# Wireless Sensor

# R900P Series User Manual

# Contents

# 1. Introduction

The R900P series devices are Netvox-manufactured LoRaWAN-compliant Class A/Class C devices that interface with external UART/RS485 sensors (e.g., CO, NO, $O_3$ , $H_2$ S, $NO_2$ , $SO_2$ , Noise, pH, ORP, Turbidity, Liquid-level, $CO_2$ , Soil-moisture, Wind-speed, Wind-direction, Atmospheric-pressure, VOC, Electrical conductivity). The devices integrate built-in vibration sensors for tamper detection and support one/two output/input signals, enabling threshold-alarm-triggered control of third-party devices). Additionally, these devices can monitor environmental parameters including temperature, humidity, and ambient light intensity, supporting both DC power supply and battery operation.

**LoRa Wireless Technology**

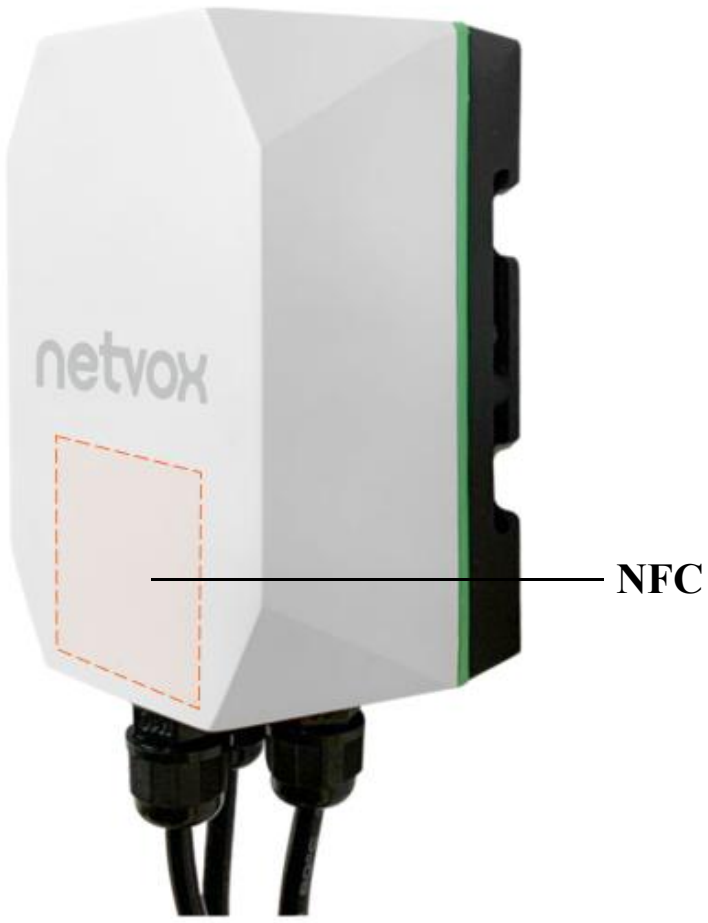
LoRa is a wireless communication technology famous for its long-distance transmission and low power consumption. Compared with other communication methods, LoRa spread spectrum modulation technique greatly extends the communication distance. It can be widely used in any case that requires long-distance and low-data wireless communications. For example, automatic meter reading, building automation equipment, wireless security systems, and industrial monitoring. It has features like small size, low power consumption, long transmission distance, strong anti-interference ability, and so on.

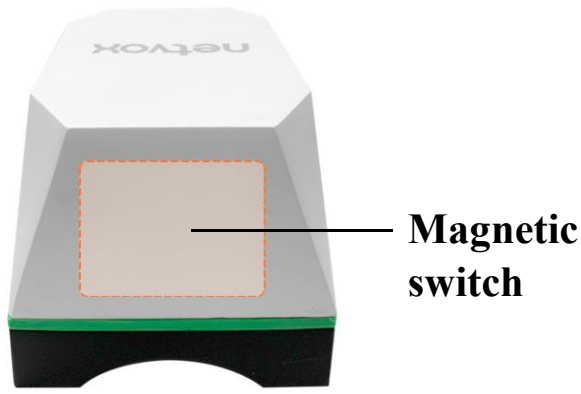
**LoRaWAN**

LoRaWAN uses LoRa technology to define end-to-end standard specifications to ensure interoperability between devices and gateways from different manufacturers.

## 2. Appearance

R900PD01O1 for example:




Top


Bottom

Left Side

Back

## 3. Features

- Powered by 2* 3.6V ER18505 batteries (also support ER14505 batteries with battery converter case) or DC
- Support magnetic switch to turn on/off and factory reset device
- Up to 7 installation methods for different kinds of scenarios
- Output/input signal
- Report when device disconnects from the network
- Support NFC. Configure and upgrade firmware on Netvox NFC app
- Store up to 10000 data
- LoRaWAN™ Class A and Class C compatible
- Frequency hopping spread spectrum
- Configuration parameters can be configured through third-party software platforms, data can be read, and alarms can be set via SMS text and email (optional)
- Applicable to the third-party platforms: Actility/ThingPark, TTN, MyDevices/Cayenne

Note: Battery life is determined by the sensor reporting frequency and other variables, please visit http://www.netvox.com.tw/electric/electric_calc.html for battery life and calculation.

# 4. Setup Instructions

## On / Off

| | |
|---|---|
| Power on | Insert 2* ER18505 batteries or connect a DC adapter. |
| Power off | Remove the batteries / DC adapter. |

Function key

| | |
|---|---|
| Turn on | Press and hold the function key for 3 seconds until the green indicator flashes once. |
| Turn off | Step 1. Press and hold the function key for 5 seconds until the green indicator flashes once.<br>Step 2. Release the function key and short press it in 5 seconds.<br>Step 3. The green indicator flashes 5 times. R900 turns off. |
| Factory reset | Step 1. Press and hold the function key for 10 seconds. The green indicator flashes once every 5 seconds.<br>Step 2. Release the function key and short press it in 5 seconds.<br>Step 3. The green indicator flashes 20 times. R900 is factory reset and off. |

Magnetic switch

| | |
|---|---|
| Turn on | Hold a magnet near R900 for 3 seconds until the green indicator flashes once. |
| Turn off | Step 1. Hold a magnet close to R900 for 5 seconds. The green indicator flashes once.<br>Step 2. Remove the magnet and get close to R900 in 5 seconds.<br>Step 3. The green indicator flashes 5 times. R900 turns off. |
| Factory reset | Step 1. Hold a magnet close to R900 for 10 seconds. The green indicator flashes once every 5 seconds.<br>Step 2. Remove the magnet and get close to R900 in 5 seconds.<br>Step 3. The green indicator flashes 20 times. R900 is factory reset and off. |

Note:

a. Remove and insert the battery; the device is off by default.

b. 5 seconds after powering on, the device will be in engineering test mode.

c. The on/off interval should be about 10 seconds to avoid the interference of capacitor inductance and other energy storage components.

d. When the batteries are removed without turning off the device, it can still operate for a while until the power supported by the supercapacitor runs out.

## Join a Network

| | |
|---|---|
| First time joining the network | Turn on the device to search the network.<br>The green indicator stays on for 5 seconds: Success<br>The green indicator remains off: Fail |
| Had joined the network before<br>(Device is not factory reset.) | Turn on the device to search the network.<br>The green indicator stays on for 5 seconds: Success<br>The green indicator remains off: Fail |
| Fail to join the network | Please check the device verification information on the gateway or consult your platform server provider. |

Function key

| | |
|---|---|
| Short press | Device is in the network<br>The green indicator flashes once. 6 seconds after sampling is completed, the device reports a data packet.<br><br>Device is not in the network<br>The green indicator remains off. |

Note: The function key does not work during sampling.

Magnetic switch

| | |
|---|---|
| Move magnet close to the switch and remove it | Device is in the network<br>The green indicator flashes once. After sampling is completed, the device reports a data packet.<br><br>Device is not in the network<br>The green indicator remains off. |

## Sleep Mode

| | |
|---|---|
| The device is on<br>and in the network. | Sleeping period: Min Interval.<br>When the reportchange exceeds the setting value or the state changes: send a data report based on the Min Interval. |
| The device is on<br>but not in the network. | (1) Please turn off the device and remove the batteries to save power.<br>(2) Please check the device verification information on the gateway or consult your platform server provider. |

## Low Voltage Alarm

| | |
|---|---|
| Low voltage | 3.2V |

Note: To ensure the accuracy of data, please change the battery when it drops to low voltage.

# 5. Data Report

35 seconds after the device is powered on, it will send a version packet and data including battery power, temperature, and humidity.

**Default setting:**

Min Interval = 0x0384 (900s)

Max Interval = 0x0384 (900s) // should not be less than 30 seconds

TemperatureChange = 0x0064 (1°C)

HumidityChange= 0x0064 (1%)

Note: a. If no configuration is done, the device sends data based on the default settings.

b. Please refer to Netvox LoRaWAN Application Command document and Netvox Lora Command Resolver http://www.netvox.com.cn:8888/cmddoc to resolve uplink data.

Data report configuration and sending period are as follows:

| Min Interval (unit: second) | Max Interval (unit: second) | Reportable Change | Current Change ≥ Reportable Change | Current Change < Reportable Change |
|---|---|---|---|---|
| Any number between 30 to 65535 | Any number between Min time to 65535 | Cannot be 0 | Report per Min Interval | Report per Max Interval |

## 5.1 Example of ReportDataCmd

FPort: 0x16

| Bytes | 1 | 2 | 1 | Var (length based on the payload) |
|---|---|---|---|---|
| | Version | DeviceType | ReportType | NetvoxPayLoadData |

**Version** – 1 bytes – 0x03——the Version of NetvoxLoRaWAN Application Command Version

**DeviceType** – 2 bytes – Device Type of Device

**The devicetype is listed in Netvox LoRaWAN Application Devicetype V3.0.doc**

**ReportType** – 1 byte – the presentation of the NetvoxPayLoadData, according to the devicetype

**NetvoxPayLoadData** – Var bytes (length based on the payload)

**Tips**

**1. Battery Voltage**

The voltage value is bit 0 – bit 6, bit 7=0 is normal voltage, and bit 7=1 is low voltage.

Battery=0xA0, binary= 1010 0000, if bit 7= 1, it means low voltage.

The actual voltage is 0010 0000 = 0x20 = 32, 32*0.1v =3.2v.

**2. Version Packet**

When Report Type = 0x00 is the version packet, such as 030111<u>00</u>0A01<u>20250424</u>, the firmware version is 2025.04.24.

**3. Data Packet**

When Report Type=0x01 is the data packet.

**4. Signed Value**

When the temperature is negative, 2's complement should be calculated.

| Device | Device Type | Report Type | NetvoxPayLoadData | | | | |
|---|---|---|---|---|---|---|---|
| R900A01O1 | 0x0111 | 0x01 | Battery (1 Byte, unit: 0.1V) | Temperature (Signed 2 Bytes, unit: 0.01°C) | Humidity (2 Bytes, unit: 0.01%) | ThresholdAlarm (1 Byte) Bit0_LowTemperatureAlarm, Bit1_HighTemperatureAlarm, Bit2_LowHumidityAlarm, Bit3_HighHumidityAlarm, Bit4-7: Reserved | ShockTamperAlarm (1 Byte) 0x00_NoAlarm, 0x01_Alarm |

Example of Uplink: **03011101240DAC19640000**

1st Byte (03): Version

2nd 3rd Byte (0111): DeviceType— R900A01O1

4th (01): ReportType

5th Byte (24): Battery—3.6V 24 (Hex) = 36 (Dec), 36* 0.1v = 3.6V

6th – 7th Byte (0DAC): Temperature—35˚C 0DAC (Hex) = 3500 (Dec), 3500* 0.01˚C = 35˚C

8th –9th Byte (1964): Humidity—65% 1964 (Hex) = 6500 (Dec), 6500* 0.01˚% = 65%

10th Byte (00): ThresholdAlarm—no alarm

11th Byte (00): ShockTamperAlarm—no alarm

## 5.2 Example of ConfigureCmd

FPort: 0x17

| Bytes | 1 | 2 | Var (length based on the payload) |
|---|---|---|---|
| | CmdID | DeviceType | NetvoxPayLoadData |

**CmdID** – 1 byte

**DeviceType** – 2 bytes – Device Type of Device

**The devicetype is listed in Netvox LoRaWAN Application Devicetype3.0.doc**

**NetvoxPayLoadData** – Var bytes (length based on the payload)

| Description | Device | Cmd ID | Device Type | NetvoxPayLoadData | | | |
|---|---|---|---|---|---|---|---|
| ConfigReport Req | R900A 01O1 | 0x01 | 0x0111 | MinTime (2 Bytes, unit: s) | MaxTime (2 Bytes, unit: s) | TemperatureChange (2 Bytes, unit: 0.01°C) | HumidityChange (2 Bytes, unit: 0.01%) |
| ConfigReport Rsp | | 0x81 | | Status (0x00_success) | | | |
| ReadConfigReportReq | | 0x02 | | | | | |
| ReadConfigReportRsp | | 0x82 | | MinTime (2 Bytes, unit: s) | MaxTime (2 Bytes, unit: s) | TemperatureChange (2 Bytes, unit: 0.01°C) | HumidityChange (2 Bytes, unit: 0.01%) |
| SetShockSensorSensitivityReq | | 0x03 | | ShockSensorSensitivity (1 Byte) | | | |
| SetShockSensorSensitivityRsp | | 0x83 | | Status (0x00_success) | | | |
| GetShockSensorSensitivityReq | | 0x04 | | | | | |
| GetShockSensorSensitivityRsp | | 0x84 | | ShockSensorSensitivity (1 Byte) | | | |
| ConfigDigitalOutPutReq | | 0x05 | | DigitalOutPutType (1 Byte) 0x00_NormallyLowLevel 0x01_NormallyHighLevel | OutPulseTime (1 Byte, unit: s) | BindAlarmSource (1 Byte) Bit0_LowTemperatureAlarm Bit1_HighTemperatureAlarm Bit2_LowHumidityAlarm Bit3_HighHumidityAlarm Bit4-7: Reserved | Channel (1 Byte) 0x00_Channel1 0x01_Channle2 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ConfigDigital OutPutRsp | | 0x85 | | Status (0x00_success) | | | |
| Read ConfigDigital OutPutReq | | 0x06 | | Channel (1Byte)<br>0x00_Channel1<br>0x01_Channle2 | | | |
| Read ConfigDigital OutPutRsp | | 0x86 | | DigitalOutPutType (1 Byte)<br>0x00_NormallyLow Level<br>0x01_NormallyHigh Level | OutPulseTime (1 Byte, unit: s) | BindAlarmSource (1 Byte)<br>Bit0_LowTemperature Alarm<br>Bit1_HighTemperature Alarm<br>Bit2_LowHumidityAlarm,<br>Bit3_HighHumidityAlarm,<br>Bit4-7: Reserved | Channel (1 Byte)<br>0x00_Channel1<br>0x01_Channle2 |
| TriggerDigital OutPutReq | | 0x07 | | OutPulseTime (1 Byte, unit: s) | | Channel (1Byte)<br>0x00_Channel1<br>0x01_Channle2 | |
| TriggerDigital OutPutRsp | | 0x87 | | Status (0x00_success) | | | |

(1) Configure device parameters

MinTime = 0x003C (60s), MaxTime = 0x003C (60s),

TemperatureChange = 0x012C (3°C), HumidityChange = 0x01F4 (5%)

Downlink: 010111003C003C012C01F4

Response: 81011100 (configuration success)

81011101 (configuration fail)

Read device parameters

Downlink: 020111

Response: 820111003C003C012C01F4

(2) Configure ShockSensorSensitivity = 0x14 (20)

Downlink: 03011114

Response: 83011100 (configuration success)

83011101 (configuration fail)

Note: ShockSensorSensitivity range = 0x01 to 0x14

0xFF (disables vibration sensor)

Read ShockSensorSensitivity

Downlink: 040111

Response: 84011114 (device's current parameters)

(3) Configure DigitalOutPutType = 0x00 (NormallyLowLevel),

OutPulseTime = 0xFF (disable pulse duration),

BindAlarmSource = 0x01 = 0000 0001 (BIN)  Bit0_LowTemperatureAlarm = 1

(when LowTemperatureAlarm is triggered, DO outputs signals)

Channel = 0x00_Channel1

Downlink: 05011100FF0100

Response: 85011100 (configuration success)

85011101 (configuration fail)

Read DO parameters

Downlink: 06011100

Response: 86011100FF0100

Configure OutPulseTime = 0x03 (3 seconds)

Downlink: 0701110300

Response: 87011100 (configuration success)

87011101 (configuration fail)

### 5.3 Example of SetSensorAlarmThresholdCmd

FPort: 0x10

| CmdDescriptor | CmdID (1 Byte) | Payload (10 Bytes) | | | |
|---|---|---|---|---|---|
| SetSensorAlarmThresholdReq | 0x01 | Channel (1 Byte) 0x00_Channel1, 0x01_Chanel2, 0x02_Channel3, etc. | SensorType (1 Byte) 0x00_Disable ALL 0x01_Temperature 0x02_Humidity | SensorHighThreshold (4 Bytes) unit: Temperature – 0.01˚C Humidity – 0.01% | SensorLowThreshold (4 Bytes) unit: Temperature – 0.01˚C Humidity – 0.01% |
| SetSensorAlarmThresholdRsp | 0x81 | Status (0x00_success) | Reserved (9 Bytes, Fixed 0x00) | | |
| GetSensorAlarmThresholdReq | 0x02 | Channel (1 Byte) 0x00_Channel1, 0x01_Chanel2, 0x02_Channel3, etc. | SensorType (1 Byte) 0x00_Disable ALL 0x01_Temperature 0x02_Humidity | Reserved (8 Bytes, Fixed 0x00) | |
| GetSensorAlarmThresholdRsp | 0x82 | Channel (1Byte) 0x00_Channel1, 0x01_Chanel2, 0x02_Channel3, etc. | SensorType (1 Byte) 0x00_Disable ALL 0x01_Temperature 0x02_Humidity | SensorHighThreshold (4 Bytes) unit: Temperature – 0.01˚C Humidity – 0.01% | SensorLowThreshold (4 Bytes) unit: Temperature – 0.01˚C Humidity – 0.01% |

Note:

a. Temperature Channel: 0x00; SensorType: 0x01

Humidity Channel: 0x00; SensorType: 0x02

b. Set SensorHigh/LowThreshold as 0xFFFFFFFF to disable threshold.

c. The last configuration will be saved when the device is reset to factory setting.

(1) Configure parameters

Channel = 0x00, SensorType = 0x01 (Temperature),

SensorHighThreshold = 0x00001388 (50˚C), SensorLowThreshold = 0x000003E8 (10˚C)

Downlink: 0100010000013880000003E8

Response: 810000000000000000000 (configuration success)

810100000000000000000 (configuration fail)

(2) Read parameters

Downlink: 020001000000000000000

Response: 8200010000013880000003E8 (device's current parameters)

(3) Configure parameters

Channel = 0x00, SensorType = 0x02 (Humidity),

SensorHighThreshold = 0x00001388 (50%), SensorLowThreshold = 0x000007D0 (20%)

Downlink: 0100010000 1388000007D0

Response: 810000000000000000000 (configuration success)

810100000000000000000 (configuration fail)

(4) Read parameters

Downlink: 020001000000000000000

Response: 820001000 01388000007D0 (device’s current parameters)

## 5.4 Example of GlobalCalibrateCmd

Fport: 0x0E

| Description | Cmd ID | SensorType | PayLoad (Fix = 9 Bytes) | | | | |
|---|---|---|---|---|---|---|---|
| SetGlobalCalibrate Req | 0x01 | 0x01_Temperature Sensor<br>0x02_Humidity Sensor | Channel (1 Byte) 0_Channel1 1_Channel2, etc. | Multiplier (2 Bytes, Unsigned) | Divisor (2 Bytes, Unsigned) | DeltValue (2 Bytes, Signed) | Reserved (2 Bytes, Fixed 0x00) |
| SetGlobalCalibrate Rsp | 0x81 | | Channel (1 Byte) 0_Channel1 1_Channel2, etc. | Status (1 Byte) 0x00_success) | Reserved (7 Bytes, Fixed 0x00) | | |
| GetGlobalCalibrate Req | 0x02 | | Channel (1 Byte) 0_Channel1 1_Channel2, etc. | Reserved (8 Bytes, Fixed 0x00) | | | |
| GetGlobalCalibrate Rsp | 0x82 | | Channel (1 Byte) 0_Channel1 1_Channel2, etc. | Multiplier (2 Bytes, Unsigned) | Divisor (2 Bytes, Unsigned) | DeltValue (2 Bytes, Signed) | Reserved (2 Bytes, Fixed 0x00) |
| ClearGlobalCalibrate Req | 0x03 | Reserved (10 Bytes, Fixed 0x00) | | | | | |
| ClearGlobalCalibrate Rsp | 0x83 | Status (1 Byte, 0x00_success) | Reserved (9 Bytes, Fixed 0x00) | | | | |

Temperature sensor: SensorType – 0x01; Channel – 0x00

Humidity sensor: SensorType – 0x02; Channel – 0x01

(1) SetGlobalCalibrateReq

Calibrate temperature sensor by increasing 10°C

Channel: 0x00 (channel1); Multiplier: 0x0001 (1); Divisor: 0x0001 (1); DeltValue: 0x03E8 (1000)

Downlink: 01010000010000103E80000

Response: 810100000000000000000 (configuration success)

810100010000000000000 (configuration fail)

(2) Read parameters

Downlink: 020100000000000000000

Response: 8201000001000103E80000 (configuration success)

(3) Clear all calibration

Downlink: 030000000000000000000

Response: 830000000000000000000

## 5.5 Example of NetvoxLoRaWANRejoin

Fport:0x20

Check if the device is connected to the network during RejoinCheckPeriod. If the device does not respond within the RejoinThreshold, it will be rejoied back to the network automatically.

| CmdDescriptor | CmdID (1 Byte) | Payload (Var Bytes) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SetNetvoxLoRaWANRejoinReq | 0x01 | RejoinCheckPeriod (4 Bytes, unit: 1s) 0x FFFFFFFF_DisableNetvoxRejoinFunction | | | | | RejoinThreshold (1 Byte) | |
| SetNetvoxLoRaWANRejoinRsp | 0x81 | Status (1 Byte) 0x00_success | Reserved (4 Bytes, Fixed 0x00) | | | | | |
| GetNetvoxLoRaWANRejoinReq | 0x02 | Reserved (5 Bytes, Fixed 0x00) | | | | | | |
| GetNetvoxLoRaWANRejoinRsp | 0x82 | RejoinCheckPeriod (4 Bytes, unit: 1s) 0x FFFFFFFF_DisableNetvoxRejoinFunction | | | | | RejoinThreshold (1 Byte) | |
| SetNetvoxLoRaWANRejoinTimeReq | 0x03 | 1st Rejoin Time (2 Bytes, unit:1 min) | 2nd Rejoin Time (2 Bytes, unit: 1 min) | 3rd Rejoin Time (2 Bytes, unit: 1 min) | 4th Rejoin Time (2 Bytes, unit: 1 min) | 5th Rejoin Time (2 Bytes, unit: 1 min) | 6th Rejoin Time (2 Bytes, unit: 1 min) | 7th Rejoin Time (2 Bytes, unit: 1 min) |
| SetNetvoxLoRaWANRejoinTimeRsp | 0x83 | Status (1 Byte) 0x00_success | Reserved (13 Bytes, Fixed 0x00) | | | | | |
| GetNetvoxLoRaWANRejoinTimeReq | 0x04 | Reserved (15 Bytes, Fixed 0x00) | | | | | | |
| GetNetvoxLoRaWANRejoinTimeRsp | 0x84 | 1st Rejoin Time (2 Bytes, unit:1 min) | 2nd Rejoin Time (2 Bytes, unit: 1 min) | 3rd Rejoin Time (2 Bytes, unit: 1 min) | 4th Rejoin Time (2 Bytes, unit: 1 min) | 5th Rejoin Time (2 Bytes, unit: 1 min) | 6th Rejoin Time (2 Bytes, unit: 1 min) | 7th Rejoin Time (2 Bytes, unit: 1 min) |

Note:

a. Set RejoinCheckThreshold as 0xFFFFFFFF to stop the device from rejoining the network.

b. The last configuration would be kept when the device is factory reset.

c. Default setting:

RejoinCheckPeriod = 2 (hr) and RejoinThreshold = 3 (times)

1st Rejoin Time = 0x0001 (1 min), 2nd Rejoin Time = 0x0002 (2 mins), 3rd Rejoin Time = 0x0003 (3 mins),

4th Rejoin Time = 0x0004 (4 mins), 5th Rejoin Time = 0x003C (60 mins), 6th Rejoin Time = 0x0168 (360 mins),

7th Rejoin Time = 0x05A0 (1440 mins)

d. If device loses connection from network before data are reported, the data will be saved and reported every 30 seconds after the device is reconnected. Data will be reported based on the format of Payload + Unix timestamp. After all data are reported, the report time will be back to the normal setting.

(1) Command Configuration

Set RejoinCheckPeriod = 0x00000E10 (3600s), RejoinThreshold = 0x03 (3 times)

Downlink: 0100000E1003

Response: 810000000000 (Configuration success)

810100000000 (Configuration failure)

(2) Read RejoinCheckPeriod and RejoinThreshold

Downlink: 020000000000

Response: 8200000E1003

(3) Configure Rejoin Time

1st Rejoin Time = 0x0001 (1 min), 2nd Rejoin Time = 0x0002 (2 mins), 3rd Rejoin Time = 0x0003 (3 mins),

4th Rejoin Time = 0x0004 (4 mins), 5th Rejoin Time = 0x0005 (5 mins), 6th Rejoin Time = 0x0006 (6 mins),

7th Rejoin Time = 0x0007 (7 mins)

Downlink: 0300010002000300040005000600 07

Response: 830000000000000000000000000000 (Configuration success)

830100000000000000000000000000 (Configuration failure)

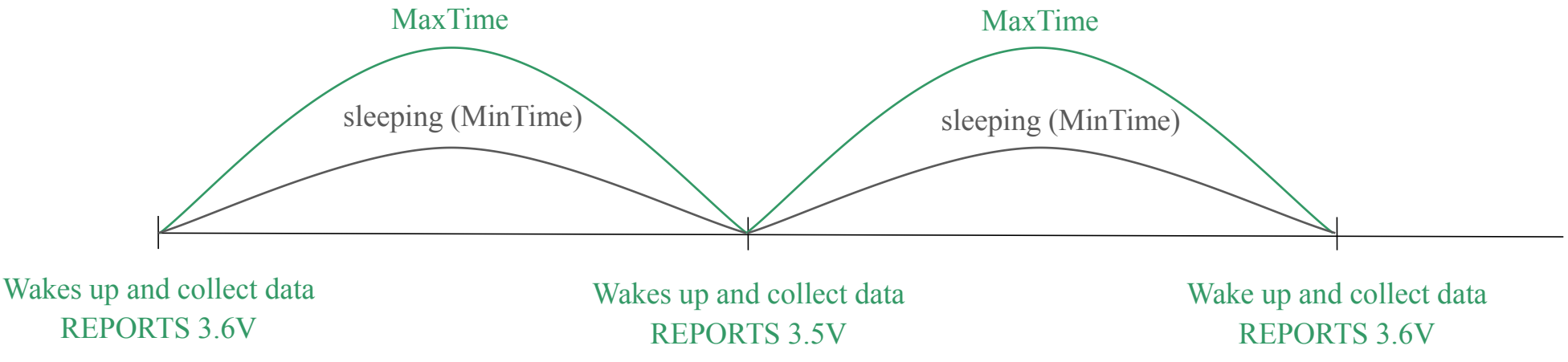
(4) Read Rejoin Time parameter

Downlink: 040000000000000000000000000000

Response: 840001000200030004000500060007

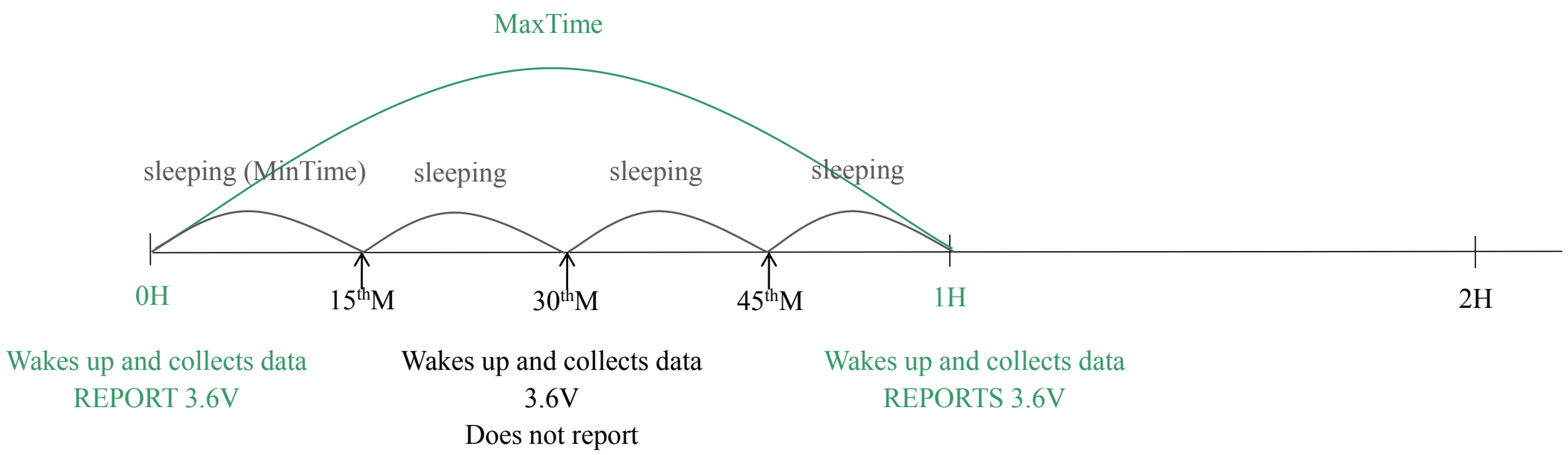
## 5.6 Example for MinTime/MaxTime logic

Example#1 based on MinTime = 1 hour, MaxTime = 1 hour, Reportable Change i.e. BatteryVoltageChange = 0.1V

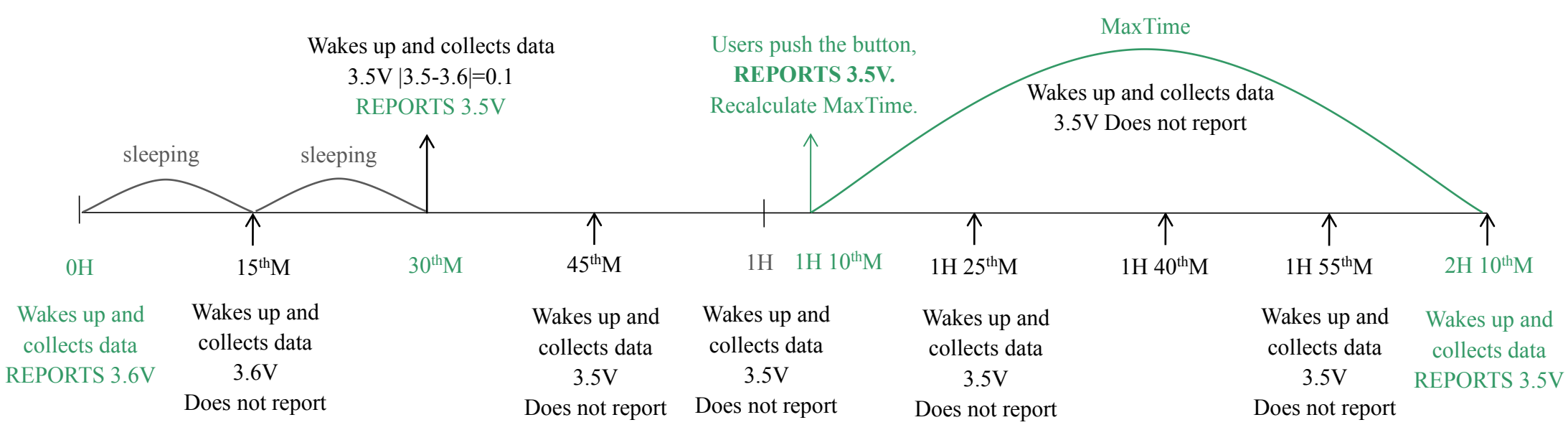



Note: MaxTime = MinTime. Data will only be reported according to MaxTime (MinTime) duration regardless BatteryVoltageChange value.

Example#2 based on MinTime = 15 minutes, MaxTime = 1 hour, Reportable Change i.e. BatteryVoltageChange = 0.1V.




Example#3 based on MinTime = 15 minutes, MaxTime = 1 hour, Reportable Change i.e. BatteryVoltageChange = 0.1V.



Notes:

a. The device only wakes up and performs data sampling according to MinTime Interval. When it is sleeping, it does not collect data.

b. The data collected is compared with the last data reported. If the data variation is greater than the ReportableChange value, the device reports according to MinTime interval. If the data variation is not greater than the last data reported, the device reports according to MaxTime interval.

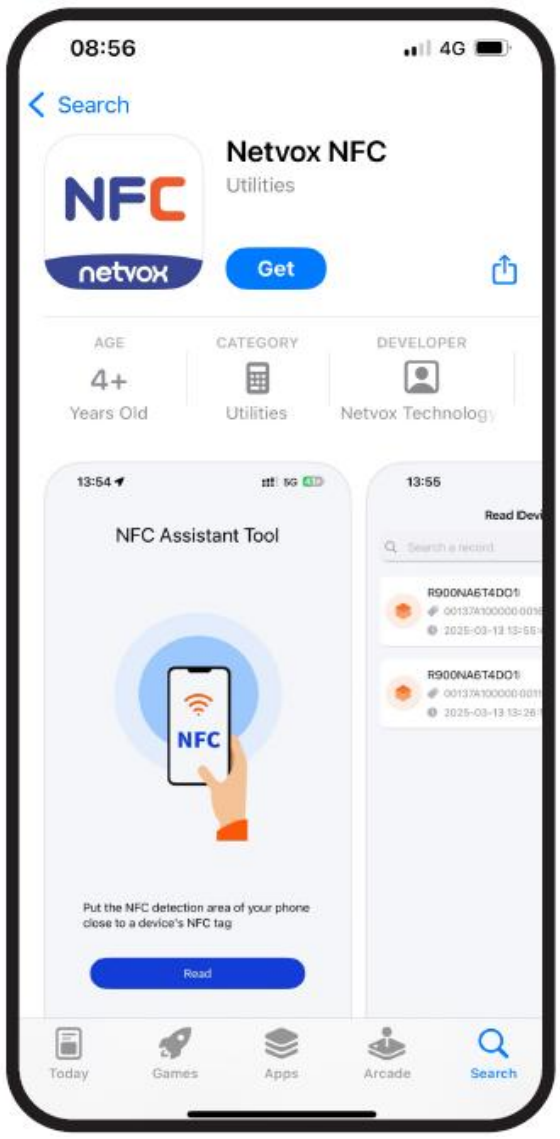
c. We do not recommend setting the MinTime Interval value too low. If the MinTime Interval is too low, the device wakes up frequently and the battery will be drained soon.

d. Whenever the device sends a report, no matter resulting from data variation, button pushed or MaxTime interval, another cycle of MinTime/MaxTime calculation is started.

## 6. Read R900 Data on NFC App

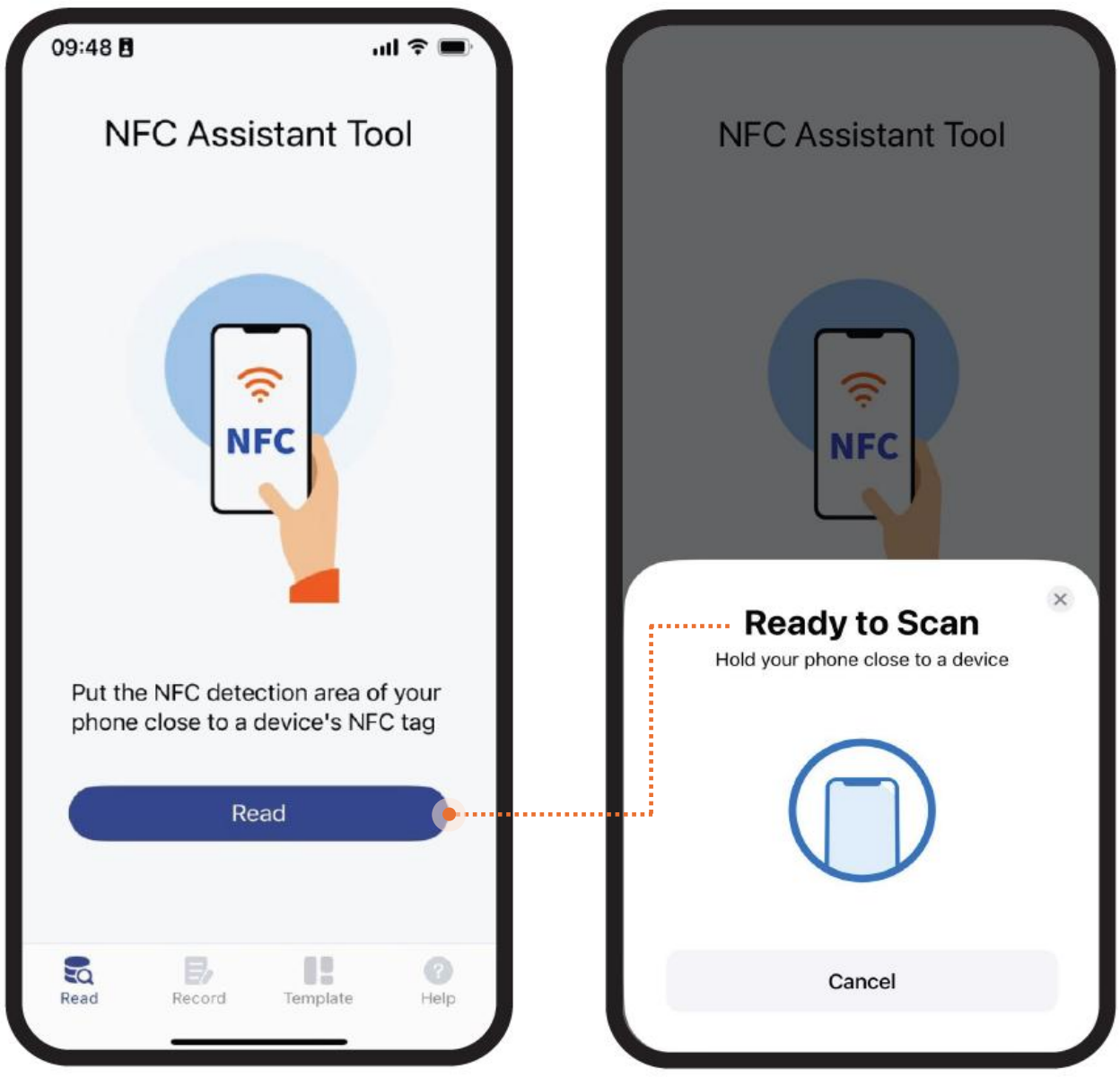
(1) Download Netvox NFC app.

Please make sure your phone supports NFC.

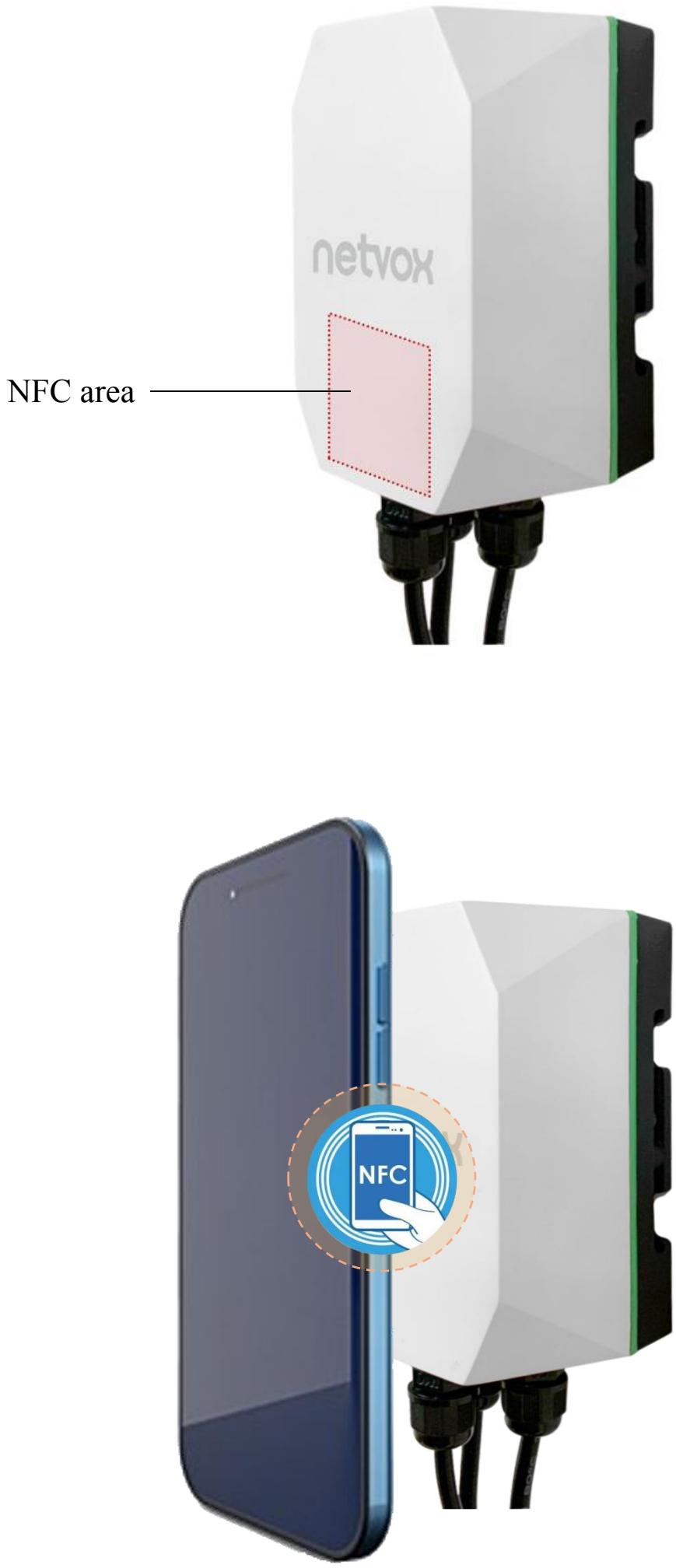



(2) Enable NFC in Settings and find your phone's NFC area.

Open the app and click Read.

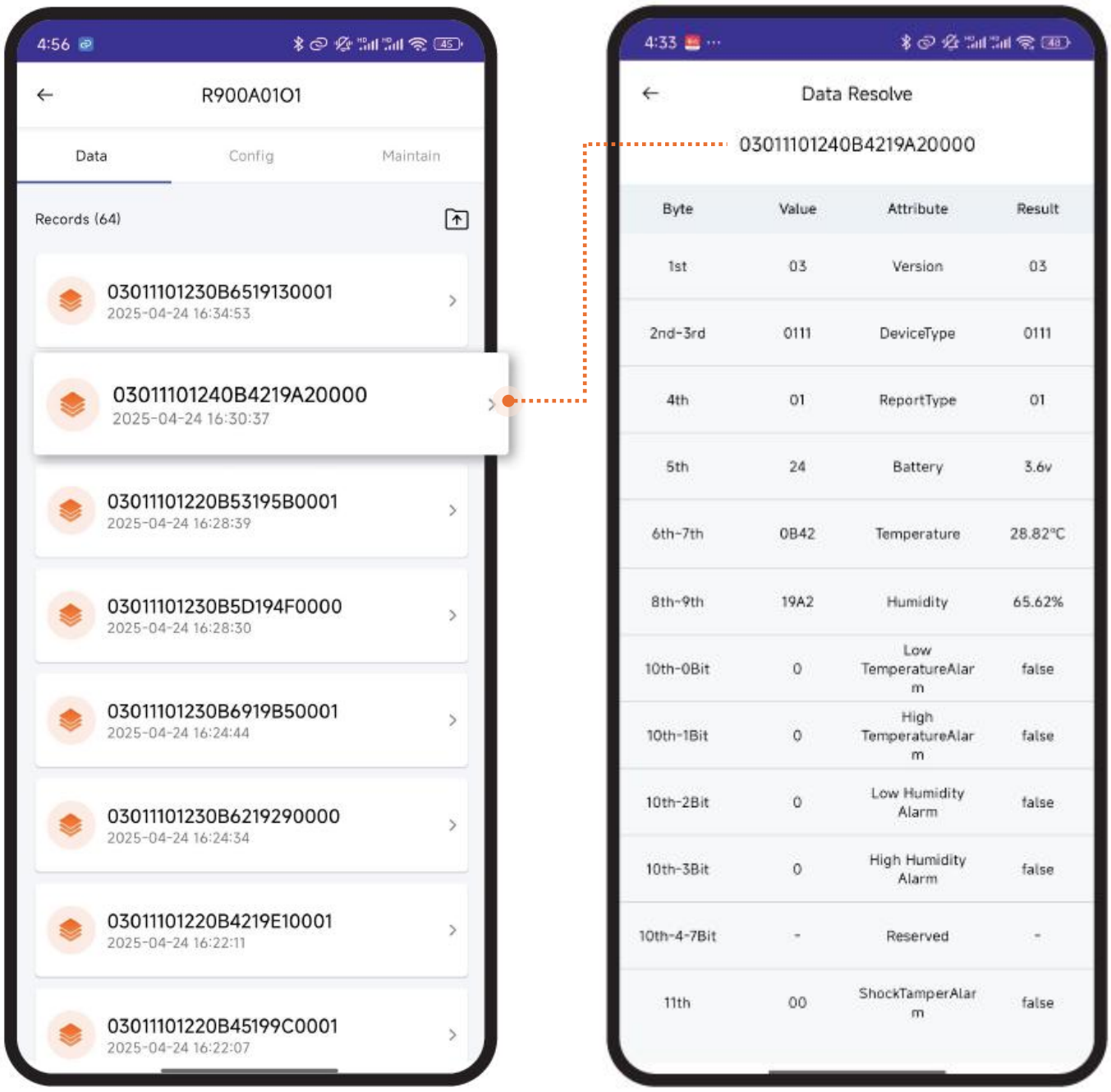


(3) Hold your phone near R900’s NFC tag.



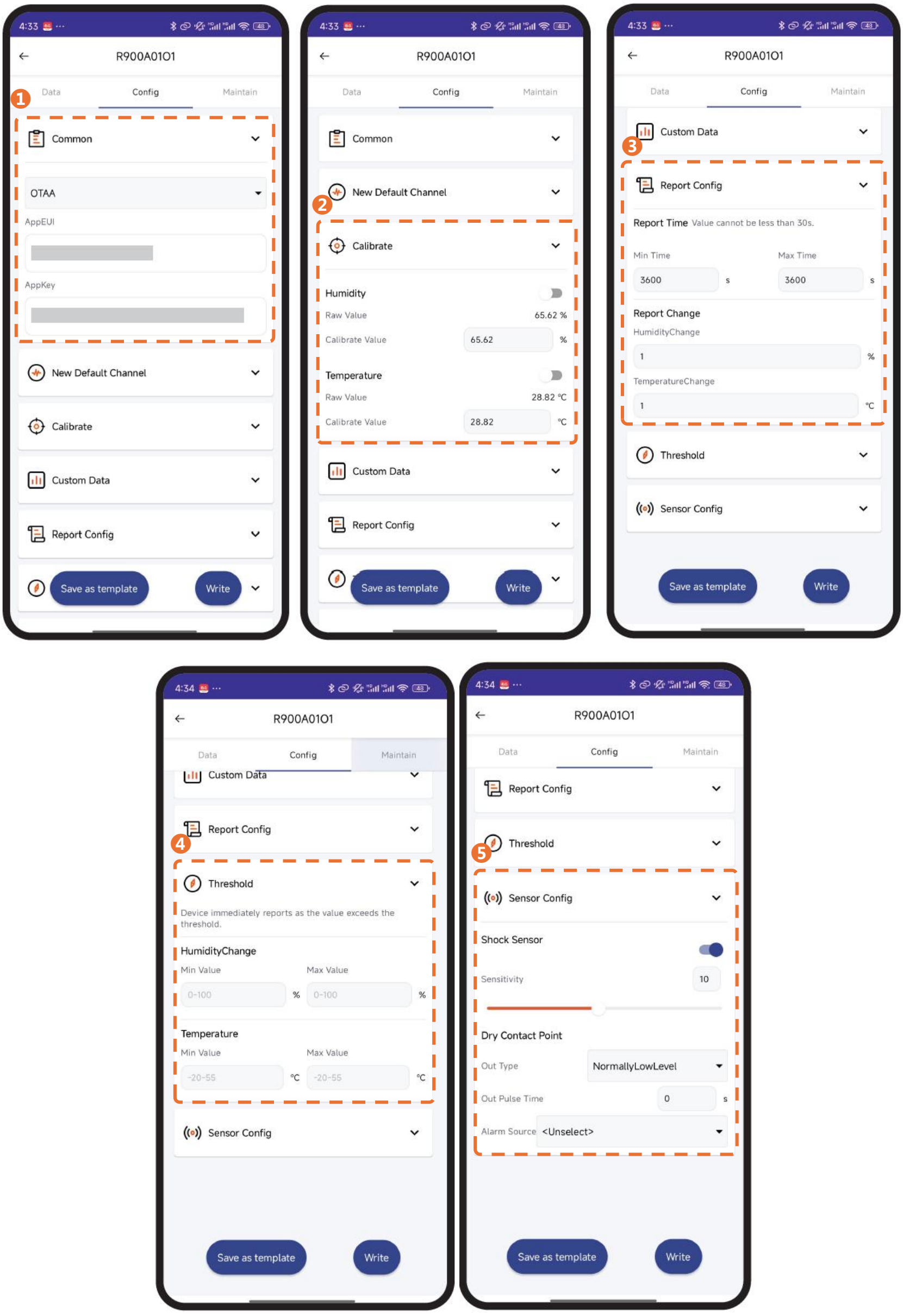
(4) After R900 is successfully read, the latest 10 data will be displayed.

Select a data and go to the Data processing.

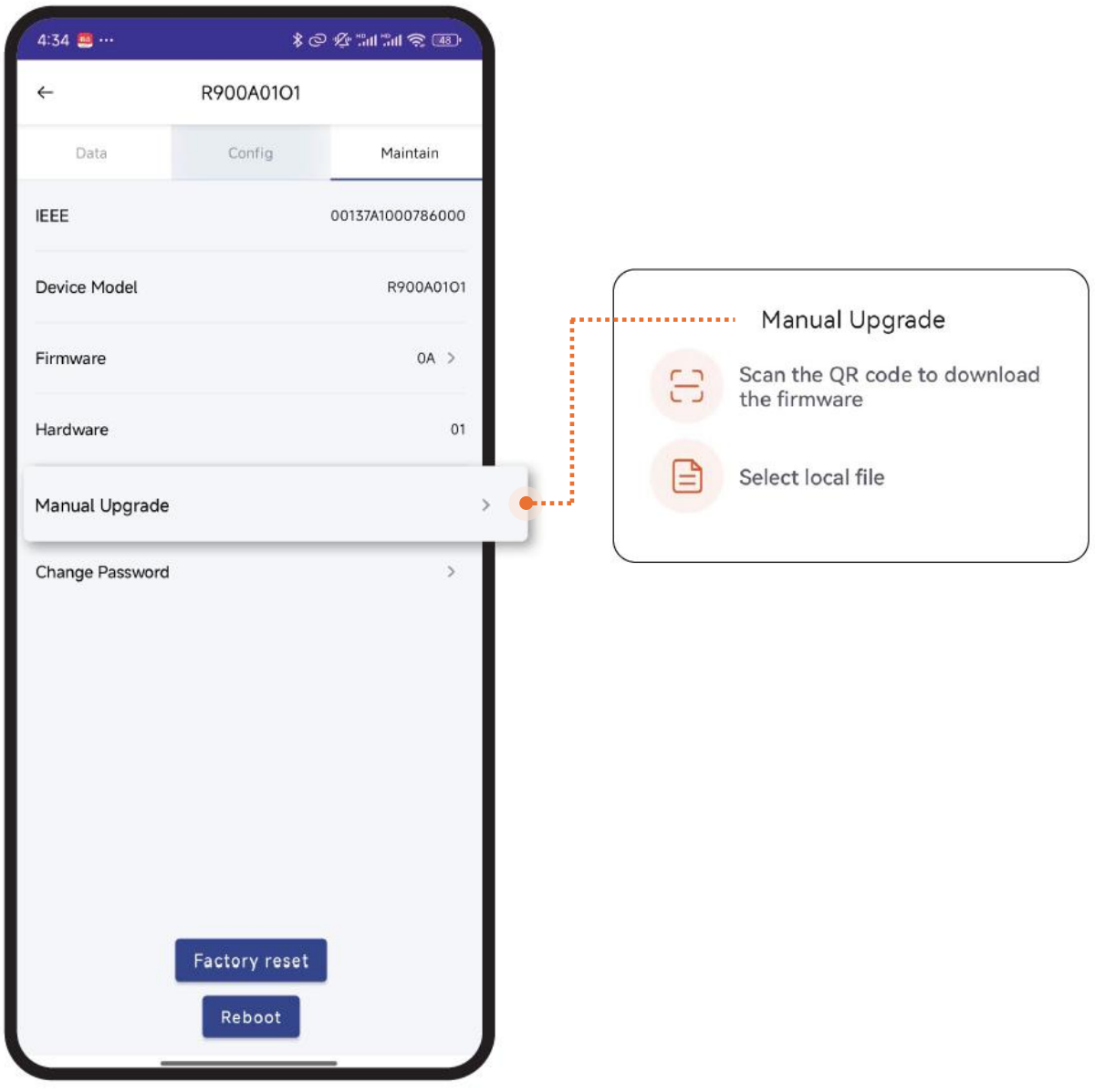


(5) Click Config to edit R900's settings, including network connection, calibration, report configuration, threshold, and sensor parameters.

Note: a. To configure device parameters, users need to enter password: **12345678** (default).
b. Password can be changed on the app and reset to default when R900 is factory reset.
c. Please reboot the device if the parameters of network connection are configured.



(6) Click Maintain to check R900A01O1’s info and available upgrade.

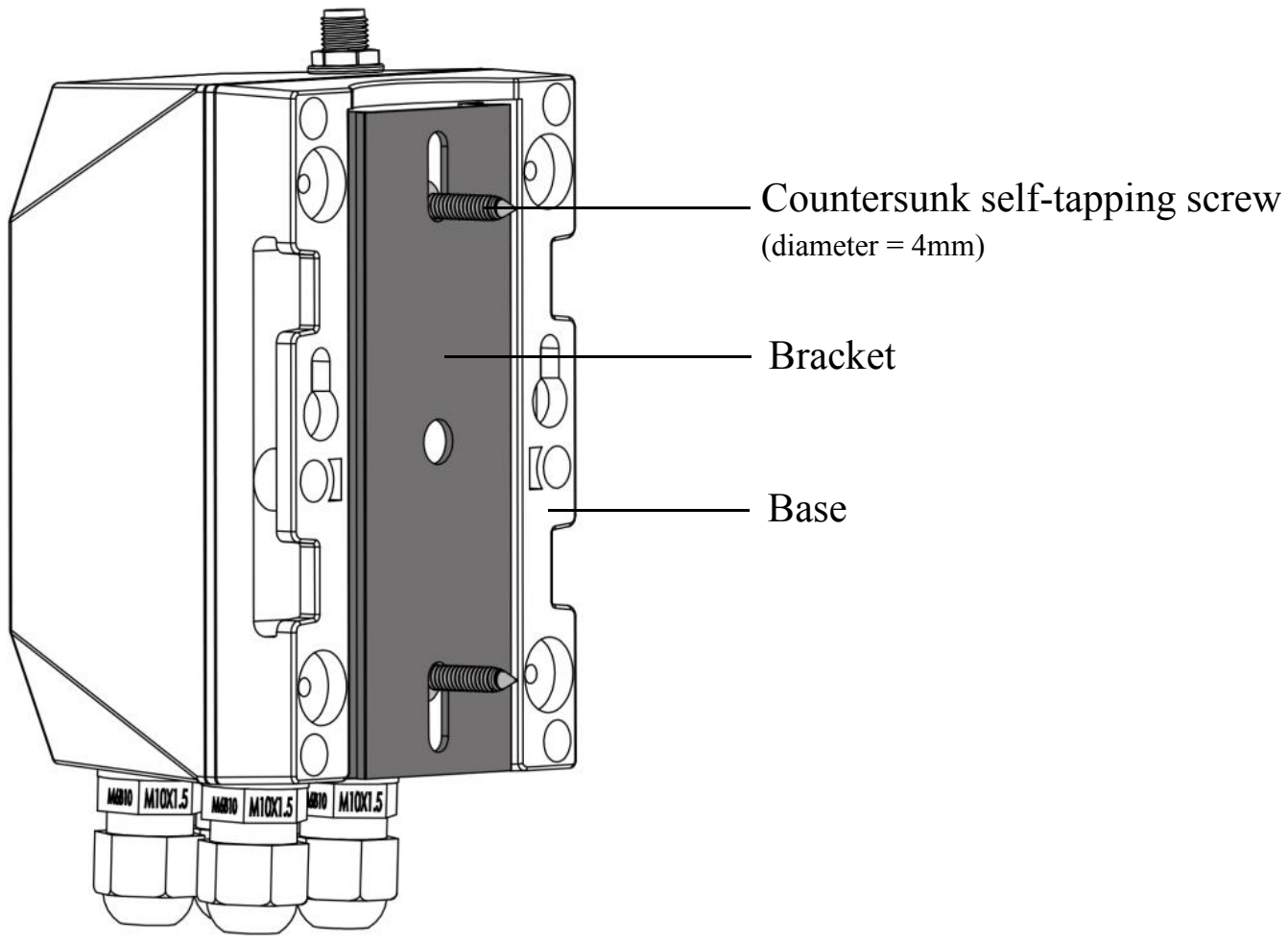


# 7. Installation

## R900

- Standard

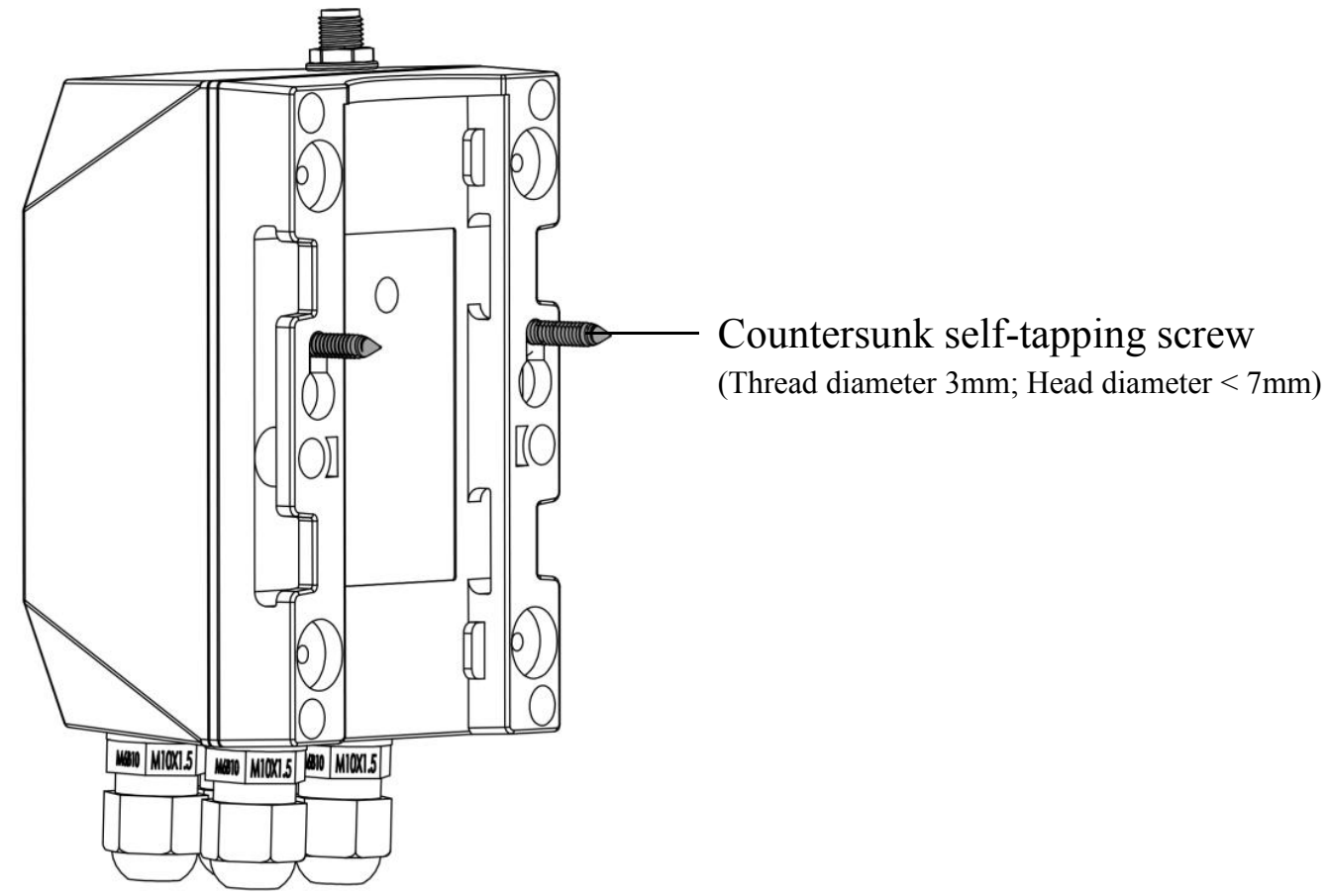
(1) Screws + Bracket




❶ Mount the bracket on a surface with 2 counter self-tapping screws.

❷ Hold R900 and slide down to connect the base and bracket.

(2) Screws



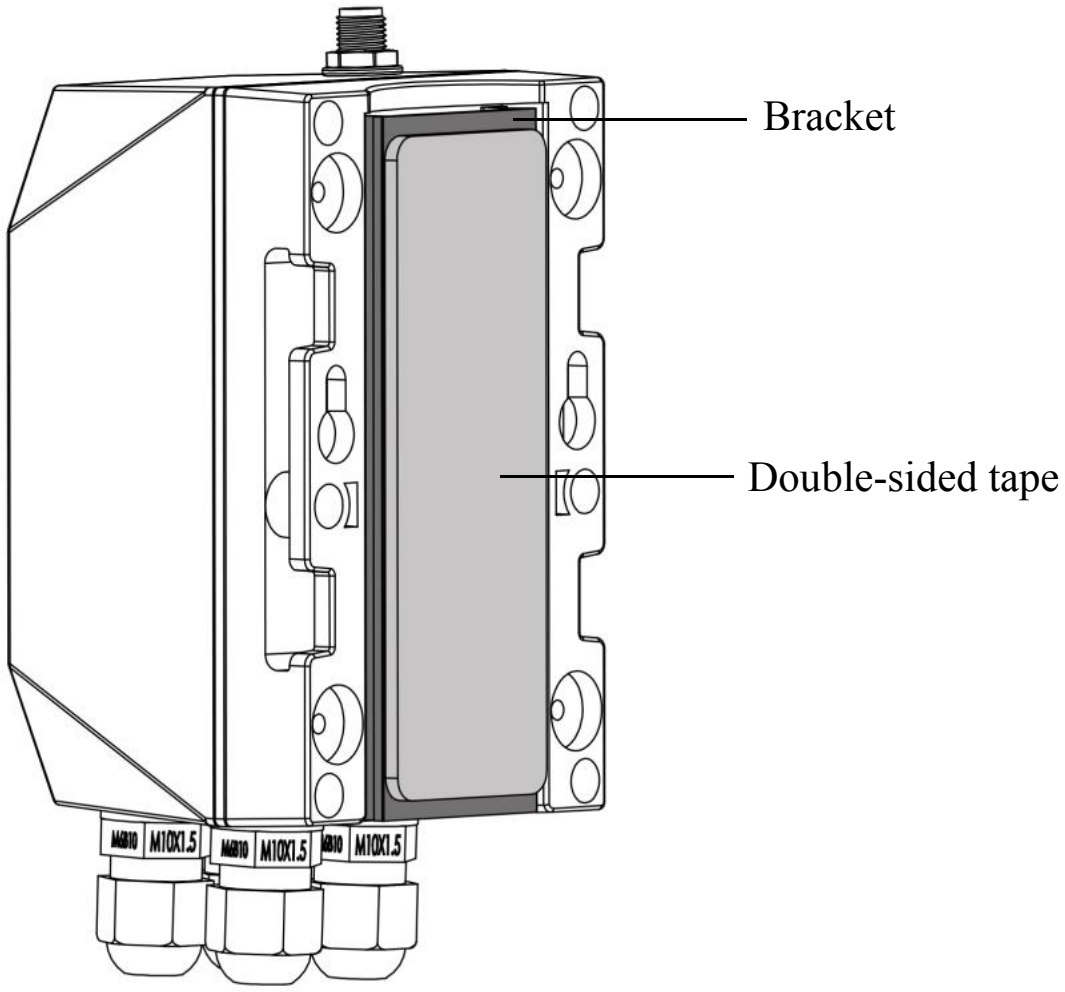

❶ Mount 2 countersunk self-tapping screws or expansion bolts on the wall.

The distance between the two screws should be 48.5mm. The gap between the bottom of the screw head and the wall should be 3mm.

❷ After the screws are mounted, align the holes of the base with the screws.

❸ Move R900 down to clamp it.

(3) Double-Sided Tape




❶ Stick the double-sided tape on the bracket.

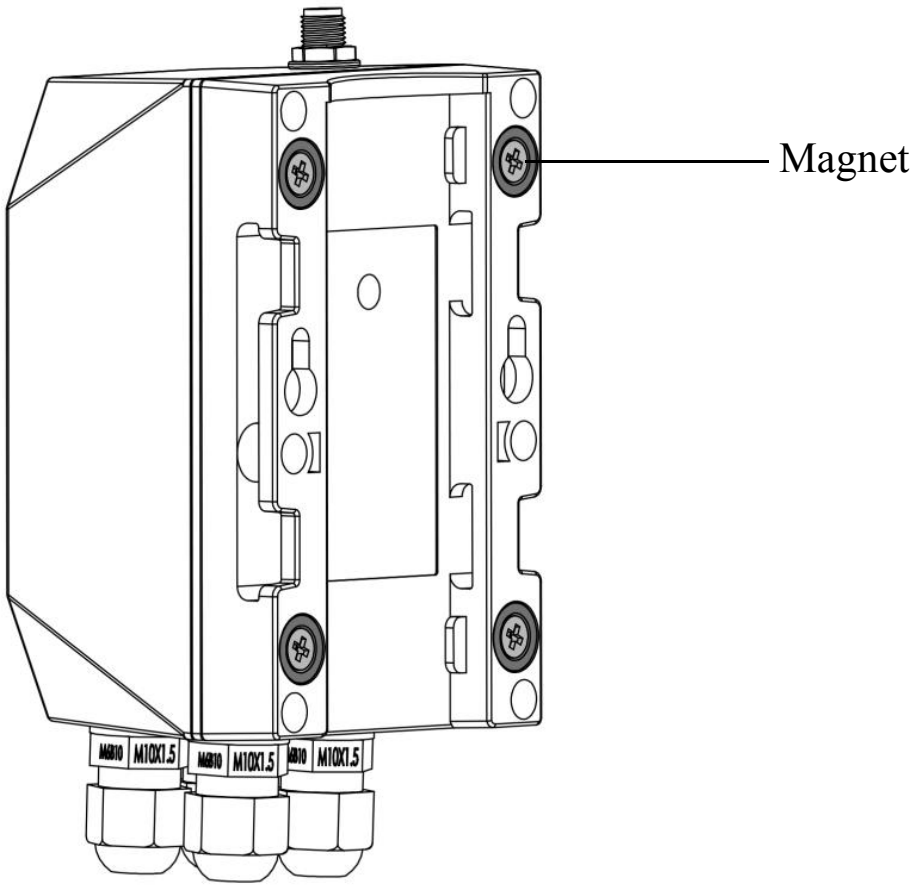
❷ Peel the liner and fix R900 on the surface.

❸ Press to ensure R900 is firmly installed.

Note: Please make sure the surface is clean and dry before applying double-sided tape.

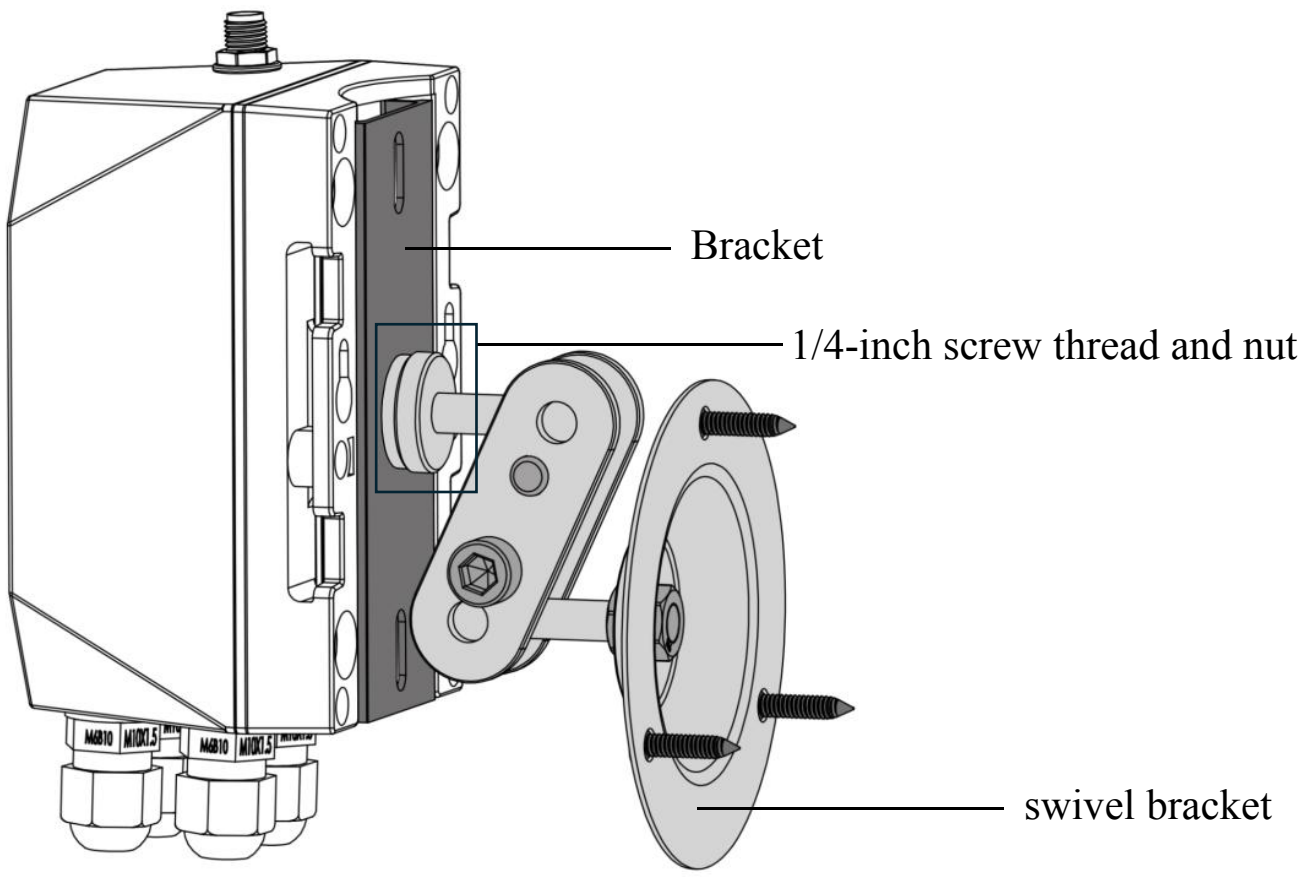
- Optional

(1) Magnet




❶ Fix the R900 on a metal surface.

(2) Swivel Bracket



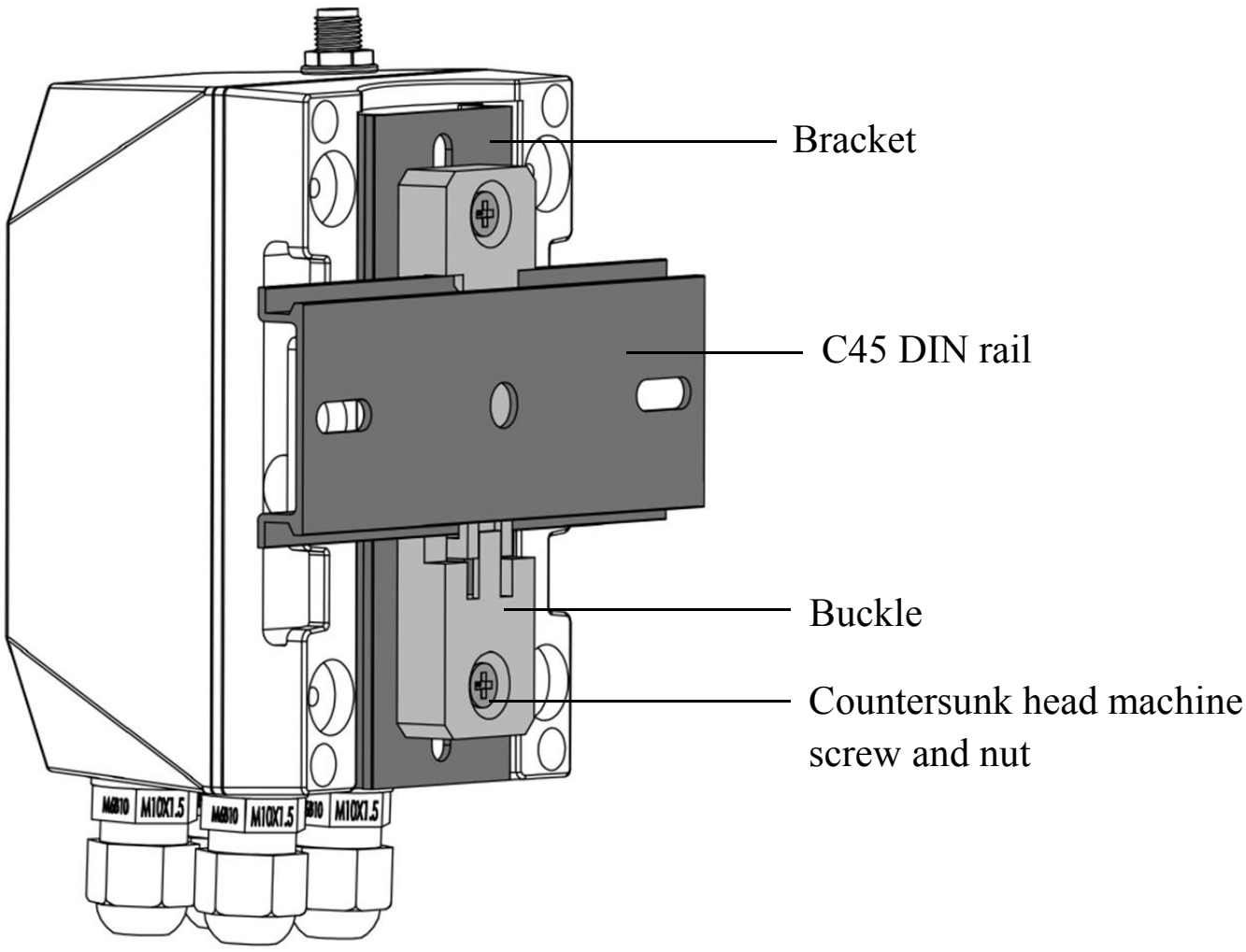

❶ Insert a 1/4-inch screw thread into the hole of the bracket.

❷ Tighten the thread with a nut.

❸ Mount the swivel bracket with self-tapping screws and expansion bolts.

❹ Hold R900 and slide down to connect the base and bracket.

(3) DIN Rail



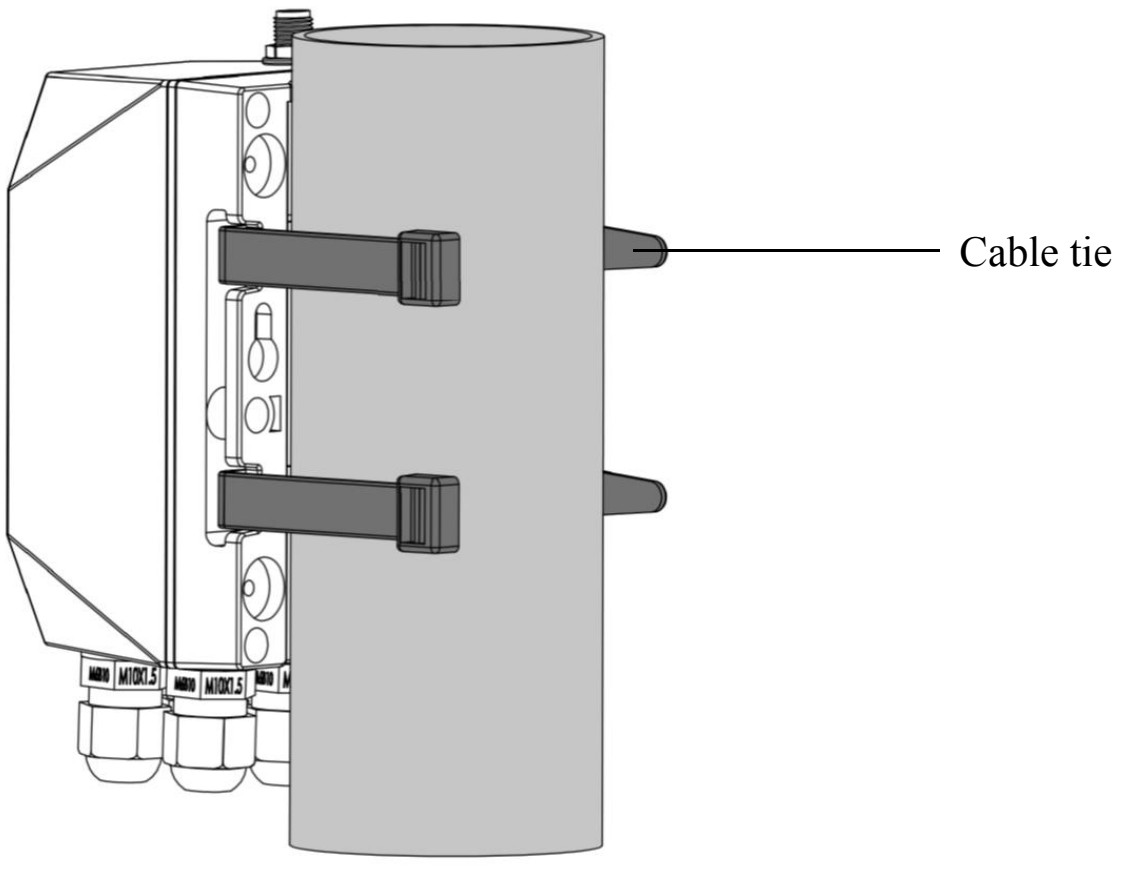

❶ Mount the rail buckle onto R900’s bracket with countersunk head machine screws and nuts.

❷ Snap the buckle onto the DIN rail.

❸ Hold R900 and slide down to connect the base and bracket.

- Prepared by customers

(1) Cable Tie




❶ Insert cable ties through the holes of the base.

❷ Insert the pointed end through the slot.

❸ Tighten the cable ties and make sure R900 is fixed firmly around a column.

## 8. Battery Passivation

Many Netvox devices are powered by 3.6V ER14505 / ER18505 Li-SOCl2 (lithium-thionyl chloride) batteries that offer many advantages including low self-discharge rate and high energy density. However, primary lithium batteries like Li-SOCl2 batteries will form a passivation layer as a reaction between the lithium anode and thionyl chloride if they are in storage for a long time or if the storage temperature is too high. This lithium chloride layer prevents rapid self-discharge caused by continuous reactions between lithium and thionyl chloride, but battery passivation may also lead to voltage delay when the batteries are put into operation, and our devices may not work correctly in this situation.

As a result, please make sure to purchase batteries from reliable vendors, and it is suggested that if the storage period is more than one month from the date of battery production, all the batteries should be activated. If encountering the situation of battery passivation, please **activate the battery with 67Ω load resistance for 8 minutes** to eliminate hysteresis in batteries.

## 9. Important Maintenance Instructions

Kindly pay attention to the following to achieve the best maintenance of the product:

- Keep the device dry. Rain, moisture, or any liquid might contain minerals and thus corrode electronic circuits. If the device gets wet, please dry it completely.
- Do not use or store the device in a dusty or dirty environment. It might damage its detachable parts and electronic components.
- Do not store the device under extremely hot conditions. High temperatures can shorten the life of electronic devices, destroy batteries, and deform or melt some plastic parts.
- Do not store the device in places that are too cold. Otherwise, when the temperature rises, moisture that forms inside the device will damage the board.
- Do not throw, knock, or shake the device. Rough handling of equipment can destroy internal circuit boards and delicate structures.
- Do not clean the device with strong chemicals, detergents, or strong detergents.
- Do not apply the device with paint. Smudges might block the device and affect the operation.
- Do not throw the battery into the fire, or the battery will explode. Damaged batteries may also explode.

All of the above applies to your device, battery, and accessories. If any device is not operating properly, please take it to the nearest authorized service facility for repair

## 10. FCC Statement:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This Equipment generates,uses and can radiate radio frequency energy and,if not installed and used in accordance with the instructions,may cause harmful interference to radio communications.However,there is no guarantee that interference will not occur in a Particular installation.If thise quipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment

off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.

—Increase the separation between the equipment and receiver.

—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

—Consult the dealer or an experienced radio/TV technician for help.

Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.