PlacePod® Vehicle Detection Sensor

PlacePod is an in-ground or surface-mounted vehicle detection sensor that communicates with a LoRa gateway to provide real-time parking data. It provides accurate vehicle detection in parking spaces, up to 7 years of battery life, and is stable over temperature fluctuations, even in harsh environments.

Figure 0-1-1: PNI Parking Solution Overview
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This guide is designed to support PNI’s PlacePod Smart Parking Solution and the Parking Management Application.
2.1 SYSTEM OVERVIEW

This user manual is designed to support PNI’s Parking Management Application. The diagram below shows the primary elements of the PlacePod system architecture. A brief description of these functional elements follows.

- **PlacePod Sensor** – The PlacePod sensor is a LPWAN-compatible vehicle detection device. It is built with PNI’s high-performance magnetic sensor and vehicle detection algorithms that accurately detect the presence or absence of a vehicle in a parking space. Each sensor has a unique ID for easy provisioning, tracking and management.

- **Gateways** – Each PlacePod device communicates to the gateways set up to receive their signals. The gateways collect the signals from the PlacePod devices and send the information on to the Network Service. The number of gateways required depends upon the size and environment of the parking areas covered by the parking system.

- **Network Service** – The Network Service collects the signals from the gateways and communicates this data to the Parking Application. The choice of provider for the Network Service is a key integration decision determined by the scope of the project.

- **Parking Application** – PNI’s Parking Management Application is a cloud-based* dashboard for visualizing and managing parking data, including installation and verification, diagnostics, monitoring, and reporting. *The application can be dockerized for an on premise installation.

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*Actility, machineQ, Senet, The Things Network, other public & private networks*
2.2 PARKING MANAGEMENT APPLICATION

PNI’s Parking Management Application can be used to manage and monitor parking resources. The web interface provides an overview of sensor data and reports, such as:

- Real-time parking status & space availability
- Average daily occupancy
- Parking events per space
- Map overlays for parking spaces, sensors, and gateways and turnover heat map

![Dashboard screenshot from PNI's Parking Management Application](image)

Figure 2-5: Dashboard screenshot from PNI's Parking Management Application
3 GETTING STARTED WITH THE PARKING MANAGEMENT APPLICATION

3.1 USER CREDENTIALS

Following are the recommended steps to set up the Parking Management Application and manage your PlacePod sensors:

**Use your credentials to log in on PNIparking.com:**

1. Use the user name and credentials provided to you by PNI Customer Support or PlacePod reseller.

![Figure 3-1: PNIparking.com Login Screen](image)

2. If you have forgotten your password, click **Forgot password?** You will receive an email with a link to reset your password.

![Figure 3-2: Forgot Password screen](image)

3. If you forgot your username, please contact PNI Customer Support or PlacePod reseller.
3.2 ADDING SENSORS

Once you log in you will arrive on the “Sensor” page, you will now need to add your first sensors.

Follow these steps to add your sensors:

1. Click on the green circle \(\text{+}\) to open the “Create sensor” page.
2. Input your Sensor ID and select **PlacePod v2** from the “Sensor type” dropdown menu.
3. Click **Save** at the bottom of the page.
4. Once the sensor has been saved, you will be returned to the “Sensor” page with a green banner indicating the sensor has been successfully created.

![Figure 3-5: The sensor has been created](image)

### 3.3 ADDING LOCATIONS

Add a location in which the parking spots will be located.

1. At the top of the page click on Locations and then on the submenu click Active locations.

![Figure 3-6: Active locations submenu](image)
2. Click on the green circle to open the “Add Location” page.

3. Fill out section 1. **Complete Location Details**: Shortcode is a short identifier for the parking lot.

![Figure 3-7: Complete Location Details](image)

4. Fill out section 2. **Determine Perimeter**: Create the points by clicking on the map. This is a general outline of the location your parking spots are inside. You must have at least 3 points to create a perimeter. You can add more points to outline a more detailed space.

![Figure 3-8: Determine Perimeter](image)
5. Click **Save** when you finish filling out the fields and selecting the perimeter.

6. There will be a green banner across the top of the page indicating the location was created successfully.

**Figure 3-9: Location Successfully Created**
3.4 ADDING PARKING SPOTS

The final step is to create the parking spots.

1. Click on Parking Spots. This will bring you to the “Parking Spots” page. Parking spots are referred to as “assets” and no assets will be shown yet.

   ![Figure 3-10: Parking Spots Page](image)

2. Click on the green circle to open the “Create Asset” page.

3. On this page, there are several sections to fill out. The first section is Parking Spot Details. In this section you will need to input the Sensor ID from the Adding Sensors section. Remember to select “PNI PlacePod v2” under “Sensor Type”. The Location field will have a dropdown menu with a list of Locations made earlier.

   ![Figure 3-11: Parking Spot Details](image)
4. The next section is **Asset type details**. You can select or create the type of parking spot. For example, “permit required”, “car sharing”, “accessible parking”, etc.

```
<table>
<thead>
<tr>
<th>Type of parking spot</th>
<th>External reference</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visitor Parking</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```  

**Figure 3-12: Type of Parking Spot**

5. Input, or choose from the map, the GPS coordinates of the parking spot. You will see the perimeter you created earlier on the map. In the “Map” window you can click Hybrid to get a satellite image overlay to help choose the correct spot from the map.

**Figure 3-13: GPS Position**
6. Finally, click **Save** to create the parking spot. This will bring you back to the “Parking Spots” page with a green banner indicating the parking spot was created successfully. Once the sensor joins the network or sends out an event packet, the device will automatically become online and update the parking status, temperature and battery voltage.

![Figure 3-14: Asset Successfully Created](image-url)
7. The image below shows a real-world example with several spots in use.

Figure 3-15: Parking Spots Real-World Example
4 DASHBOARD AND ANALYTICS

4.1 DASHBOARD OVERVIEW

The Dashboard shows a summary of all the parking spots across all locations. There are graphs to show the live occupancy overview along with “Average occupancy” and “Average number of parking events”.

![Dashboard Overview](image1.png)

**Figure 4-1: Dashboard Overview**

The graphs of the historical data can be viewed over customizable date ranges as shown in the image below.

![Dashboard Historical Data Date Range](image2.png)

**Figure 4-2: Dashboard Historical Data Date Range**
The data presented can also be filtered by Location, by Status (occupied or vacant) and by Type.

![Dashboard Filter by Type of Parking Spot](image)

**Figure 4-3: Dashboard Filter by Type of Parking Spot**

For Support, please contact PNI Sensor Customer Support at: [https://www.pnicorp.com/support/](https://www.pnicorp.com/support/)
DO NOT OPEN THE PLACEPOD SENSOR. THE PLACEPOD SENSOR IS SHIPPED READY TO ACTIVATE AND INSTALL. THE SENSOR SHOULD NOT BE OPENED FOR ANY REASON. OPENING THE SENSOR VOIDS THE PRODUCT WARRANTY.

Warranty and Limitation of Liability – PlacePod Vehicle Detection Sensor (“Product”). PNI Sensor (“PNI”) manufactures its Products from parts and components that are new or equivalent to new in performance. PNI warrants that each Product to be delivered hereunder, if properly used, will, for one year (365) days following the date of shipment be free from defects in material and workmanship and will operate in accordance with PNI’s published specifications and documentation for the Product in effect at time of order. Any Product that is non-functional and unresponsive to firmware and software updates will be considered failed hardware units and will be replaced at no charge. This warranty includes one year (365 days) of debugging maintenance for customers that use the PNI Parking Management Software to manage PNI’s Product.

This warranty does not cover wear and tear due to normal use, or damage to the Product as the result of improper installation, misuse, neglect of care, alteration, vandalism, theft, accident, or unauthorized repair.

THE ABOVE WARRANTY IS IN LIEU OF ANY OTHER WARRANTY, WHETHER EXPRESS, IMPLIED, OR STATUTORY, INCLUDING BUT NOT LIMITED TO, ANY WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY WARRANTY OTHERWISE ARISING OUT OF ANY PROPOSAL, SPECIFICATION, OR SAMPLE. PNI NEITHER ASSUMES NOR AUTHORIZES ANY PERSON TO ASSUME FOR IT ANY OTHER LIABILITY.

If any Product furnished hereunder fails to conform to the above warranty, Customer’s sole and exclusive remedy and PNI’s sole and exclusive liability will be, at PNI’s option, to repair, replace, or credit Customer’s account with an amount equal to the price paid for any such Product which fails during the applicable warranty period provided that (i) Customer promptly notifies PNI in writing that such Product is defective and furnishes an explanation of the deficiency; (ii) such Product is returned to PNI’s service facility at Customer’s risk and expense; and (iii) PNI is satisfied that claimed deficiencies exist and were not caused by improper installation, misuse, neglect of care, alteration, vandalism, theft, accident, or unauthorized repair. If a Product is defective, transportation charges for the return of the Product to Customer within the United States and Canada will be paid by PNI. For all other locations, the warranty excludes all costs of shipping, customs clearance, and other related charges. PNI will have a reasonable time to make repairs or to replace the Product or to credit Customer’s account. PNI warrants any such repaired or replacement Product to be free from defects in material and workmanship on the same terms as the Product originally purchased.

Except for the breach of warranty remedies set forth herein PNI shall have no liability for any indirect or speculative damages (including, but not limited to, consequential, incidental, punitive and special damages) relating to the use of or inability to use this Product, whether arising out of contract, negligence, tort, or under any warranty theory, or for infringement of any other party’s intellectual property rights, irrespective of whether PNI had advance notice of the possibility of any such damages, including, but not limited to, loss of use, revenue or profit. In no event shall PNI’s total liability for all claims regarding a Product exceed the price paid for the Product. PNI neither assumes nor authorizes any person to assume for it any other liabilities.