



# User Manual

For Wireless Vehicle Detector **WVD-130x**



## STATEMENT

### General Statement

All the contents of this document are protected by law, without permitted by ROSIM, any organization or individual should not copy or transmit this document in any way. We've tried our best to make this specification accurate, but mistakes are still unavoidable. The contents of this document are being checked periodically, your suggestion will be appreciated.

The contents of this specification are accordant to the corresponding products. Please keep attention to our website [www.rosimits.com](http://www.rosimits.com) for any updating information, which may not be informed of you in advance.

To make sure operation correctly, please read this user manual carefully before installing. We are not responsible for any problems or damage caused by incorrect operation.

Operation specifications issued by traffic department or related authorities should be followed when installing, for example place traffic barriers and traffic indicator correctly, operators wear special cloth, etc. We are not responsible for the personal security of products installation.

ROSIM reserves the right of final interpretation.

### Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

**FCC Caution:**

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

**Non-modification Statement:**

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

## NOTICE

This document is intended for system integrators to provide operation guidance. Please read carefully before using. It should be known that before the sensor installing, the Wireless Access Point is required to be installed previously, considering the verifying of the sensor online status depends on the network established by them. Keep away from fire, strong electric field, strong magnetic field, and avoid strong shock, otherwise a permanent damage might be caused. Do not take apart without permission, as it may cause damage to the product.

Please note that in this document, the Wireless Vehicle Detector (WVD) is also called Sensor, the Wireless Access Point (WAP) is also called Collector or shorted in AP.

## VERSION

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## 1. Introduction

Wireless Vehicle Detector (WVD) is based on magnetometer, short range RF and nano power communication protocol technology. It is installed onto the road surface to collects the data of traffic flow. The data is gathered by Wireless Access Point (WAP), which acts as a wireless gateway between the wireless vehicle detection system and other traffic application systems. All the WVDs, under the management of WAP, establish a local wireless sensor network, which collects traffic information real timly.

## 2. Dimension



## 3. Application

ROSiM provides various types of WVD products that can be used in many kinds of traffic systems like signal light optimization, traffic flow monitoring, travel information guidance and red light and speed enforcement, etc. Please select the suitable model before order.

Note that for different application system , the WAP and WVD need different configurations. Customers are expected to use the configure software Sensor Manager to complete the configuration of these devices according to the actual situation.

## 4. Function

### 4.1. Vehicle existence measurement

By Installing WVD on the road, the existence of a vehicle will be detected in real time, and transmitted to the WAP which is installed not far away. This feature might be

used to traffic lights optimization system. In a traffic intersection, traffic flow and occupation rate information of each direction are gathered by the WAP, and transmitted to the traffic light controller. Based on a specific algorithm, the traffic light system optimizes the time of the traffic lights according to the real time traffic flow, achieving the highest efficiency of movement.

## 4.2. Vehicle move direction measurement

By installing WVD on the road, the moving direction of the vehicle will be detected immediately and transmitted to the WAP which is installed nearby. This feature can be combined with digital HD snap cameras to monitor reverse drive, one-way street violation and so on.

## 4.3. Average traffic flow speed measurement

By installing WVDs on the road, with the deployment of WAP in the vicinity, the speed of the traffic flow is detected. For a speed measurement application, two WVDs are needed to be installed in each lane. The distance between these two WVDs is software configurable. Usually for an urban road, the distance could be set to 3 to 4 meters; and for free way, it could be 6 to 8 meters.

## 4.4. Vehicle type classification

The length of the passing vehicle could be calculated by WVDs since the speed of the vehicle was detected. So assessment of the vehicle type could be made. Be careful that this is only an approximate data.

## 4.5. Temperature measurement

There is a temperature sensor integrated inside WVD which can monitor the temperature of the road surface. It needs a little time to make a response of road temperature, and also an offset might be exist between the measurement value and the actual temperature of the road surface, since the sensor is integrated inside the product.

## 4.6. Battery measurement

WVD is powered by a build in battery that can be replaced. Users have the flexibility to maintain the products. (Note this requires to be authorized by the manufacturer

and should comply with Operation and Maintenance Manual) By virtue of this, the life span of the product can be extended, which will save the maintenance costs that needed in traditional loop detection methods.

WVD can monitor the battery status in real time. Once the battery is running out, WVD sends warning to the host system for battery replacement.

## 5. Specifications

Technical Info.	Parameters
Part number	WVD-130x
Wireless radio frequency	915MHz
Communicate range	120m
Wireless protocol	ROSiM
Detection technology	3D magnetometer
Detection range	0.5m
Accuracy	97%
Reaction time	50ms
Power supply	Battery
Battery life	10year
Maintenance	Device and battery all replaceable
Product size	Diameter 116mm/Height 90mm
Load resistance	>5 tons impulse pressure
Protection	IP68
Work condition	All weather
Operation temperature	-40 ~ 85°C
Storage temperature	-40 ~ 85°C
Installation	Embedded
Installation time	5 to 8 minutes per lane
Application vehicles	Car, Van, Truck, Container

## 6. Installation

The ROSIM Wireless Vehicle Detector can be very easily installed. Since there's no cables needed, it takes only a few minutes to finish one WVD installation in each lane. The installing tools are also very simple. All of these factors make the installation process cause no impact to the traffic.

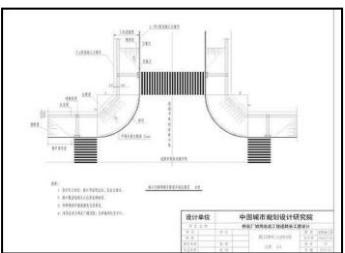
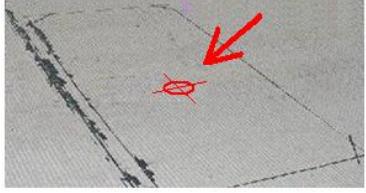
## 6.1.Preparations

It should be known that the Wireless Access Point is required to be installed prior to WVDs, considering the WVD's online status needs to be verified under the network established by them when installing.

Before installing, a band tape, a drill, a hammer, a chisel and a set of screw drivers should be prepared.



## 6.2.Installation steps

<b>Step 1: Sensor ID</b>  	<p>Find the ID signed on the top of the WVD, allocate the ID to a certain lane according to the project schematic, and remember the arrangement to make sure which sensor will be installed in which lane.</p> <p><i>Note that in a certain project, every ID of all the sensors is unique, so the corresponding relationship between a sensor and the lane where the sensor installed is also unique.</i></p>
<b>Step 2: Measurement</b>  	<p>Measure and find the centre of the lane. The position along with the lane is defined according to the application.</p> <p><i>Note that a simple way to define the installation position for WVDs is just select the right place where a traditional loop detector was ready to install.</i></p>

<b>Step 3: Testing</b>  	<p>Place the sensor that is ready to install in the position defined in step 2. Test with the WAP, which should have been installed previously, to make sure the wireless communication network works well.</p> <p>The ID of each sensor is corresponding to one of the 48 LEDs on the front panel of WAP. The relationship between detection results and LED status is:</p> <ol style="list-style-type: none"> <li>1.LED=Red → Vehicle detected</li> <li>2.LED=Green → No vehicle</li> <li>3.LED=Green flash → WVD warning</li> <li>4.LED=Off → No WVD installed in this lane</li> <li>5.LED=Red but no vehicle---WVD is in calibrating</li> </ol> <p>The corresponding LED should be in status of 1, 2 and 5, which means testing OK.</p>
<b>Step 4: Drilling</b>  	<p>Drill a hole of <math>\Phi 120\text{mm}</math>, depth 100mm. The sensor will be embedded in it.</p>
<b>Step 5: Filling</b>  	<p>The filling should be mixed in the hole before installing the sensor. Cement of high grade and sand are recommended as the components of the filling and mixed together in proportion of 3:2 or higher, with appropriate amount of water.</p> <p><i>Note that because cement of high grade solidifies very quickly, so the operation time should be as soon as possible and keep stirring to prevent the filling from solidification until the sensor is embedded.</i></p>

<b>Step 6: Embedding</b> 	<p>There's a triangle mark, which indicates the traffic flow direction, on one of the arris around the side of WVD. The triangle mark should point to the vehicle movement direction when installation.</p> <p>After the filling is ready, find the triangle mark from the arris around the side of WVD and point it to the traffic flow movement direction, then put the WVD in the hole quickly and keep the top of the WVD equal to or 3-5mm lower than the surface of the road. It is important to clean up the sensor from the overflows.</p>
<b>Step 7: Check</b> 	<p>After installation of all the sensors, it is recommended to check all sensors' online status in cooperate with the Wireless Access Point (WAP). The ID of each sensor is corresponding to one of the 48 LEDs on the front panel of WAP. The relationship between detection results and LED status is:</p> <p>LED=Red-----Vehicle detected    LED=Green-----No vehicle    LED=Green flash-----WVD warning    LED=Off-----No WVD installed in this lane    LED=Red but no vehicle---WVD is in auto calibrating</p> <p><i>Note that the status of those un-used LEDs might be uncertain and should be ignored, since there is no WVD sensor is bounded to them.</i></p>

## 7. Supports

ROSiM creates and manufactures high quality wireless parking detection devices. We provide customers 24 hours on-line supports.

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