

# NJ-iot603

## Smart Manhole Cover Monitor User Manual



### Version Revision

The revision history accumulates descriptions for each document update.

| number | Document Version | Reviser     | date of issue | Modification Notes                     |
|--------|------------------|-------------|---------------|----------------------------------------|
| 1      | V1.0.0           | Lu Tingzhen | 2025.02.15    | Standard Specification Document Format |
|        |                  |             |               |                                        |

Xiamen Nengjia New Energy Technology Co., Ltd.

<https://light.net-join.com/>

Update Time: 20250215

## 1、 Brief Description of the Monitoring Function for Smart Manhole Covers

The NJ- IoT603 is a battery- powered smart monitoring terminal designed for unattended manhole cover supervision in municipal infrastructure. It integrates NB- IoT (Narrowband Internet of Things) cellular communication, enabling deep- penetration data transmission from underground enclosures with ultra- low power consumption.

The Net-Join intelligent manhole cover sensor is installed beneath the cover. When detecting someone tampering with it, the sensor instantly reports the cover's tilt angle and an alarm signal to the base station, which then transmits the data via the network to the municipal manhole cover management system server. Upon receiving the alert, administrators promptly dispatch personnel for intervention, achieving intelligent and efficient management of municipal manhole covers..

The following features are optional:

**Tilt detection** – 3-axis digital gyroscope for angular displacement monitoring

**Flood level detection** – Float switch with 0 – 3 m range

**Ambient temperature monitoring** – Configurable high/low threshold

**Vibration detection** – Piezoelectric transducer for loose cover identification

**NB- IoT wireless transmission** – Autonomous alarm reporting and periodic status uploads

## 2、 Product Features

Key performance features of the intelligent manhole cover monitoring terminal:

- **Manhole Cover Management:** Management of information such as manhole cover numbers, coordinates (latitude and longitude), and associated roads
- **Condition Monitoring:** Real-time monitoring of manhole cover status, including: normal/abnormal/low voltage/detection of displacement/liquid level detection/temperature detection/gas detection (optional as needed)
- **Alarm Location:** Real-time alarm transmission, highlighted alarm location, synchronized SMS notification
- **Alarm Handling:** Issue work orders, perform on-site repairs, clear alarms, manage alarm databases
- **Alarm Inspection:** Forward alarm information to inspection personnel, handle the situation on-site, and transmit photos from the scene.
- **SMS Reminder:** Send an alert immediately if a manhole cover shows abnormalities
- **Map Display:** The digital map shows manhole cover locations, basic information, and real-time status
- **Text display:** shows manhole cover location, basic information, real-time status, and history records

- **Monitoring Dashboard:** Displays the current status of manhole covers in real time, including online/offline status, daily alarm records, daily inspection records, weekly alarm records, and map display. The dashboard supports modifying its name.

### 3、Product Images and Sizes



**Abnormal movement/tilt, bumpiness, temperature**

**Smart manhole cover monitor (available in various models to meet different customer needs, with optional functional expansions)**

**Physical dimensions: 130\*120\*42 mm**

### 4、application scenarios

With the acceleration of urbanization and the rapid development of municipal infrastructure, numerous municipal equipment assets across departments such as public utilities, power supply, and telecommunications require management, among which manhole covers represent a critical component. Due to the lack of effective monitoring and management mechanisms, manhole covers give rise to a series of issues: unauthorized penetration and theft of communication conduits occur frequently; resources are difficult to control and their advantages hard to leverage; manual inspection and maintenance cannot be conducted continuously 24/7, posing safety risks; manual management struggles to oversee construction and maintenance operations comprehensively, often resulting in non-standard procedures; stolen manhole covers expose well openings, leading to injuries and property damage, thereby endangering public safety and tarnishing the city's image.

- Widely used in public security, telecommunications, military forces, power generation, and water conservancy.
- Safety monitoring systems for underground pipeline networks in sectors such as transportation and gas distribution.

- Government agencies responsible for municipal infrastructure—including water supply, power distribution, and telecommunications networks—with outdoor manhole covers, as well as other urban infrastructure management departments.
- Supports integration with third-party platforms

## 5、technical parameter

### 1) Voltage Parameter Positioning Performance

| name                      | Parameter Content                                                                                              |
|---------------------------|----------------------------------------------------------------------------------------------------------------|
| specifications and models | NJ-iot603                                                                                                      |
| External Dimensions       | 130*120*42mm                                                                                                   |
| Alarm Angle Range         | Can be set from 1° to 180°                                                                                     |
| Level Alarm               | floatated level gauge (0–3 m)                                                                                  |
| Temperature Alarm         | Monitor ambient temperature and set a temperature alert; report deviations beyond the threshold to the backend |
| maximum power dissipation | <1W                                                                                                            |
| Automatic Wake Time       | Adjustable range: 5 minutes to 45 days                                                                         |
| Alarm Reporting Interval  | Adjustable from 1 to 1440 minutes                                                                              |
| Dormant current           | < 10uA                                                                                                         |
| Alarm Response Time       | Low-power offline mode: 20–40 seconds on a normal network connection                                           |
| internal battery          | Lithium-ion battery: 3.6 V, 8000 mAh                                                                           |
| stand-by time             | 3–5 years or more (depending on the frequency of data collection and reporting)                                |
| working temperature       | -40°C-85°C                                                                                                     |
| storage temperature       | -40°C-85°C                                                                                                     |
| levels of protection      | IP68                                                                                                           |
| Working Humidity          | 95% RH (no condensation)                                                                                       |
| NB iot Version            | Supports NB iot cards                                                                                          |

|                                 |                                                                                 |
|---------------------------------|---------------------------------------------------------------------------------|
| Outer shell plastic             | Composite ABS, compressive strength $\leq 15 \text{ kg/cm}^2$                   |
| Effective water immersion depth | <0.4 M (the deeper the device is submerged, the greater the signal attenuation) |

## 2) Product Selection Table

| Selection Guidelines for Intelligent Manhole Cover Alarms |                                                                                                                                                                                                |                                                                                   |                                                                                     |                                                                                          |                                                                                                              |                                                                                                         |                                                                                     |
|-----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| product appearance                                        |                                                                                                               |  |    |         |                            |                      |  |
| product configuration                                     | Abnormal movement/dumping + vibration + temperature                                                                                                                                            | Abnormal movement/tilt + vibration + temperature + water immersion detection      | Abnormal movement/tilt + vibration + temperature + float-type water level detection | Abnormal movement/tilt + vibration + temperature + electrode-based water level detection | Abnormal movement/tilt + vibration + temperature change + water immersion + float-type water level detection | Abnormal movement/tilt + vibration + temperature change + water immersion + submersible depth detection | Abnormal movement/tilt + vibration + temperature + water immersion + RS485          |
| communication mode                                        | NB-iot                                                                                                                                                                                         | NB-iot                                                                            | NB-iot                                                                              | NB-iot                                                                                   | NB-iot                                                                                                       | NB-iot                                                                                                  | NB-iot                                                                              |
| location mode                                             | GIS                                                                                                                                                                                            | GIS                                                                               | GIS                                                                                 | GIS                                                                                      | GIS                                                                                                          | GIS                                                                                                     | GIS                                                                                 |
| voltage range                                             | 3V-3.6V                                                                                                                                                                                        | 3V-3.6V                                                                           | 3V-3.6V                                                                             | 3V-3.6V                                                                                  | 3V-3.6V                                                                                                      | 3V-3.6V                                                                                                 | 9V-24V                                                                              |
| quiescent current                                         | <10uA                                                                                                                                                                                          | <10uA                                                                             | <10uA                                                                               | <10uA                                                                                    | <10uA                                                                                                        | <10uA                                                                                                   | <10uA                                                                               |
| working temperature                                       | -40℃~85℃                                                                                                                                                                                       | -40℃~85℃                                                                          | -40℃~85℃                                                                            | -40℃~85℃                                                                                 | -40℃~85℃                                                                                                     | -40℃~85℃                                                                                                | -40℃~85℃                                                                            |
| classification of waterproof                              | IP68                                                                                                                                                                                           | IP68                                                                              | IP68                                                                                | IP68                                                                                     | IP68                                                                                                         | IP68                                                                                                    | IP68                                                                                |
| Angle Threshold                                           | 0° ~180°                                                                                                                                                                                       | 0° ~180°                                                                          | 0° ~180°                                                                            | 0° ~180°                                                                                 | 0° ~180°                                                                                                     | 0° ~180°                                                                                                | 0° ~180°                                                                            |
| Level Threshold                                           | --                                                                                                                                                                                             | Device Water Entry Alert                                                          | Adjust float height: (0-5 meters; default: 2 meters)                                | Adjust float height: (0-5 meters; default: 2 meters)                                     | Adjust the float height for equipment water ingress alarm (0-5 meters; default: 2 meters)                    | Set a water depth threshold for detection (0-10 meters; default: 5 meters)                              | Device Water Entry Alert                                                            |
| outline dimension                                         | Outer diameter: 115 mm; Thread pitch: 128 mm; Height: 42 mm                                                                                                                                    | Outer diameter: 115 mm; Thread pitch: 128 mm; Height: 42 mm                       | Outer diameter: 115 mm; Thread pitch: 128 mm; Height: 42 mm                         | Outer diameter: 115 mm; Thread pitch: 128 mm; Height: 42 mm                              | Outer diameter: 115 mm; Thread pitch: 128 mm; Height: 42 mm                                                  | Outer diameter: 115 mm; Thread pitch: 128 mm; Height: 42 mm                                             | Outer diameter: 115 mm; Thread pitch: 128 mm; Height: 42 mm                         |
| way to install                                            | Screw fixation or stainless steel bracket installation (optional)                                                                                                                              | Screw fixation or stainless steel bracket installation (optional)                 | Screw fixation or stainless steel bracket installation (optional)                   | Screw fixation or stainless steel bracket installation (optional)                        | Screw fixation or stainless steel bracket installation (optional)                                            | Screw fixation or stainless steel bracket installation (optional)                                       | Screw fixation or stainless steel bracket installation (optional)                   |
| remark                                                    | Device positioning uses electronic map coordinates and supports secondary development. Devices can be equipped with GPS or Beidou positioning; for details, contact your sales representative. |                                                                                   |                                                                                     |                                                                                          |                                                                                                              |                                                                                                         |                                                                                     |

## 6、Installation Requirements and Instructions

The intelligent manhole cover monitor must be properly installed to achieve its designed functionality. As it utilizes a NB-iot network, installation should typically be carried out under the guidance of an engineer certified by the relevant authorities; otherwise, signal instability may occur.

**matters need attention :**

Installation requirements: Equipment requires activated strong magnets, electric drills, drill bits, M5×30 screws (for cast iron manhole covers), and plastic expansion 6×30 screws (for concrete manhole covers).  
Installation position: Do not install in the center of cast iron manhole covers. Customers should purchase appropriate screws based on the manhole cover material.





The installation location is as follows:

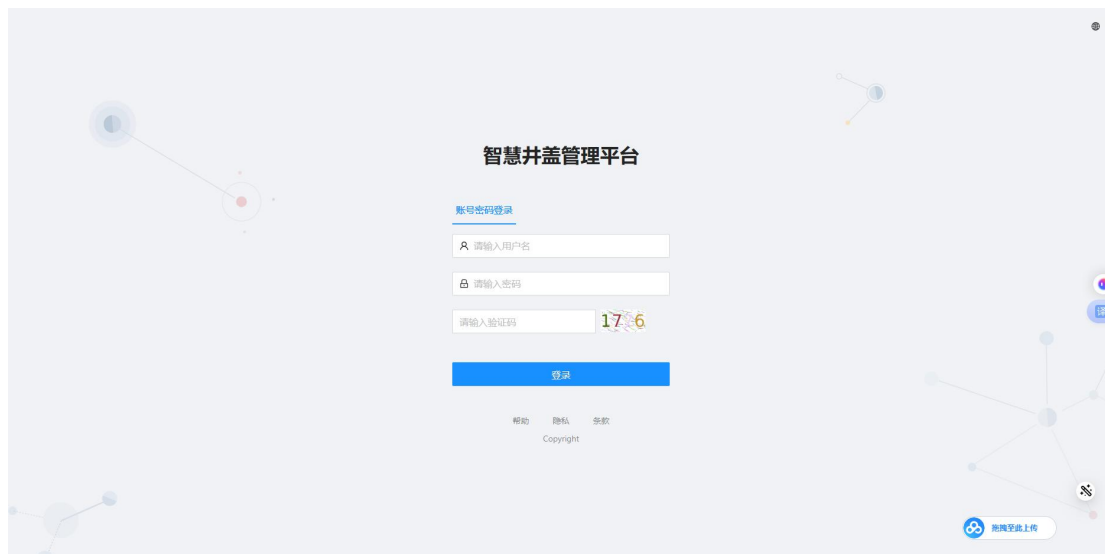


## 7、 The Smart Manhole Cover Management Cloud Platform and WeChat

### 7.1 Login Homepage

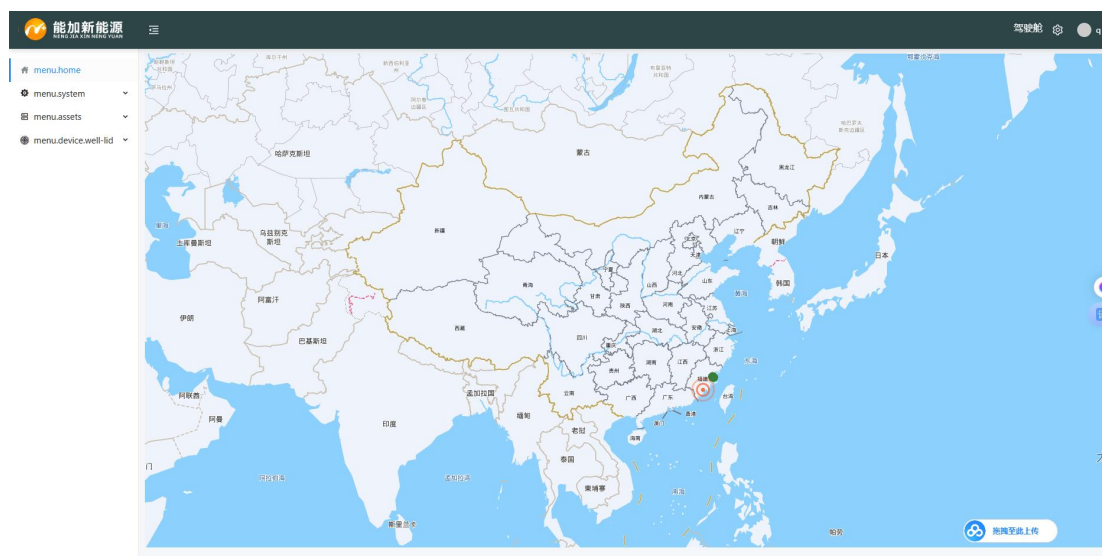
Open a browser (use 360 Browser's Speed Mode, Google Chrome, or a browser supporting the Chromium kernel), enter <https://xmnengjia.com/jinggai>, and log in with your account credentials: [Username]: case-sensitive. [Password]: case-sensitive.

Open the WeChat Mini Program, search for "Nengjia IoT Cloud Platform," and click to enter the Smart Manhole Cover Monitoring Cloud. After logging in with your account and password: [Username]: case-sensitive. [Password]: case-sensitive.



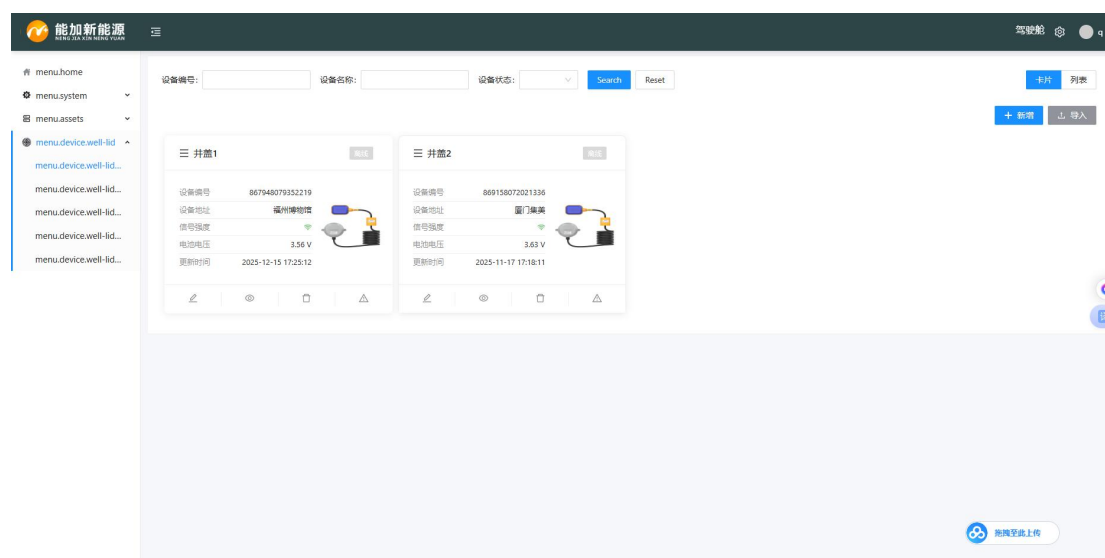
## 7.2 Equipment Overview

The PC homepage features a global map visualization as the core display, directly showing the geographic locations of sites and enabling precise positioning of target devices. A fixed navigation menu is placed on the left side, providing quick access to modules including the home page, system settings, asset management and device monitoring, facilitating overall system overview and global management. With a clean and intuitive layout, it supports both large-screen visual monitoring and daily backend operations, adapting to desktop browsing and routine operation & maintenance. It serves as an all-in-one visual monitoring cockpit for new energy stations.



### 7.3 Device List

This page serves as the centralized manhole cover device management module. It supports filtering and searching by device ID, device name and device status, and allows switching between card view and list view. The card view displays key information of each manhole cover device intuitively, including device name, running status, device ID, installation location, signal strength, battery voltage and last update time. It also provides functions such as new device creation, bulk import, editing, viewing, deletion and alert management. It helps operation & maintenance staff manage the manhole cover monitoring device inventory uniformly, check real-time operating conditions, monitor battery power and communication status, and achieve refined operation and management of IoT manhole cover devices.



### 7.4 Alarm Management

This page is the alarm management module of the smart manhole cover system. It supports multi-dimensional filtering and searching by device ID, device name and processing status. The table displays key alarm information, including device ID, device name, alarm time, alarm details, alarm location, processing status and on-site images, clearly showing abnormal events such as tilt deviation and liquid level overload. It supports alarm processing, record deletion, data export and page navigation. It enables full tracking of alarm status and closed-loop management of risk alerts, allowing operation & maintenance staff to eliminate hazards promptly and ensure safe operation of municipal manhole facilities.

| 设备编号            | 设备名称 | 报警时间                   | 报警信息                      | 报警地址 | 处理状态 | 现场图 | 操作 |
|-----------------|------|------------------------|---------------------------|------|------|-----|----|
| 869158072021336 | 井盖2  | 2025-11-17 17:18:11    | 倾斜异常报警, 当前值: 176° 阈值: 30° | 厦门集美 | 未处理  |     | 处理 |
| 869158072021336 | 井盖2  | 2025-11-17 17:08:52    | 倾斜异常报警, 当前值: 176° 阈值: 30° | 厦门集美 | 未处理  |     | 处理 |
| 869158072021336 | 井盖2  | 2025-11-11 09:53:14    | 倾斜异常报警, 当前值: 49° 阈值: 30°  | 厦门集美 | 未处理  |     | 处理 |
| 869158072021336 | 井盖2  | 2025-11-11 09:47:43    | 倾斜异常报警, 当前值: 52° 阈值: 30°  | 厦门集美 | 未处理  |     | 处理 |
| 869158072021336 | 井盖2  | 2025-11-07 11:09:46:11 | 倾斜异常报警, 当前值: 63° 阈值: 30°  | 厦门集美 | 未处理  |     | 处理 |
| 867948079352219 | 井盖1  | 2025-11-07 15:03:49    | 液位超限                      | 厦门集美 | 未处理  |     | 处理 |
| 867948079352219 | 井盖1  | 2025-11-07 11:51:58    | 液位超限                      | 厦门集美 | 未处理  |     | 处理 |
| 867948079352219 | 井盖1  | 2025-11-07 11:45:47    | 液位超限                      | 厦门集美 | 未处理  |     | 处理 |
| 867948079352219 | 井盖1  | 2025-11-07 11:42:56    | 液位超限                      | 厦门集美 | 未处理  |     | 处理 |
| 869158072021336 | 井盖2  | 2025-11-07 11:41:22    | 倾斜异常报警, 当前值: 157° 阈值: 30° | 厦门集美 | 未处理  |     | 处理 |

## 7.5 Work Order Management

This page is the work order management module of the smart manhole cover system. It supports multi-condition filtering and searching by device ID, device name, processing status and creation date. The table displays core work order information, including device ID, device name, device address, creation time, work order details, processing status, processing results and on-site images, recording maintenance work orders generated by alarms such as tilt anomalies, bump anomalies and liquid level overruns. It supports inspection, cancellation, deletion and page navigation, enabling full-lifecycle tracking of maintenance work orders, standardizing inspection workflows, ensuring timely closed-loop resolution of manhole faults and improving the operation efficiency of municipal facilities.

| 设备编号            | 设备名称             | 设备地址 | 创建时间                | 工单信息                      | 处理状态 | 处理结果   | 现场图 | 操作    |
|-----------------|------------------|------|---------------------|---------------------------|------|--------|-----|-------|
| 869158072021336 | 井盖2              | 厦门集美 | 2025-07-04 09:34:20 | 倾斜异常报警, 当前值: 178° 阈值: 30° | 待处理  |        |     | 巡检 作废 |
| 869158072021336 | 井盖2              | 厦门集美 | 2025-07-03 14:08:38 | 倾斜异常报警, 当前值: 166° 阈值: 30° | 待处理  |        |     | 巡检 作废 |
| 869158072021336 | 井盖2              | 厦门集美 | 2025-06-30 15:35:33 | 倾斜异常报警, 当前值: 55° 阈值: 30°  | 待处理  |        |     | 巡检 作废 |
| 869158072021336 | 井盖2              | 厦门集美 | 2025-06-24 14:15:19 | 倾斜异常报警, 当前值: 120° 阈值: 30° | 待处理  |        |     | 巡检 作废 |
| 869158072021336 | 井盖2              | 厦门集美 | 2025-06-24 14:14:19 | 倾斜异常报警, 当前值: 119° 阈值: 30° | 待处理  |        |     | 巡检 作废 |
| 869158072021336 | 井盖2              | 厦门集美 | 2025-06-24 14:13:22 | 倾斜异常报警, 当前值: 123° 阈值: 30° | 待处理  |        |     | 巡检 作废 |
| 867948079352219 | 井盖1              | 厦门集美 | 2025-06-17 17:08:47 | 颠簸异常报警, 当前值: 158 阈值: 150  | 已完成  |        |     |       |
| 测试设备002         | 福建省厦门市集美区软件园三期D区 |      | 2025-05-15 14:33:13 | 液位超限报警                    | 已完成  | 2111   |     |       |
| 测试设备002         | 福建省厦门市集美区软件园三期D区 |      | 2025-05-15 10:32:06 | 液位超限报警                    | 已完成  | 444444 |     |       |
| 测试设备002         | 福建省厦门市集美区软件园三期D区 |      | 2025-05-15 10:32:06 | 液位超限报警                    | 已完成  | 454545 |     |       |

## 7.6 Historical Data

This page is the historical data query module for smart manhole covers. It supports searching records by device ID and displays time-series parameters such as temperature, voltage, tilt angle and signal status. Data export and page browsing are available for condition tracking and fault analysis.

能加新能源

NEO JIA XIN ENERGY SYSTEM

☰

menu.home

menu.system

menu.assets

menu.device-well-lid

menu.device-well-lid...

menu.device-well-lid...

menu.device-well-lid...

menu.device-well-lid...

menu.device-well-lid...

设备编号:

Search

Reset

删除

导出

| <input type="checkbox"/> | 更新时间                | 设备名称 | 设备编号            | 温度   | 电压   | 倾斜角度 | 颠簸次数 | 信号强度   | 浮球状态 | 水浪状态 | 漂浮状态 | 备用电池电压 |
|--------------------------|---------------------|------|-----------------|------|------|------|------|--------|------|------|------|--------|
| <input type="checkbox"/> | 2025-12-15 17:25:12 | 井盖1  | 867948079352219 | 22.8 | 3564 | 121  | 638  | 87.1%  | 正常   | 正常   | 已激活  |        |
| <input type="checkbox"/> | 2025-12-15 17:19:03 | 井盖1  | 867948079352219 | 22.7 | 3564 | 121  | 627  | 100%   | 正常   | 正常   | 已激活  |        |
| <input type="checkbox"/> | 2025-12-15 17:12:53 | 井盖1  | 867948079352219 | 22.7 | 3550 | 121  | 616  | 100%   | 正常   | 正常   | 已激活  |        |
| <input type="checkbox"/> | 2025-12-15 17:06:43 | 井盖1  | 867948079352219 | 22.7 | 3560 | 122  | 605  | 100%   | 正常   | 正常   | 已激活  |        |
| <input type="checkbox"/> | 2025-12-15 17:00:34 | 井盖1  | 867948079352219 | 22.6 | 3552 | 122  | 594  | 100%   | 正常   | 正常   | 已激活  |        |
| <input type="checkbox"/> | 2025-12-15 16:54:24 | 井盖1  | 867948079352219 | 22.6 | 3562 | 121  | 583  | 100%   | 正常   | 正常   | 已激活  |        |
| <input type="checkbox"/> | 2025-12-15 16:48:14 | 井盖1  | 867948079352219 | 22.6 | 3558 | 122  | 572  | 100%   | 正常   | 正常   | 已激活  |        |
| <input type="checkbox"/> | 2025-12-15 16:42:04 | 井盖1  | 867948079352219 | 22.6 | 3562 | 121  | 561  | 100%   | 正常   | 正常   | 已激活  |        |
| <input type="checkbox"/> | 2025-12-15 16:35:54 | 井盖1  | 867948079352219 | 22.6 | 3562 | 122  | 550  | 96.77% | 正常   | 正常   | 已激活  |        |
| <input type="checkbox"/> | 2025-12-15 16:29:43 | 井盖1  | 867948079352219 | 22.5 | 3568 | 122  | 539  | 100%   | 正常   | 正常   | 已激活  |        |

1 - 10 of 7826

<

1

2

3

4

5

...

783

>

10 / page

Go to

Page

跳转至此上程



**Net Join IoT**  
Nengjia New Energy

<https://light.net-join.com/>