

## WiiMTL tilt and lux sensor

### -----For manhole cover monitoring

It adopts one piece capacitive accelerometer sensor to detect the tilt change of the manhole cover and an additional luminance sensor to detect the brightness change inside the manhole to correctly judge the close/open status of the manhole cover, the built-in NB-IoT communication module will update the data packet to cloud sever immediately if stats change is confirmed, the cloud sever will send real time SMS/Email notification to the relative personnel for further inspection.



## FEATURES

- Capacitive MEMS (digital) accelerometer & photosensitive sensor
- Double verification
- Detect the open or close status of the manhole cover
- 3 years' battery life
- Wireless communication: NB-IoT network
- Remote monitoring
- SMS/Email notification
- Powered by long-life batteries;
- Innovative steady installation
- Transparent tempered plastic case
- Bear 20,000Kg pressure

## APPLICATIONS

- Manhole cover opening detection
- Manhole illegal access
- Manhole cover broken
- Land subsidence

## EXTENSION FUNCTION

- Land subsidence
- Water overflow detection
- Gas pressure detection
- Hazardous gas detection

## OVERVIEW

### Mechanism

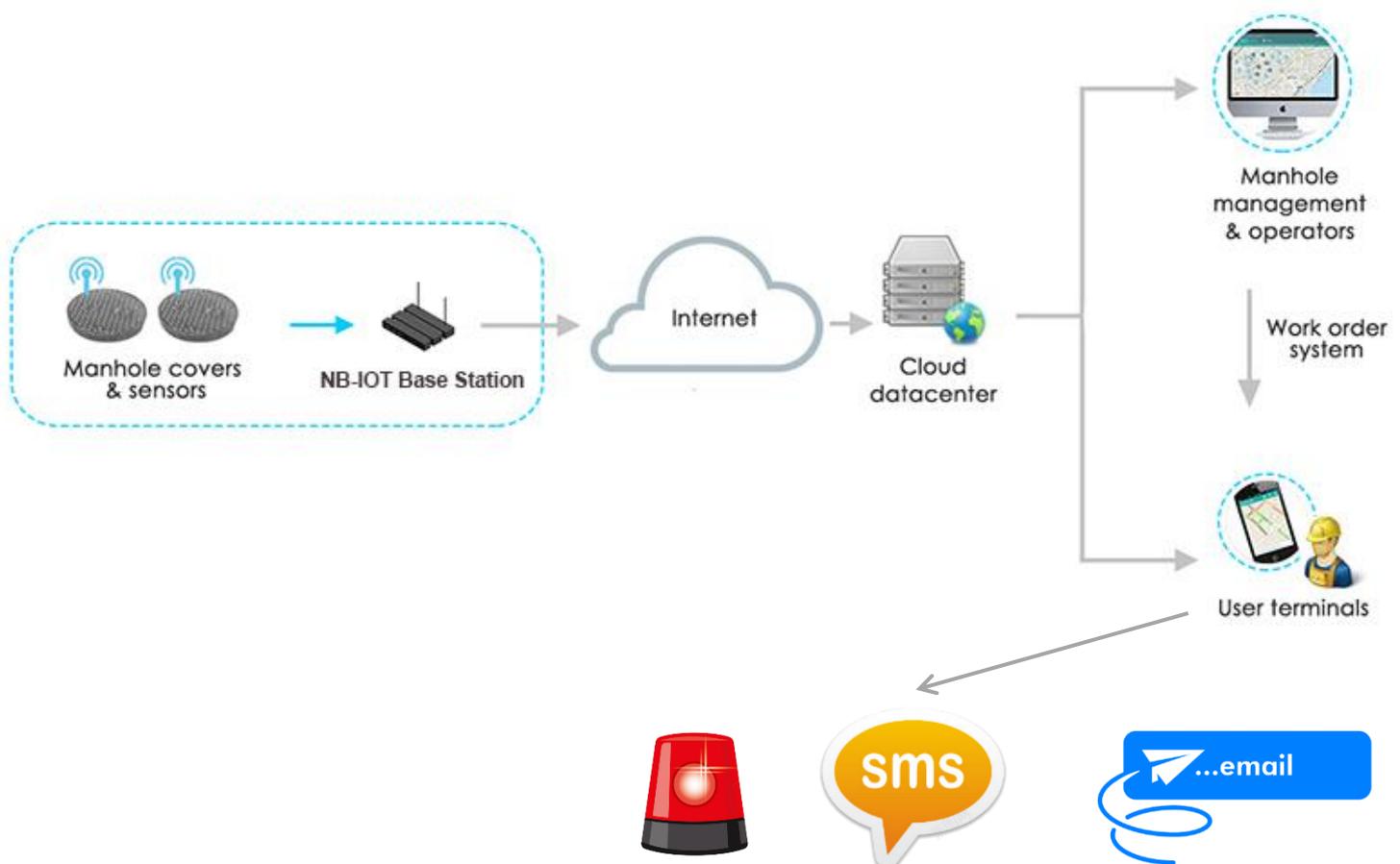
The detector is installed on the downside of the manhole cover. It measures the current inclination angle of the manhole cover and the current lux value as background. The manhole cover is detected as "Be Opened" when both the inclination angle of manhole cover is over 15° (threshold value configurable) and the manhole brightness changes is over 10% in short time; the sensor sends this information to the cloud server by NB-IoT network immediately, and the cloud platform will send SMS/Email alert notification to the relative persons too.

- The heart of the WiiMTL detector is a capacitive MEMS (digital) accelerometer sensor, it measures the acceleration change of X/Y/Z axis and then calculates the inclination angle if the manhole cover is opened or there is land subsidence.
- As auxiliary, there is a photosensitive sensor to detect the brightness of the manhole, it is an additional verification mechanism to check if the manhole cover is really opened, together with the inclination angle changes detected by the MEMS sensor.
- In other cases; the manhole cover broken is checked if the sensor detects the brightness change but the inclination angle change doesn't reach the threshold value, or the manhole's land subsidence is checked if the sensor detects the inclination angle change but there is no brightness change.

Each sensor continuously monitors the acceleration changes using advanced filtering and noise reducing techniques to avoid other vibration and inclination angle changes, eg. vehicles passing the manhole cover.

The WiiMTL detector 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 GIS dashboard and receive SMS/Email notification in real time.

## TOPOLOGY



## MAIN TECHNICAL PARAMETERS

<b>Parking Lot Sensor</b>	
Sensor	3-axial electromagnetic sensor and auxiliary photosensitive lux sensor
Resolution	8mg / 0.028Lux
<b>Wireless Connectivity</b>	
Network	NB-IoT: LTE Cat NB2 Band1/B2/B3/B4/B5/B8/B12/B13/B17/B18/B19/B20/B25/B28/B66: Transmitting Power: 23dBm±2dB Receiving Sensitivity: -114dBm(no retransmit) -130dBm(with retransmit)
SIM Card Type	Micro SIM Card
<b>Power</b>	
Power source	Built-in lithium battery 8000mAh@3.6V
Battery life	3 years
Battery Changeable	Yes
<b>Mechanical</b>	
Case Material	Transparent High Intensity Plastic
Dimensions	Ø 90 mm * height 33 mm
Weight	120 g
Installation	Surface Mounting
<b>Environmental</b>	
Operating temp	-20 °C to +70 °C
Ingress Degree	IP68