Surface Mounted Parking Detector

Chapter 1: Features

The LoRaWAN parking sensor based on LoRaWAN communication technology is a product developed by our company specifically for parking space detection. It can be used in indoor underground parking lots, outdoor open parking lots, and roadside parking spaces.

It has the characteristics of accurate vehicle detection, low operating power consumption, high link budget, easy installation, and no maintenance. When contacting this product for the first time, according to the introduction of this document, install the debugging tool through the Android phone, and use the Bluetooth to establish a connection with the geomagnetism to complete the activation and debugging.

Chapter 2: Engineering Installation Instructions

2.1 Installation requirements

The ground-mounted geomagnetic sensor needs to clean the ground first, and there should be no debris and obvious dust. If the basement parking space is epoxy floor paint ground, it can be wiped clean with a rag. Use AB glue or marble glue to spread evenly on the back of the sensor, and then directly stick it to the ground. It can also be installed with three expansion screws (expansion screws are recommended for more reliable installation).

2.2 One-shaped parking space

For roadside "one-shaped" parking spaces, the order of installation position is 1 based on "2.1".

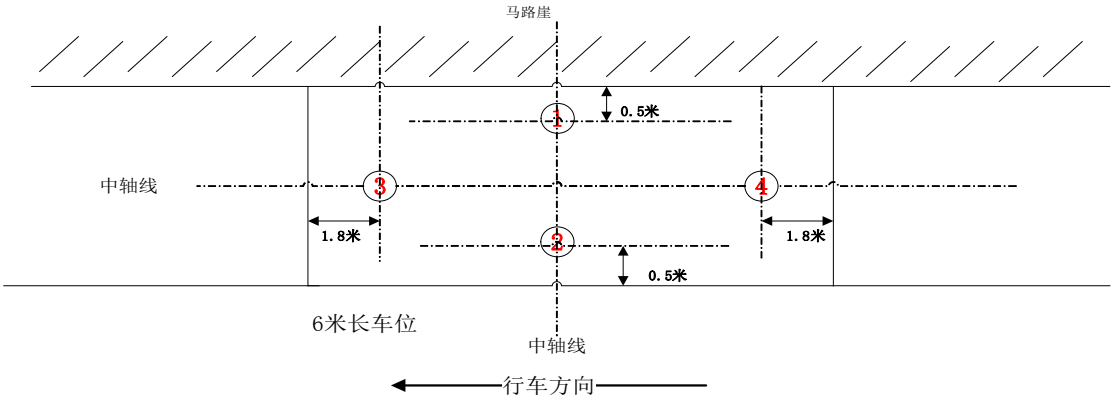


Figure 2.2 One-shaped parking space

2.3 Non-One-shaped Parking sensor

For vertical "non-one-shaped" parking spaces, the order of installation positions is 1 (the optimal selection position) and 2 based on "2.1". The stopper is generally 0.5m away from the road
cliff.

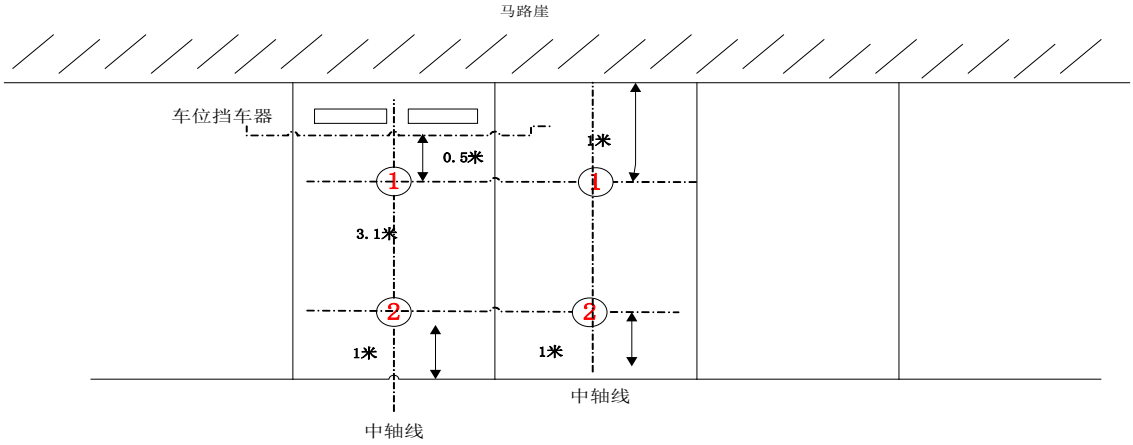


Figure 2.3　非字型车位

2.4 Oblique non-one-shaped parking space

For "oblique non-one-shaped" parking spaces with a certain included angle, on the basis of "2.1", when there is no metal guardrail on the roadside, install it at the position of "1", and when there is a metal guardrail, press the position of "2" Install, finally choose 3 to install。

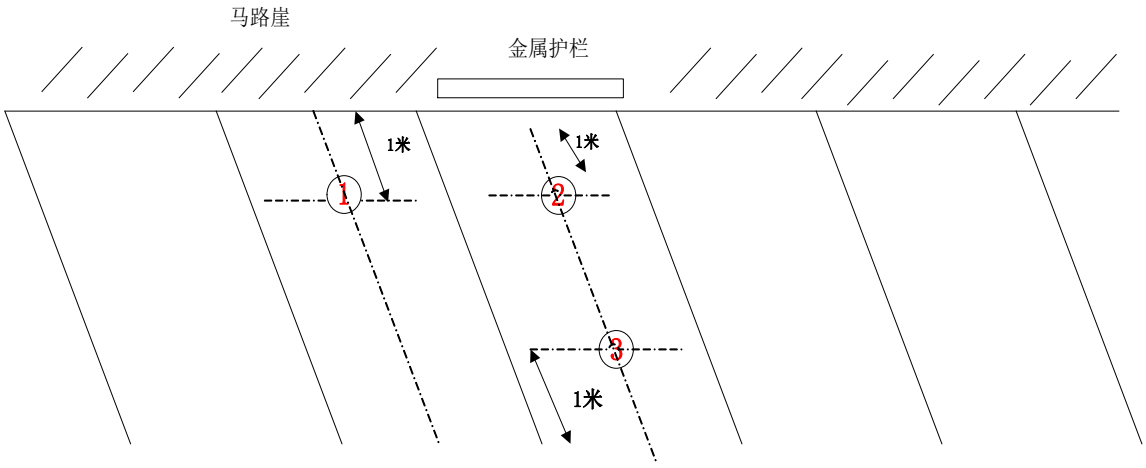


Figure 2.4　斜非字型车位

Chapter 3: Device activation and debugging

3.1 App tool installation

The Android version is supported currently, and the smart phone needs to support BLE4.0 and above. After the installation is complete, an AjaMag folder will be automatically created in the root directory of the phone. If the folder is not created for individual phone compatibility issues, please create a new AjaMag folder to store the upgraded firmware and log data.

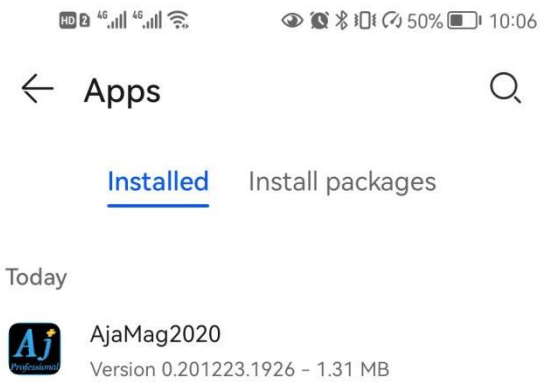


Figure 3.1.1 Apk Install packages

Figure 3.1.2 Upgrade file placement directory

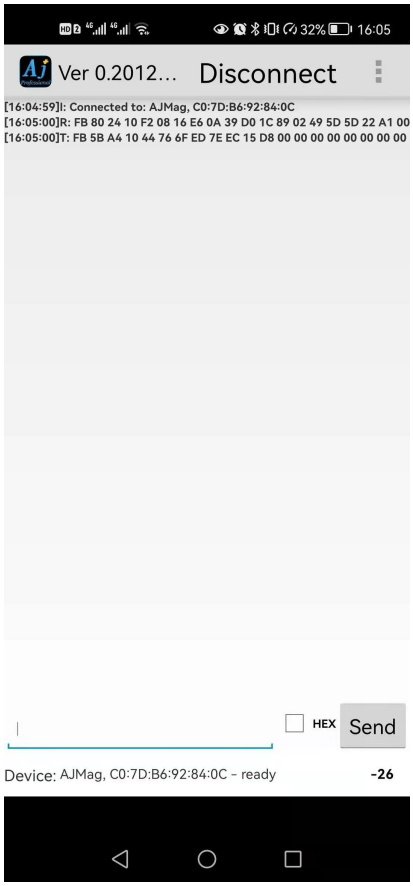
3.2 Bluetooth connection

Open the App to allow the Bluetooth function to be turned on. If you are close to the geomagnetic shell, you can directly stick to the shell. Click the [Connect] button in the upper right corner. The App searches for Bluetooth devices and finds the device named AJMag. If you scan multiple devices with the same name, select the device with the largest RSSI. Generally, the phone is close to the shell at about -55~70. Click this device to connect. If you only scan one device, connect directly.

Figure **3.2.1Allow to connect bluetooth**

Figure **3.2.2 Select maximum RSSI to connect**

After the device is successfully connected, the current device's Bluetooth MAC address [Device:AJMag,MAC-ready] and the Bluetooth signal value in the lower right corner will be displayed. At this time, the mobile phone can leave the device for a certain distance and does not need to be close to prevent subsequent calibration. The influence of mobile phones on geomagnetism. Meanwhile, the Bluetooth signal can basically operate normally within the range of 3~5 meters.



Click [Device Settings] in the upper right corner of the App to enter the main control column. By default, the working status information of the entire geomagnetism will be automatically read. This information is mainly for easier locating and troubleshooting in the debugging state. Note that the [information] here is the full amount of information read after the check, if not selected, it is the single information of the current function table. After operating the related commands in the function list, please remove the tick of [Information] here before operating.

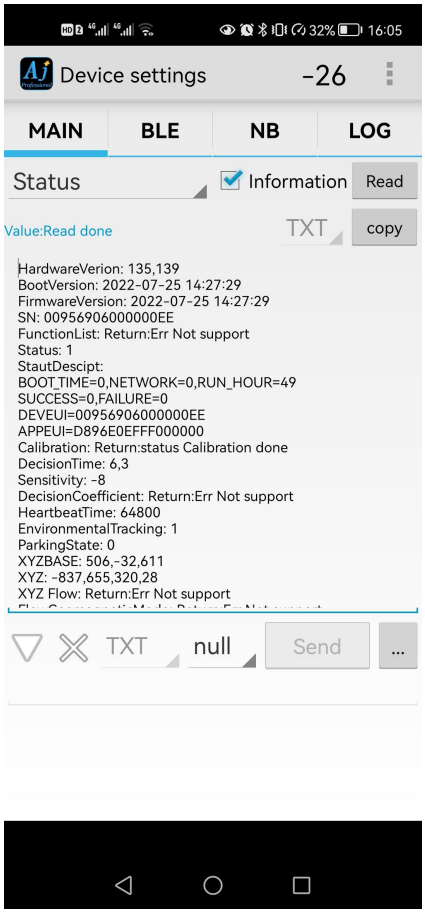


Figure 3.3.2 Select main-Working status

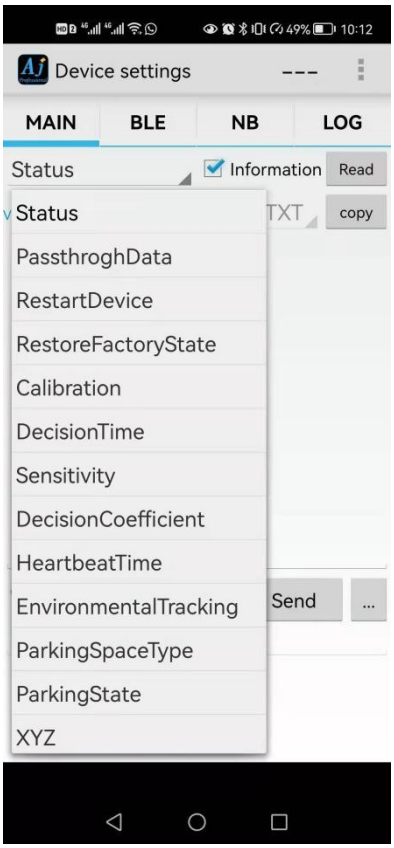
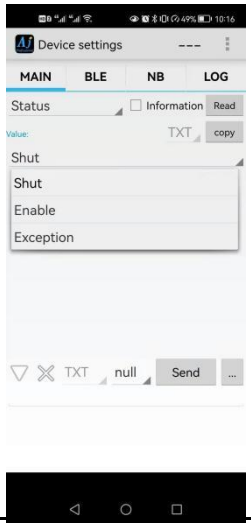


Figure **3.3.3** Main Control Tab

3.4 BLE tab

There is an option in the BLE column, the [Restart Device] function. Generally, the restart master function can be executed when the device is abnormal during the debugging stage. After execution, the geomagnetic program will restart, which is a hardware reset. The geomagnetism that has been connected to the network will not affect the use after restarting, and the geomagnetism terminal will save the vehicle detection context and communication context parameters.



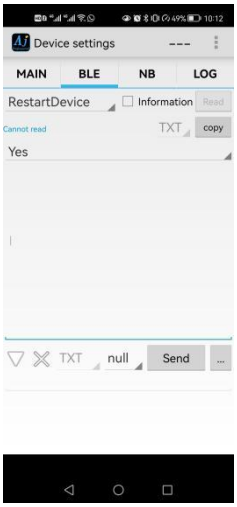


Figure **3.4 BLE Restart device**

By default, geomagnetism is in an inactive state. In the activated state, geomagnetism will turn on the vehicle detection logic and report data, and execute the network search logic. If there is no network coverage, it will try to enter the network according to a certain back-off mechanism. Uncheck [Information], click [Close] to select [Open] status and click [Send] button to complete geomagnetic activation. You can click the [Read] button to check whether the status has changed. If you need to set the geomagnetism to be in an inactive state again, change the status to [Close]. In the inactive state, the geomagnetism is in an ultra-low power consumption standby state. After activation, the geomagnetism internal detection logic/network service and other functions will be automatically turned on. After the activation, the geomagnetism is in the vehicle detection state and the power consumption is around 85uA.

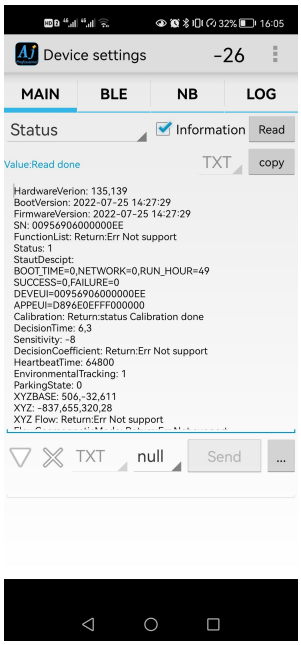


Figure **3.5 Select Main→Working Status**

3.6 Calibration

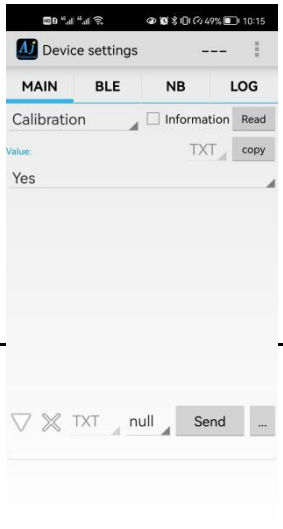
In the debugging stage, if the geomagnetic equipment is not fixed, it will inevitably encounter the geomagnetic movement. Once the geomagnetic position moves, it needs to be recalibrated. If it is an engineering installation, a geomagnetic calibration will be performed for the first activation of geomagnetism.

After the calibration is completed, read the data of the XYZ coordinate axes. Generally, the three axes are near zero, indicating that the calibration is successful. To calibrate, click Master → Geomagnetism Calibration, click the [Send] button, and geomagnetism will enter the calibration state. Pay attention to the following 2 points during calibration:

① The calibration process takes 40 seconds to 50 seconds;

② After calibration, the background magnetic field within 1 meter radius of the device should not be changed;

Figure **3.6 Calibration**



Chapter 4: Notes

1. During the test phase, if the geomagnetism is not fixed yet, as long as the geomagnetism position moves, the calibration operation must be performed again, otherwise the simulated state change cannot be detected correctly.
2. In the test phase, you can choose to place a magnetic screwdriver or a tea box made of ferrous material on the top of the geomagnetic field to simulate a vehicle entering.
3. Please enter the triplet information on the geomagnetic label into the NS server in advance, and then activate it.
4. Geomagnetism uses OTAA to access the network by default, and the network access information context will be saved.
5. If the geomagnetism replaces the NS server, please contact technical support to obtain the geomagnetism restoration factory instruction, and use the App to restore the geomagnetism to the factory.
6. Regarding the principle of geomagnetic installation, install it directly in the middle of the parking space. If you encounter obstacles such as manhole covers in the middle, please refer to the description in Chapter 2.
7. Please contact the technical window to obtain the parking sensor communication protocol.