

CS-iTVP-05 Wireless Parking Sensor

User' s Manual

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Chinastar M&C

Wireless Parking Sensor User' s Manual

1. Overview

1.1 Product Introduction

The CS-iTVP-05 series of wireless parking sensors use an anisotropic magnetoresistive sensor to monitor changes in the magnetic field on the parking space and determine whether the parking space is occupied or free. It is connected to the gateway or network coordinator by various transmission methods such as LORAWAN and NB-IOT, and then transmitted to the server through 4G/Ethernet.

The battery-powered sensor features a low-power design with high detection rate, stable operation, no wiring, easy installation, and simple maintenance, widely used on indoor parking lots, roadside parking lots, open parking lots, and illegal parking detection applications.

1.2 Working principle

The static strength of the Earth's magnetic field is between 0.5 and 0.6 Gauss, and its intensity is constant over a certain area (approximately several kilometers). Ferromagnetic objects, such as cars, can disturb nearby magnetic fields. The magnetoresistive sensor is used to measure the change of the magnetic field strength, thereby judging the state of the parking space.

1.3 Product Types

Depending on the installation method, the product has two types: surface/ground type and underground type.

2. Main design indicators

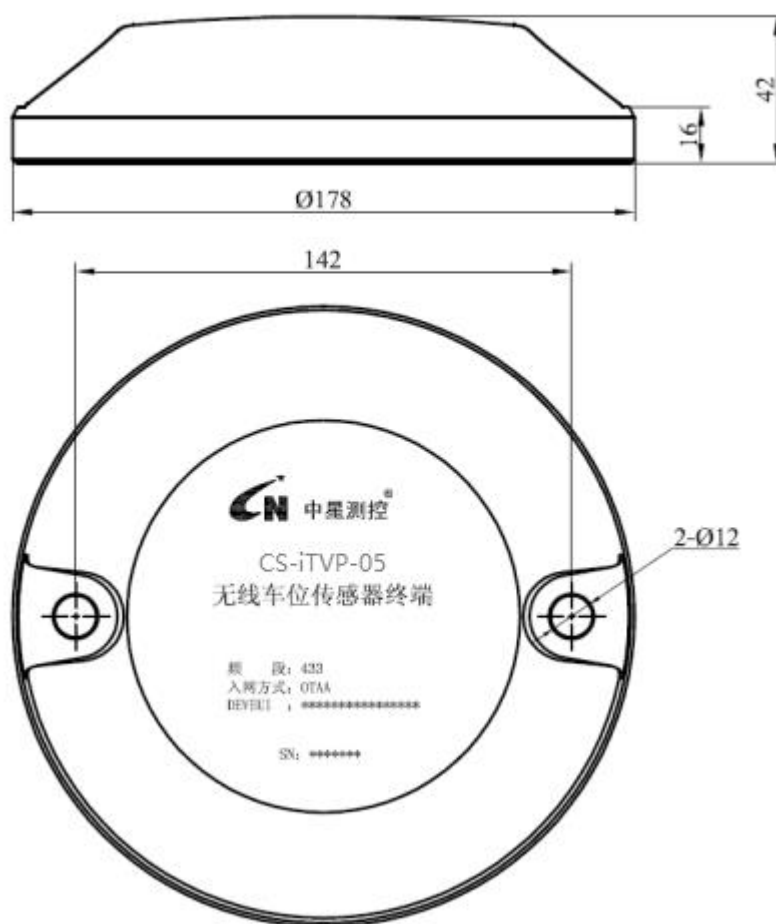
2.1. Main technical parameters

Table 1 Main technical parameters

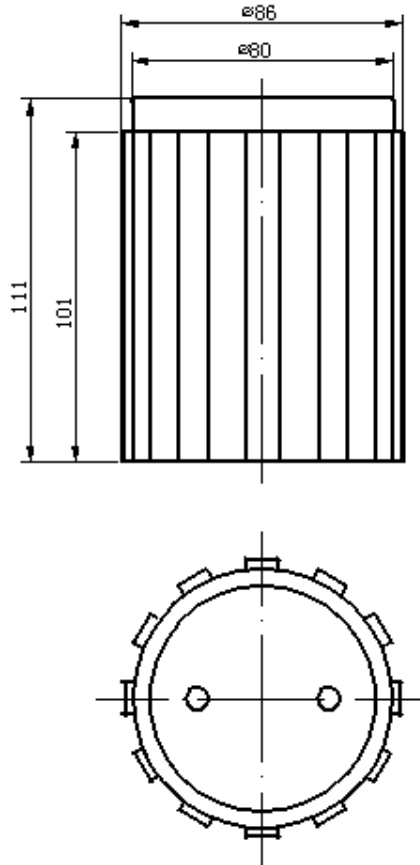
Item	Technical parameters	Remark
Frequency	433MHz/470MHz/868MHz/915MHz/923MHZ	LoRaWAN
	B1/B3/B5/B8/B20	NB-IoT
Equipment type	Class A	LoRaWAN
Antenna interface	内置 FPC 天线	
Configuring serial port	9600, n, 8, 1	Open the product cover, and use the serial port for configuration
Voltage	3.6V	Li Battery ER26500+SPC1550
Battery Life	3-5 year	
Maximum working current	<300mA	
Level of protection	IP68	
material	PC+ABS material	
size	Φ178mm×42mm (stick to install)	
	Φ86mm×111mm (Embedded mounting)	
Operating temperature	(-25~+85) °C	NB-IOT (consumption SIM card)
	(-45~+85) °C	LORAWAN/ NB-IOT (industruction SIM card)
Storage temperature	(-45~+85) °C	

2.2. Outline structure

The dimensions of the surface/ground parking sensor are shown in Figure 1. The underground parking sensor is shown in Figure 2.



Figure#1 Ground-type parking sensor



Figure#2 Underground-type parking sensor

3. Instructions for use

Note: For LoRaWAN transmission mode, no need to open the back cover if the sensor is already equipped with a battery.

3.1 SIM card installation instructions (only for NB-IoT transmission mode)

3.1.1 SIM Card for NB-IoT Installation Procedure for ground type

Open the back cover -> Insert the NB SIM card -> Connect the Battery -> Put the cover back -> Tighten the screws

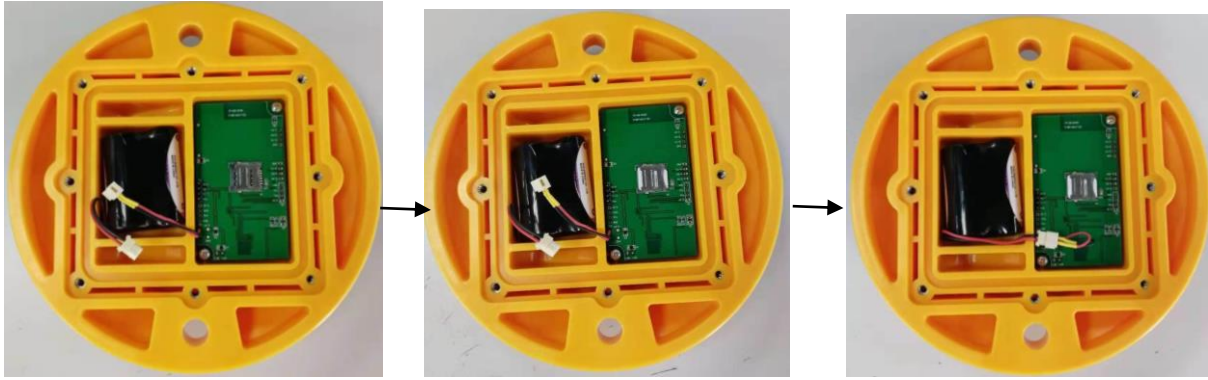
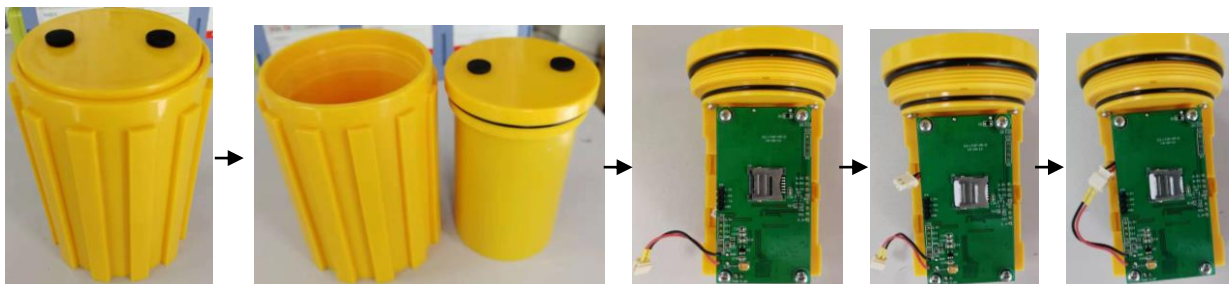


图 3 Figure#3 NB/SIM Card Installation Procedure for ground type

Note:

- 1) **Open the SIM card holder in the OPEN direction. After installing the NB card, lock the SIM card holder in the LOCK direction.**
- 2) **Connect the battery connector & ensure that the red/black wires are not reversed**
- 3) **Fix the back cover with screws, tighten the screws to ensure the sealing of the sensor.**

3.1.2 NB/SIM Card Installation Procedure for underground type



Unscrew the top cover -> Take it out of the sleeve -> Insert the NB SIM card -> Connect the battery

Figure#4 NB/SIM Card Installation Procedure for underground type

1) **Open the SIM card holder in the OPEN direction. After installing the NB card, lock the SIM card holder in the LOCK direction.**

2) **Connect the battery connector & ensure that the red/black wires are not reversed**

3) **Remove and install the top cover with the special tool.**

3.2 Battery Replacement Instructions

The parking space sensor is powered by a built-in disposable lithium battery. When the battery is low, the sensor will report a low voltage alarm message and the ER26500+SPC1550 battery pack should be replaced.

Battery replacement method:

- 1) Open the sensor back cover, disconnect the battery connector, remove the battery, replace the battery of the same specification, and connect the battery connector;
- 2) Close the cover and tighten the screws;
- 3) Put the parking position sensor back to the original position and complete the installation according to 4.1 or 4.2. The replacement is complete.
- 4) Replacement done.

3.3 Network Description

3.3.1 LoRaWAN Networking Instruction

LORAWAN supports OTAA and ABP network access modes. The default network access parameters can be configurable.

If choose to configure the network access parameters yourself, please ask the supplier for the relevant documentation.

DevEUI is printed on the product.

3.3.2 NBIOT access instruction

The IMEI number is printed on the product, which can be used directly when accessing certain platforms. Support UDP, COAP and TCP communication methods. Compatible with China Telecom's IoT open platform. If necessary, please ask for the codec plug-in for platform connecting.

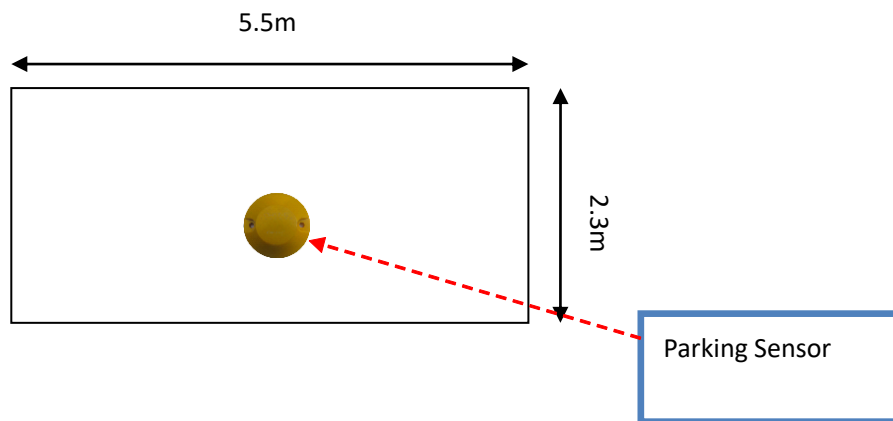
3.4 Communication Protocol

Please refer to "CS-iTVP-05-XY Wireless Parking Sensor Communication Protocol".

4. Installation instructions

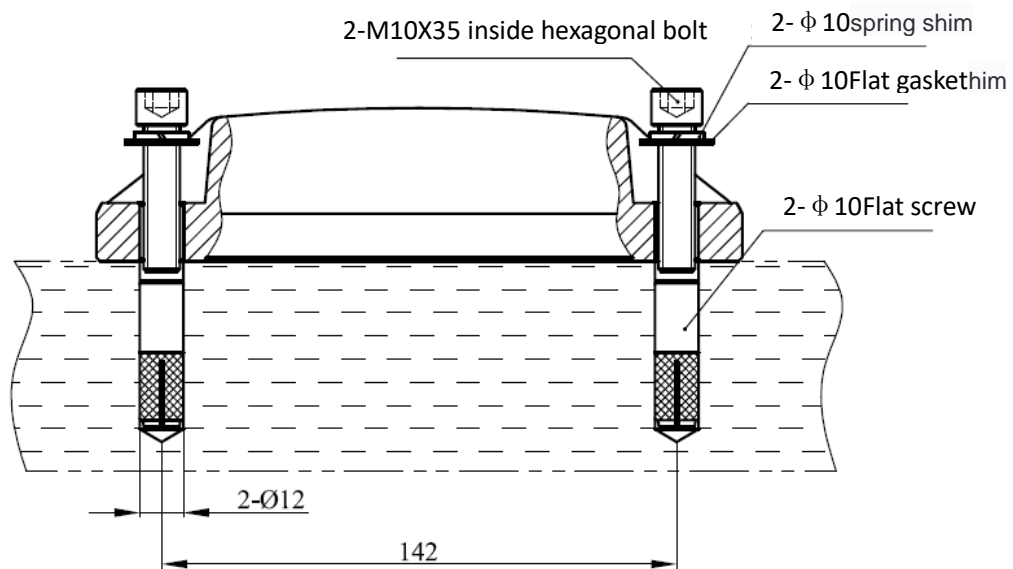
4.1 Installation instructions for ground type

1) The installation position is shown in Figure 5. The parking sensor should be fixed at the center of the parking space.

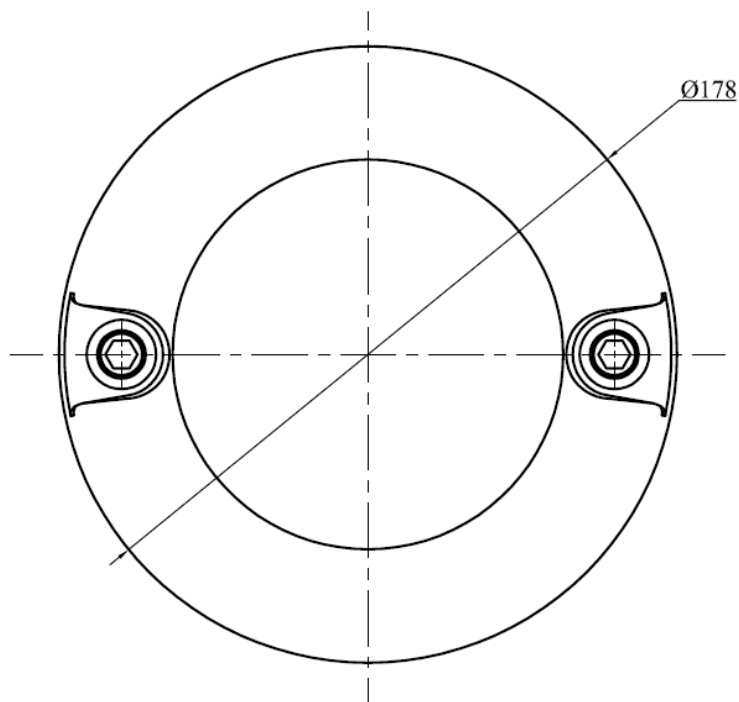


Figure#5 Installation position

2) The concrete floor on which the sensor is installed should be flat. As shown in Figure 6, drill 2- $\Phi 12 \times 46$ mm holes in the installation position, put the 2- $\Phi 10$ flat-explosive screws in the holes, then fix the sensor with 2-M10 \times 35mm hexagon socket head bolts, spring washers and flat washers.



Figure#6A Installation instructions for ground type



Figure#6B Installation instructions for ground type



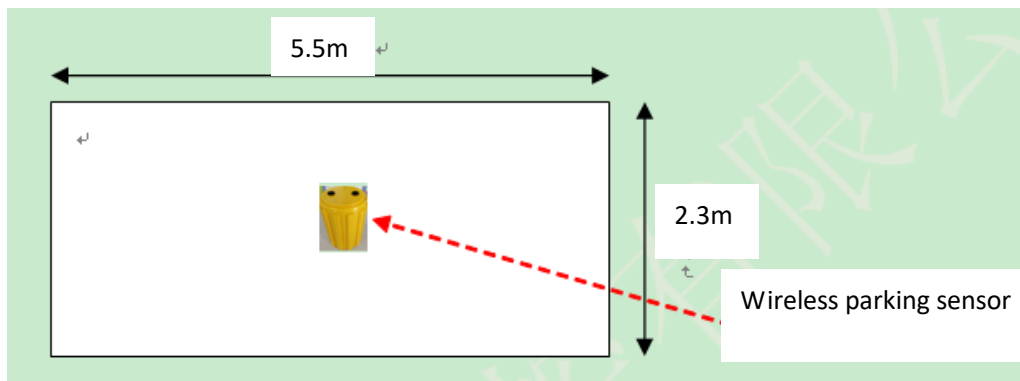
Figure#6C Installation instructions for ground type

4.2 Installation instructions for underground type

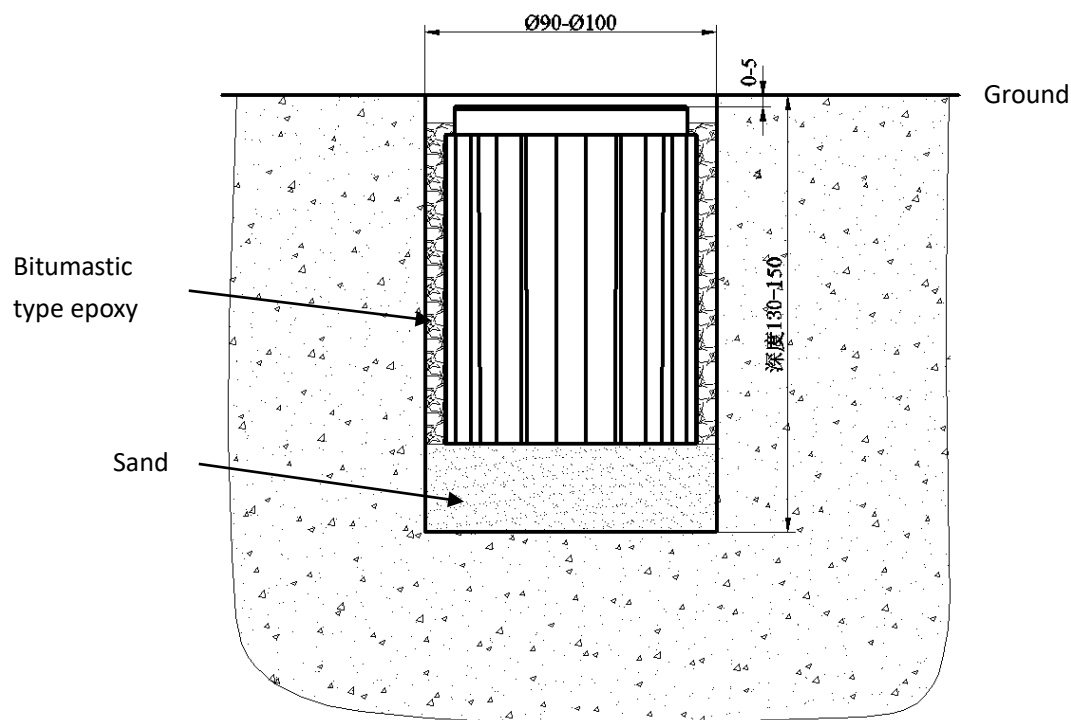
The installation steps are as follows:

- 1) As shown in Figure 7, drill a circular hole in the installation position, diameter 90-100mm, depth 135-160mm;
- 2) Put some fine sand to make the bottom of the round hole flat, remove any stones or sharp objects at the bottom, and ensure that the upper surface of the sensor is 1-5mm below the ground surface;
- 3) Put the sensor into a round hole;
- 4) Fill the gap between the round hole and the sensor with epoxy asphalt;

5) After the epoxy resin asphalt is solidified, the installation is completed (Fig. 8);



Figure#7 Installation position



Figure#8A Installation instructions for underground type



Figure#8B Installation instructions for underground type

4.3Data analysis

After the sensor is installed, ensure that there is no ferromagnetic interference nearby when activated. Right at the black-dot mark on the top, put the magnetic steel for 2-3 seconds and then remove it, make sure at least 5 meters from the sensor. The sensor is activated and enters the working status.



Figure#9 the location of the magnetic activate

Data viewing and setting in the cloud, please refer to the "CS-iTVP-05-XY Wireless Parking

Sensor Communication Protocol";

5. Order guide

Model					
CS-iTVP-05					
↓	Communi- cation method				
	LW	LoRaWAN			
	NB	NB-IoT			
	↓	Frequency			
		B1	NB-IOT		
		B3	NB-IOT		
		B5	NB-IOT		
		B8	NB-IOT		
		B20	NB-IOT		
		BG	B1/B3/ B5/ B8/B20		
		EU434	433MHz (LORAWAN)		
		CN470	470MHz (LORAWAN)		
		EU868	868MHz (LORAWAN)		
		US915	915MHz (LORAWAN)		
		AS923	923MHZ (LORAWAN)		
		↓	Installatio n Type		Packagin g Type
			S	Ground Type	P
			B	Undergroun d Type	B
			↓		↓
CS-iTVP-05	NB	B8	S		P

举例：Example

CS-iTVP-05_NB_B8_S_P, NBIOT transmission mode, B8 band, surface install, bubble pack package。

6. Install and configure accessories

1) USB to UART-TTL adapter. This is not necessary if the customer won't configure the sensor by themselves.

2) Battery model ER26500+SPC550. If you need a battery, please specify when purchasing.
Special tool for underground parking sensor installation, one for each order. If additional ones are needed, please specify when purchasing;

Accessories can be selected according to Table 1.

If any question, please contact the supplier.

Table#1 Accessories selection guide

Model	Description	备注 Remarks
PL2303	USB to UART-TTL adapter. This is not necessary if the customer won't configure the sensor by themselves.	
ER26500+SPC1550	Battery model ER26500+SPC550. If you need a battery, please specify when purchasing.	
CS-iTVP-05-A01	Special tool for underground parking sensor installation, one for each order. If additional ones are needed, please specify when purchasing;	
CS-iTVP-05-A02	Magnetic steel, one for each order. If additional ones are needed, please specify when purchasing.	

7. Precautions

- 1) It is recommended to use the mounting accessory (non-magnetic).The sensor cannot be moved after installation;
- 2) When the sensor is being activated and the background magnetic field is being established, metal interference within 1m may cause abnormal detection;
- 3) The installation must be firm to ensure that the sensor does not move due to wheel crushing;
- 4) The sensor is suitable for regular cars, vans, off-road vehicles, and is recommended for parking spaces of 2.5*5.5 meters. For other parking spaces and special vehicles, please declare in advance when purchasing;

8. Statement

The company reserves the rights to modify the specifications and contents of this manual, and is subject to change without prior notice. Due to product updates, details may not exactly match the product. Please refer to the real product. The rights to interpret this document belong to the company.
