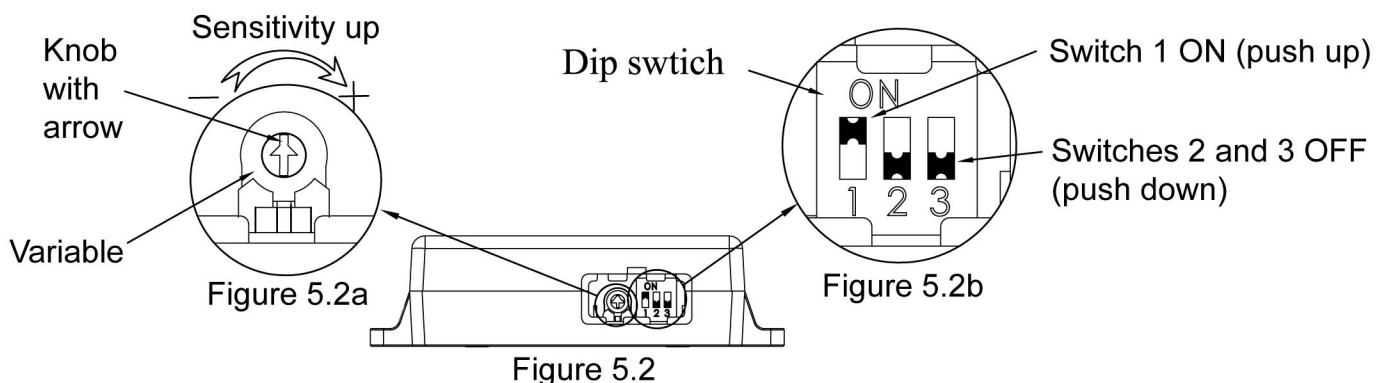


Figure 5.2

# 10.0 Testing

## 10.1 No offset/bypass

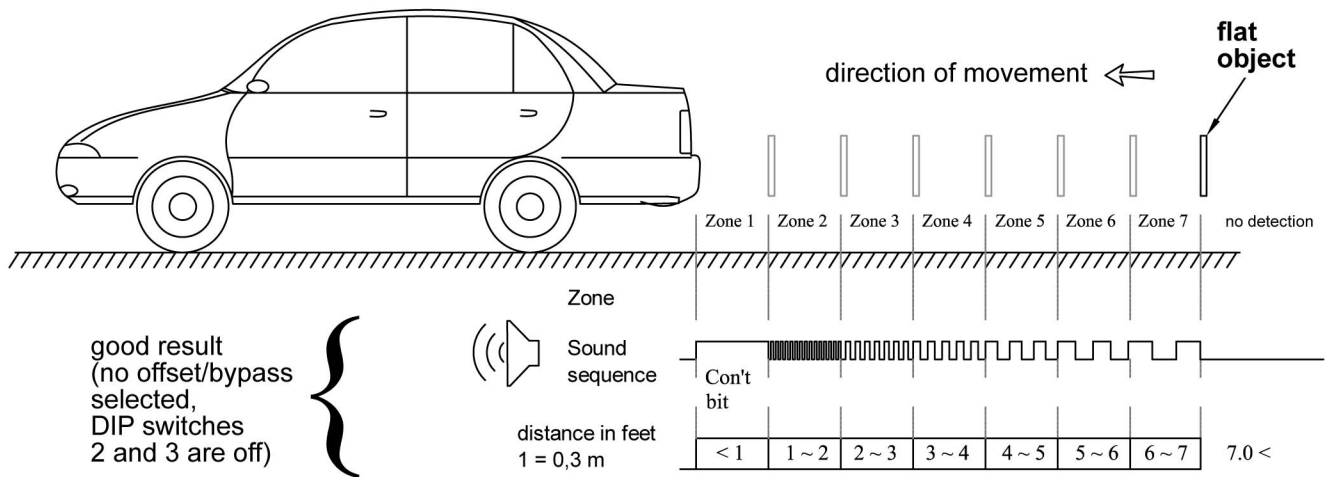


Figure : 6.0a (testing - no offset/bypass selected)

## 10.1 With offset/bypass

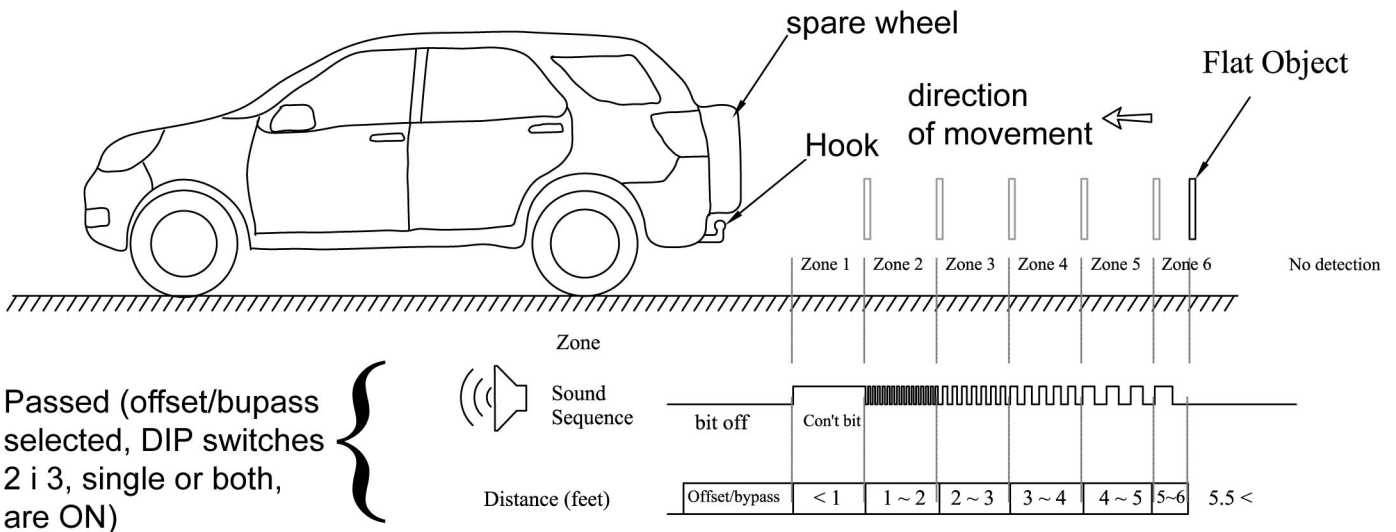


Figure 6.0b (Testing, offset/bypass selected, 1.5 feet)

Remark:


When a sensitivity test is required, such test must be made for one sensor at the time



## 11.0 Troubleshooting

This system shall include diagnostic functions. Any failure of power and/or of any sensor shall be identified with sequence of buzzer beeps and digits on display.

System active  = All connections work properly (correct)

Sound sequence	Possible cause	Check/solutions
No sound at all	1. No power	Check power
	2. Defective buzzer or display connection	Check connection and cable with a multimeter
Short beep after turning on	Short beep means there is a failure in the system - single beep - sensor 1 defective - two beeps - sensor 2 defective - three beeps - sensor 3 defective - four beeps - sensor 4 defective A defective display shall show as in figure 7.0	Check the connection of the sensor in the direction of a possible inaccurate assembly. If it still does not work, this means that the sensor is defective and should be replaced.
	Display shows 2 strips and 2 dots	Display is powered on but there is no data. Make sure that Switches 1 and 2 are both ON
Continuous beeping	Too sensitive	Reduce sensitivity by rotating the variable arrow counter-clockwise until no beep is heard (see fig. 5.2 a)

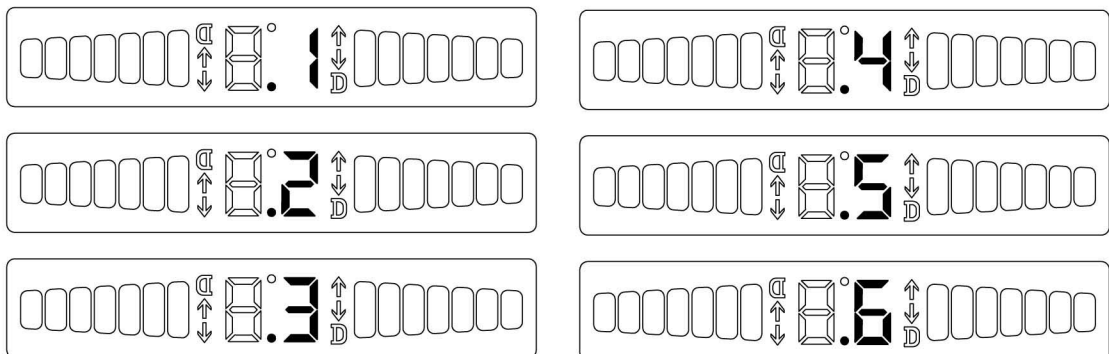


Figure 7.0

Remark:

System can operate normally even with a defective sensor.

Example: Sensor 1 is defective - the system will notify that the sensor 1 is defective (with a sound or digital display) for a short period, then the system will continue to work normally with other sensors functioning.

### Important notice for the user

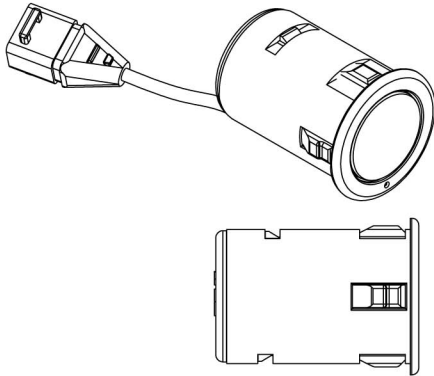
This device is designed to help the driver when parking, it should not be regarded as a safety device for any other purpose. Proper driving technique is required. Manufacturer, distributor and seller shall not be liable for any unforeseen accident. Use of this device for detecting people or animals is not recommended.

\*\*\*\* Manual applicable only for purchase with a rubber adapter \*\*\*\*

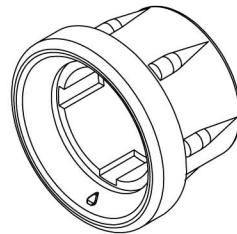
## 25mm rubber adapter 1 for a steel bumper

The 25mm rubber adapter is designed for vehicles with a steel bumper. The silicone rubber adapter is designed in order for minimizing damage to the sensor by a small stroke, in order to increase the distance sensitivity and to reduce the error sensing.

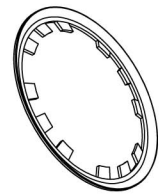
Components and installation procedures are shown below:



Round sensor

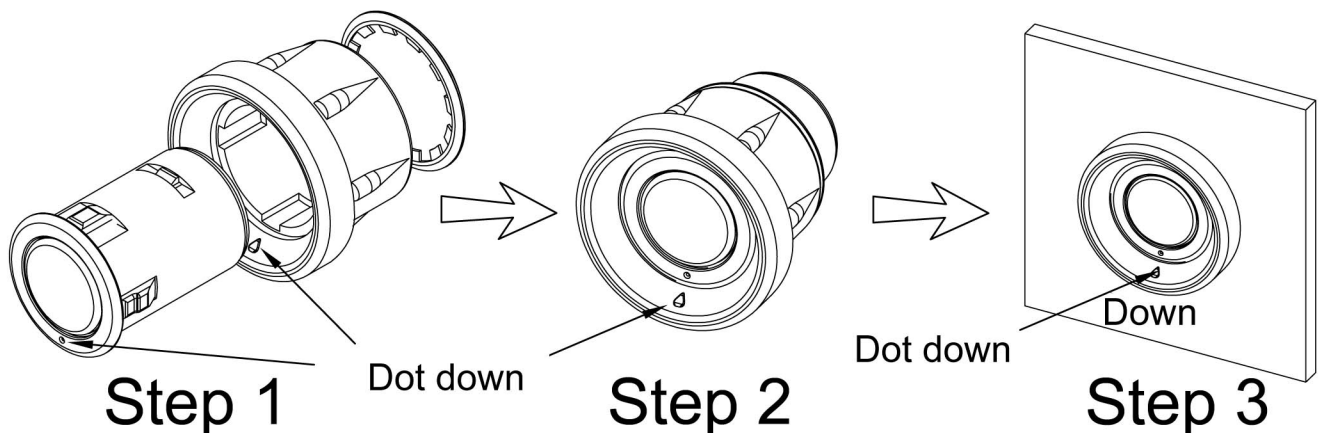


Rubber adapter



Ring

### Procedure



Step 1: Put together the round sensor connector, adapter and the adapter ring to a complete unit. Make sure that the dot on the sensor is aligned with the dot on the adapter. See figure in step 1 above.

Step 2: Check the complete unit as shown in fig. 2 above. Make sure the dots are aligned.

Step 3: When complete unit is installed in the bumper, make sure that the dot is at the bottom. See figure in step 3 above.

\* *The rubber adapter can be used with round sensor only*