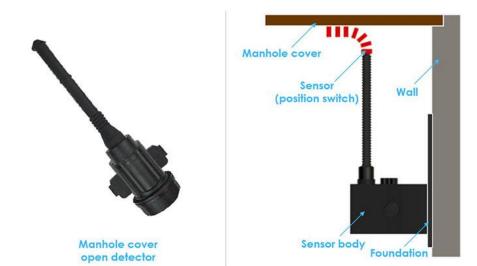# NB-IoT Manhole Cover Opening Detecting/Monitoring System

Nowadays manhole cover failure such as metal theft (for manhole cover or copper cable underneath it) is on the rise and generally becomes a society issue. An unauthorized opening of manhole is very dangerous, it can cause deadly fall-in accidents to people and also inflict a huge amount of damage to public property.

Introduction

Manholes leading to underground supply systems are essential for their maintenance, for example, it concerns telecommunication networks, water supply networks, gas supply networks and electricity networks, and so on. Although it is very crucial to a city's operations, the manhole can be one of the least protected and most vulnerable assets.

Manholes and manhole covers are everywhere.

Manhole cover losses & accidents in China

Manhole Cover Opening Sensor/Detector

Manhole cover
open detector

Manhole cover

Sensor
(position switch)

Wall

Sensor body

Foundation

The sensor detects two statuses of the manhole cover - opened or closed.
During installation, the sensor is sticking out of the manhole surface, indicating the manhole is in "opened" status.
After the manhole cover is placed on it, the sensor is bended over, knowing now the manhole is in "closed" status.

The sensor is sticking out before the cover is placed.

Manhole cover open detector

The inner shoulder of the manhole

With WiiHey's Manhole Cover Open Detector, you can deploy real-time monitoring and protection against metal theft, vandalism, and unauthorized access of manholes. The product utilizes a range of commercially available, off-the-shelf sensors to detect and prevent manhole related incidents. Signals are transmitted from the sensor device to a cloud platform via LPWAN (Low Power Wide Area Network) technologies, such as GPRS, NB-IoT, SigFox, etc. The sensors in combination with the cloud-based dashboard will allow you to monitor and well plan the maintenance of manholes.

If the sensor becomes straight again, then it knows the cover is opened, it will send out message and trigger alarms.

Key Features

- Opened/Closed detection;
- Cloud based platform;
- Real Time Email/SMS/Siren Alarm notification;
- Low false alarm rates;
- Automatic heartbeat update;
- Low power consumption (last >5 years);
- IP68 waterproof;
- -25°C to 65°C operating temperature range;
- Easy to install, wireless communication and free maintenance.
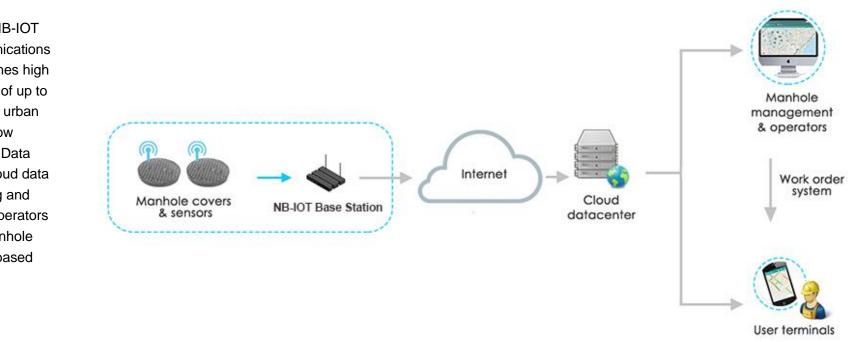
Notification

Benefits

- Monitor, report, predict and optimize your manholes;
- Pick up on unauthorized activities and well plan maintenance schedules;
- 24/7 monitoring with multiple status messages updated per day and instant alarm notification;
- Total flexibility and reliability, can be deployed in urban or rural environments.

Applicable to...

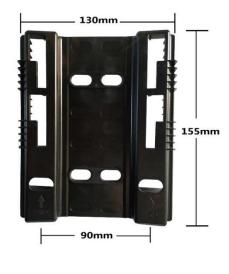- Manhole/Handhole/Sewer/Drain cover;
- Pipe/Cable hole cover.

Architecture

The sensor adopts NB-IOT LPWAN IoT communications technology. It combines high transmission ranges of up to several kilometers in urban environments, with low power consumption. Data are transmitted to cloud data center for processing and fusion. Eventually, operators could view every manhole status from a cloud-based dashboard.

Technical Parameters

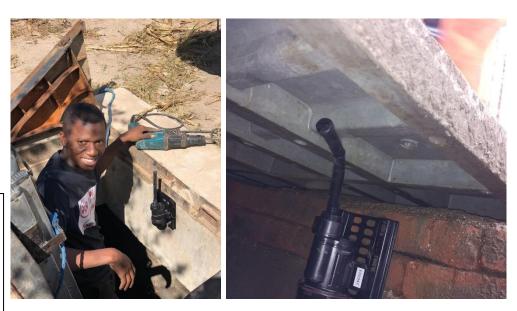| Opened/Closed Status Measurement	
Opened/Closed Status Measurement	
Sensor type	Reed switch
Wireless Connectivity	
Radio	NB-IoT Network (Band1/B2B3/B4/B5/B8/B12/B13/B17/B18/B19/B20/B25/B28/B66), or GSM/GPRS
SIM Card	Micro SIM Card
Power	
Power source	Built-in Li/SOCl2 battery
Battery volume	19AH, for 5+ years battery life
Mechanical	
Dimensions	See the figure below
Environmental	
Operating temperature	-25°C to +65°C
IP Rating	IP68

Dimension

Gallery

Summery

With WiiHey's manhole monitoring solution, thousands of covers are monitored simultaneously, and every cover is individually identified and mapped. It allows immediate positioning of unauthorized attempts on each manhole. This facilitates an immediate focused response by security or management operators via the GIS cloud-based software application.

As a professional and leading IOT designing and manufacturing company, we are ready to design the new IOT-related products together with customers' requirement.

For any query, please don't hesitate to leave us an email or call.

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Function extension:

(Overflow Monitoring)

After adding a water pressure sensor, overflow monitoring function could be integrated to this manhole cover opening detector