AVCOMM Smart Manhole Cover Sensor

AVC-MCS102

User Manual

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User Manual

About This Manual

This user manual is intended to guide a professional installer to install and configure the sensor. It includes procedures to assist you in avoiding unforeseen problems.

NOTE:

Only qualified and trained personnel should be involved with installation, inspection, and repairs of this sensor.

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1 Overview

These documents are helpful to understand the AVC-MCS102 Smart Manhole cover Sensor's following.

- Function of AVC-MCS102 sensor
- Install NB-IoT SIM card
- Power on and Reset
- Installation
- Quick start
- Common problems& solutions

2 Function of AVC-MCS102 Smart Manhole cover Sensor

Move detection:

When the device detects that the tilt angle of manhole exceeds the alarm threshold, it will trigger the manhole sensor to report alarm data(moved). When the position of the manhole cover returns to normal, the equipment will be triggered to report normal data (not moved).

Full/Empty detection:

AVC-MCS102 sensor measure the distance from sensor to liquid level. When the distance is less than this threshold 30cm(default), we think the manhole is full, if more than this threshold, think the manhole is empty. And the measure interval is 10min by default. When there is the full/empty status changed, the sensor will report this data, if not, only report the data at upload time interval (default 24hours).

Data reporting rule:

1> Periodic report data at upload time, default the interval is 24hours; 2> Trigger the device to report data when the status is changed,

Move status: When the device tilt angle exceeds the alarm threshold, will trigger sensor to report the move alarm data right now. Then when the measured angle is less then alarming threshold, will trigger sensor report move normal status right now.

Full/Empty status: the measure interval is 10min by default. When there is the full/empty status changed, the sensor will report this data, if not, only report the data at upload time interval (default 24hours). Status changed means, change from full to empty, or from empty to full.

3> Reboot: AVC-MCS102 sensor will report one data after 1min rebooting.

Default Setting:

Configuration	Default parameters	Remarks
Upload time	24hours	Reporting data every 24hours by default.
Detection time	10min	AVC-MCS102 sensor detect the full/empty status, if status changed, it reports the data, if not changed, only report data at upload time. Status means from full to empty or empty to full.
Move alarm threshold	30°	When the angle is greater than 30 °, the device will trigger the upload of data. (the angle is the relative angle between the device and the ground)
Battery alarm threshold	20%	It will detect the power of battery. more than 20% no alarm; less than20% alarm will be activated.
Full alarm threshold	30cm	The full alarm threshold. When the height is less than this threshold, we think the manhole is full, if more than this threshold, think the manhole is empty.
APN	CTNB	Please change the APN to yours when you receive the sensor so that it can connect to the NB-IoT network.
Server address		It is just for testing。

3 Install NB-IoT SIM Card

NB-IoT Sim card: Micro card.

Insert NB card: sensor use self-elastic card slot, please find the card slot and insert the SIM card, as the following picture,

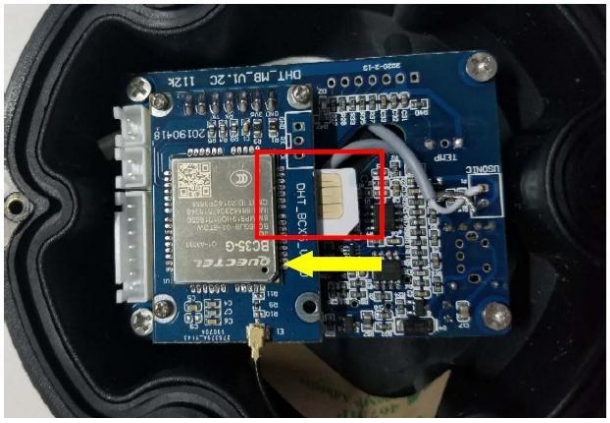


Figure3.1 Installation direction

Figure3.1 Finished

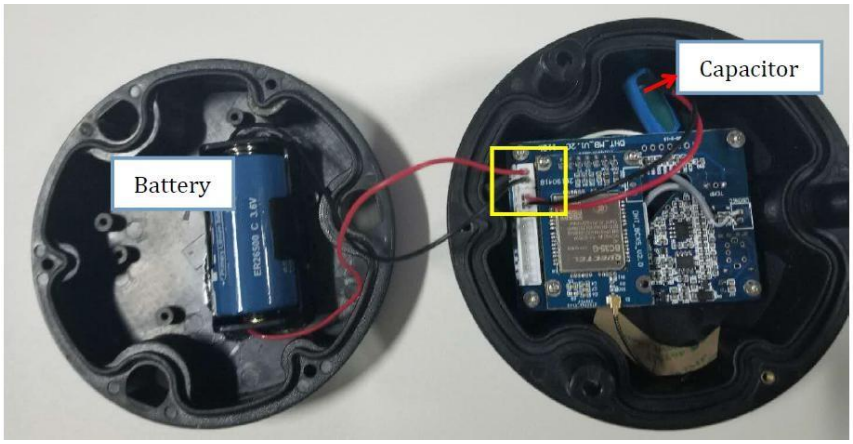
4 Power On

Please first connect the capacitor, then connect battery, as followingpicture: Note:

1 If you connect the power, but not reporting, pleae try to restart sensor by magnet.

2 If you need to restart sensor, please use magnet. DONOT unplug/plug battery frequently.

3 Sensor report the data later 1min after power on or reboot.



5 Reboot Sensor by Magnet

Magnet: 

Move the magnet on the top cover and remove the magnet. This will reboot sensor. If the device is successfully rebooted, the device will report a data after 1min.

Note:

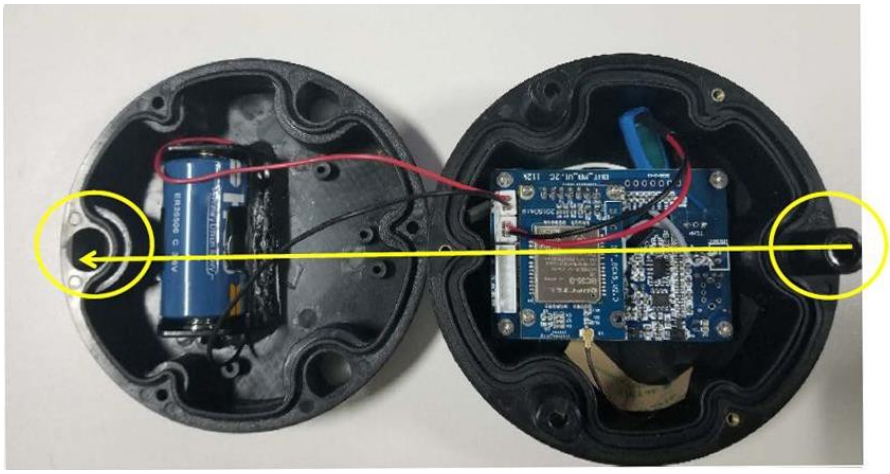
1 Due to different versions, the appearance may be slightly different, this picture is for reference only, please refer to the actual received.

2 Sensor report the data later 1min after power on or reboot.

6 Installation

6.1 AVC-MCS102 Sensor housing installation

This content describes the method and precautions for installing the shell: Installation direction:



Notes:

1. When installing, screw in three screws first, do not tighten too tightly, and then reinforce the three screws separately.

2. When sealing, pay attention to the power cord, do not press the cord. Avoid damage.

3 After installation, the gap between the upper and lower covers is less than 0.5mm, which has achieved the purpose of waterproofing.

6.2 Install AVC-MCS102 sensor to manhole cover

6.2.1 Preparation before installation

Insert NB-IoT SIMcard, power on, and properly sealed.

In addition, the magnet can be used to restart the device on site and view the data on the platform to ensure that the network communication on site is normal.

6.2.2 Installation

Installation method:

Finding the location: put the sensor in the center of the manhole cover. (White) ultrasonic probe perpendicular to the object or liquid level. Please do not install it at an angle to avoid being unable to accurately determine the full or empty status.

Drilling: Punch holes in the manhole cover according to the installation holes of the device and fix the sensor on the manholecover with screws.

Initialization: After correctly installing the AVC-MCS102 sensor on the manhole cover, you can use the magnet to restart the sensor, then place the manhole cover on the well within one minute. Because the initialization starts one minute after the restart, and the first initialization data is reported. Therefore, it is necessary to place the manhole cover within 1 minute after restarting.

7 Quick Start

Step 1: Insert NB-IoT SIM card

Insert the simcard correctly. Please refer to the third part of this document.

Step 2: Connect the battery

The device is not connected to the battery by default, so open the device case before testing and power it on. Please refer to the fourth part of this document.

Step3: Move detection function

1>Initialization; Use the magnet to restart the device, then place the manhole cover with sensor on the manhole quickly within one minute. And check then initialized data after 1min. Note: this step is very importanct and must be needed.

2>Start the test.

3>Lift the device at an angle greater than 30°. At this time, the device can be triggered to report alarm data. Check the alarm data on platform.

4>Adjust the angle of the device to less than 30°, which can trigger the device to report alarm data again. Check the data on platform.

Step4: Full/Empty detection function

1> For example, last data show full alarm.

2> Change the height>30cm, so the status is empty, wait 10min, then check the data on platform.

3> Change the height <30cm and >20cm, so the status is full, wait 10min, then check the data on platform.

Note:

1 Default detection time interval is 10min, therefore, need to wait serval minutes, wait sensor detect the status, or report.

2 Please do not move or turn over the AVC-MCS102 sensor to avoid triggering a move alarm and failing to measure accurate height values when you change the distance for testing the full/empty status.

8 Common problem&solution

Q1 Why can not I see the device data?

A1:no battery connected.

Considering shipping rules, some is not connected for battery. So, user should open cover and connect battery with the PCB board. For some version with magnetic part outside, please remove

the magnetic part, then the battery will power on the sensor.

A2: band error.

Please confirm whether the device frequency is the same as the gateway frequency.

A3: The device is not properly registered on the Network server.

Please check the information about whether the device is properly registered on the web server, including devaddr, deveui, appeui, appkey information and frequency band.

A4: The gateway is not connected to the Network server.

Please check if the gateway is properly connected to the Network server and confirm it can work well.

A5: The device is far away from the gateway.

A6: The battery is dead.

Please check if the data shows a battery alarm or use a voltage measurement tool to measure the battery voltage or replace another battery for verification.

Q2 If the manhole cover is lifted, the sensor will generate an alarm, and then put the manhole cover back in place, will it stop the alarm?

Yes, when the cover is lifted and angle is >30° (alarm threshold), manhole sensor will report moved alarm, And when put the manhole cover back, angle is <30°, manhole sensor will report one normal data(not alarm) immediately.

Q3 Why do you have to wait a minute after restarting?

It is to facilitate the initialization of the sensor when the manhole cover is actually installed.

Therefore, after installation, you can restart the manhole cover by magnet and place the manhole cover within 1 minute. After 1 minute, the device starts to initialize and reports data. At this time, the position is set to the initial position and the angle is 0°