NEXCOM International Co., Ltd.

Environment & Energy Solutions
Industrial IoT Data Acquisition System
RN-30 Series
User Manual

NEXCOM International Co., Ltd.
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www.nexcom.com

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PREFACE

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Acknowledgements

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Regulatory Compliance Statements

This section provides the FCC compliance statement for Class A devices and describes how to keep the system CE compliant.

Declaration of Conformity

FCC

This equipment has been tested and verified to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. 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. Operation of this equipment in a residential area (domestic environment) is likely to cause harmful interference, in which case the user will be required to correct the interference (take adequate measures) at their own expense.

CE

The product(s) described in this manual complies with all applicable European Union (CE) directives if it has a CE marking. For computer systems to remain CE compliant, only CE-compliant parts may be used. Maintaining CE compliance also requires proper cable and cabling techniques.

Technical Support and Assistance

1. For the most updated information of NEXCOM products, visit NEXCOM's website at www.nexcom.com.

2. For technical issues that require contacting our technical support team or sales representative, please have the following information ready before calling:
   - Product name and serial number
   - Detailed information of the peripheral devices
   - Detailed information of the installed software (operating system, version, application software, etc.)
   - A complete description of the problem
   - The exact wordings of the error messages

Warning!

1. Handling the unit: carry the unit with both hands and handle it with care.

2. Maintenance: to keep the unit clean, use only approved cleaning products or clean with a dry cloth.

Conventions Used in this Manual

Warning:
Information about certain situations, which if not observed, can cause personal injury. This will prevent injury to yourself when performing a task.

Caution:
Information to avoid damaging components or losing data.

Note:
Provides additional information to complete a task easily.

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www.nexcomusa.com

Package Contents

Before continuing, please verify the contents of the product package. The items included are listed in the table below.

Item	Part Number	Description	Qty
Antenna - NB-IoT	603ANT0486X00	OUTDOOR NB-IoT ANTENNA N-Plug W/Label:NB-IoT	1
Antenna - GPS	603ANT0487X00	OUTDOOR GPS ANTENNA N-PLUG W/LABEL:GPS	1
Antenna - LoRa	603ANT0483X00	OUTDOOR LORA ANTENNA N-PLUG W/LABEL:LORA	1
Antenna - Wi-Fi (RN-30-EG01 only)	603ANT0482X00	OUTDOOR WIFI ANTENNA N-PLUG W/LABEL:Wi-Fi	1
SD Card	73AE032G11X00	32GB Industrial grade -25~85°C	1
Robust pole mount kit with adjustable angle	5040450166X00	MOUNTING KIT FOR RN-30-ND01 SERIES VER:A	1

Accessory

Item	Part Number	Specification	Compatible products
Solar Panel	10RA000RN05X0	36 watts Solar Power Panel Vmpp 11.75 V Impp 3.07 A Cable length 280 CM Mounting bracket	RN-30-ND01 RN-30-ND02
Robust pole mount kit with adjustable angle	5040450166X00	Mounting hole: 60 x 60 mm Screw: M6 x 12 mm, 4 pcs	RN-30-ND01 RN-30-ND02 RN-30-EG01 Solar Panel
SD Card	73AE032G11X00	32GB Industrial grade -25~85°C	RN-30-ND01 RN-30-ND02 RN-30-EG01

Ordering Information

Refer to the list below for the ordering information.

RN-30-ND01 (P/N: 10RA000RN02X0)

Data acquisition system, NB-IoT, LoRa and GPS
Single sensor port for Smart Staff Gauge Connection

RN-30-ND02 (P/N: 10RA000RN03X0)

Data acquisition system, NB-IoT, LoRa and GPS
Dual sensor ports for Smart Staff Gauge Connection

RN-30-EG01 (P/C: 10RA000RN04X0)

AI data acquisition system, NB-IoT, LoRa, Wi-Fi and GPS
Single sensor port for Smart Staff Gauge Connection

RN-30-SG01 (P/N: 10RA000RN00X0)

Smart Staff Gauge, 80 CM, RS-485

RN-30-SG02 (P/N: 10RA000RN01X0)

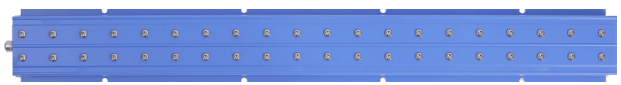
Smart Staff Gauge, 160 CM, RS-485

Chapter 1: Product Introduction

Smart Staff Gauge

Model Name	Water level measurement range	EC range	Protocol	Power input
RN-30-SG01	0~76cm (0~2.49ft)	0~13000 µs/cm	RS-485/ SDI-12	6.3~15V DC
RN-30-SG02	0~156cm (0~5.12ft)	0~13000 µs/cm	RS-485/ SDI-12	6.3~15V DC

RN-30-SG01



RN-30-SG02

RN-30-SG01

Key Features

- Water level measurement range: 0~76cm (0~2.49 ft)
- EC measurement range: 0~13000 µs/cm
- Supports RS-485 or SDI-12 protocol
- IP68 design

Hardware Specifications

Water level measurement

- Range: 0~76cm (0~2.49ft)
- Resolution: 4cm
- Accuracy: +0/-3cm

EC measurement

- Range: 0~13000 µs/cm
- Resolution: 0.1%
- Accuracy@25°C: ±5% full scale

Temperature sensor

- Three temperature sensors
- Range: 0~75°C (32~167°F)
- Resolution: 1°C

I/O Interface

- RS-485 or SDI-12 (customized)
- DC input 6.3~15V
- M12 A-Coded 5-pin female connector

Dimensions

- 793 (L) x 97 (W) x 30 (H) mm / 31.2 (L) x 3.8 (W) x 1.2 (H) inches

RN-30-SG02

Key Features

- Water level measurement range: 0~156cm (0~5.12 ft)
- EC measurement range: 0~13000 µs/cm
- Supports RS-485 or SDI-12 protocol
- IP68 design
- Foldable mechanism design

Hardware Specifications

Water level measurement

- Range: 0~156cm (0~5.12ft)
- Resolution: 4cm
- Accuracy: +0/-3cm

EC measurement

- Range: 0~13000 µs/cm
- Resolution: 0.1%
- Accuracy@25°C: ±5% full scale

Temperature sensor

- Six temperature sensors
- Range: 0~75°C (32~167°F)
- Resolution: 1°C

I/O Interface

- RS-485 or SDI-12 (customized)
- DC input 6.3~15V
- M12 A-Coded 5-pin female connector

Dimensions

- 1587 (L) x 97 (W) x 30 (H) mm / 62.5 (L) x 3.8 (W) x 1.2 (H) inches

Industrial IoT Data Acquisition System

Model Name	Port number for Sensor	Wireless Support	Battery	AI Computing
RN-30-ND01	Single port	NB-IoT/ LoRa	14400mAh Lithium Battery	N/A
RN-30-ND02	Dual port	NB-IoT/ LoRa	14400mAh Lithium Battery	N/A
RN-30-EG01	Single port	NB-IoT/ LoRa/ Wi-Fi	14400mAh Lithium Battery	NVIDIA® Jetson Orin™ Nano 4GB SOM, 20 TOPS

RN-30-ND01

RN-30-ND02

RN-30-EG01

RN-30-ND01

Key Features

- Single sensor port for NEXCOM Smart Staff Gauge or compatible sensor connection
- Provide pre-installed NEXCOM Smart Staff Gauge data acquisition RS-485 MODBUS API
- Support NB-IoT & LoRa wireless data transmitting
- Support both AGPS & GNSS
- Provide 14400 mAh Lithium Battery
- Power input: 11.75V DC from Solar panel
- IP67 design

Hardware Specifications

Wireless
- NB-IoT: All regions
- Bands: B1, B2, B3, B4, B5, B8, B12, B13, B18, B19, B20, B25, B26, B27, B28, B66, B85
- NB-IoT Antenna Gain: 2 dBi
- LoRa: 863~928 MHz
- LoRa Antenna Gain: 1.6 dBi
- GPS AGPS & GNSS
- GPS Antenna Gain: 22 dBi

Data Transmission Interval
- 1~99 minutes

I/O
- Sensor port: M12 A-Coded 5-pin female connector
- Power on/off switch
- Solar panel DC input
- SIM card socket
- USB-C DC input (indoor use only)
- SD card socket
- Antenna: NB-IoT, LoRa, and GPS

User Setting Item
- Device ID, Database IP, SIM card, APN
- Data transmission interval, LoRa ID
- Staff Gauge type, Height origin, etc.

Power Supply
- 11.75 V DC from Solar panel, 3-pin IP67 connector

Battery
- 14400 mAh Lithium Battery
- Support 28 days of operation with one RN-30-SG02, transmitting data at ten-minute intervals.

Mechanical
- 438 (L) x 257 (W) x 90 (H) mm / 17.2 (L) x 10.1 (W) x 3.5 (H) inches
- Aluminum alloy chassis
- IP67 design

Mounting
- Mounting holes: 60mm x 60mm
- Screw: M6 x 12 mm, 4 pcs
- Robust pole mount kit with adjustable angle (optional accessory)

Environment
- Operating temperature: Ambient with air flow: -5°C~60°C (41°F~140°F)
- Storage temperature: -20°C~80°C (-4°F~176°F)
- Relative humidity: 10%~ 90% (non-condensing)
- Vibration protection: Random: 1.15 Grms@1~200Hz

Certifications
- CE
- FCC

RN-30-ND02

Key Features

- Dual sensor ports for NEXCOM Smart Staff Gauge or compatible sensor connection
- Provides pre-installed NEXCOM Smart Staff Gauge data acquisition RS-485 MODBUS API
- Support NB-IoT & LoRa wireless data transmitting
- Support both AGPS & GNSS
- Provide 14400 mAh Lithium Battery
- Power input: 11.75V DC from Solar panel
- IP67 design

Hardware Specifications

Wireless
- NB-IoT: All regions
- Bands: B1, B2, B3, B4, B5, B8, B12, B13, B18, B19, B20, B25, B26, B27, B28, B66, B85
- NB-IoT Antenna Gain: 2 dBi
- LoRa: 863~928MHz
- LoRa Antenna Gain: 1.6 dBi
- GPS AGPS & GNSS
- GPS Antenna Gain: 22 dBi

Data Transmission Interval
- 1~99 minutes

I/O
- Sensor port: Dual M12 A-Coded 5-pin female connectors
- Power on/off switch
- Solar panel DC input
- SIM card socket
- USB-C DC input (indoor use only)
- SD card socket
- Antenna: NB-IoT, LoRa, and GPS

User Setting Item
- Device ID, Database IP, SIM card, APN
- Data transmission interval, LoRa ID
- Staff Gauge type, Height origin, etc.

Power Supply
- 11.75 V DC from Solar panel, 3-pin IP67 connector

Battery
- 14400 mAh Lithium Battery
- Support 24 days of operation with two RN-30-SG02, transmitting data at ten-minute intervals.

Mechanical
- 438 (L) x 257 (W) x 90 (H) mm / 17.2 (L) x 10.1 (W) x 3.5 (H) inches
- Aluminum alloy chassis
- IP67 design

Mounting
- Mounting holes: 60mm x 60mm
- Screw: M6 x 12 mm, 4 pcs
- Robust pole mount kit with adjustable angle (optional accessory)

Environment
- Operating temperature: Ambient with air flow: -5°C~60°C (41°F~140°F)
- Storage temperature: -20°C~80°C (-4°F~176°F)
- Relative humidity: 10%~ 90% (non-condensing)
- Vibration protection: Random: 1.15 Grms@1~200Hz

Certifications
- CE
- FCC

RN-30-EG01

Key Features

- NVIDIA® Jetson Orin™ Nano 4GB SOM, 20 TOPS
- Single sensor port for NEXCOM Smart Staff Gauge or compatible sensor connection
- Provide pre-installed NEXCOM Smart Staff Gauge data acquisition RS-485 MODBUS API
- Support NB-IoT, LoRa & Wi-Fi wireless transmitting
- Support both AGPS & GNSS
- Provide 14400 mAh Lithium Battery
- Power input: USB Type-C PD 15V DC
- IP67 design

Hardware Specifications

Wireless
- NB-IoT: All regions
- Bands: B1, B2, B3, B4, B5, B8, B12, B13, B18, B19, B20, B25, B26, B27, B28, B66, B85
- NB-IoT Antenna Gain: 2 dBi
- LoRa: 863~928MHz; LoRa antenna Gain: 1.6 dBi
- GPS AGPS & GNSS; GPS antenna Gain: 22 dBi
- Wi-Fi 802.11 a/b/n; Wi-Fi antenna Gain: 1.6 dBi

Data Transmission Interval
- 1~99 minutes

AI Computing
- NVIDIA Jetson Orin Nano™ 4GB SOM, 20 TOPS

Storage
- Internal M.2 NVMe 2280 SSD 128 GB

I/O
- Sensor port: One M12 A-Coded 5-pin female connector
- Power on/off switch
- SIM card socket
- USB-C DC input (indoor use only)
- SD card socket
- Antenna: NB-IoT, LoRa, Wi-Fi, and GPS
  - Wi-Fi 802.11 a/b/n, Wi-Fi antenna Gain: 1.6 dBi

User Setting Item
- Device ID, Database IP, SIM card, APN,
- Data transmission interval, LoRa ID,
- Staff Gauge type, Height origin, etc.

Power Supply
- USB Type-C PD 15V DC

Battery
- 14400 mAh Lithium Battery

Mechanical
- 438 (L) x 257 (W) x 90 (H) mm / 17.2 (L) x 10.1 (W) x 3.5 (H) inches
- Aluminum alloy chassis

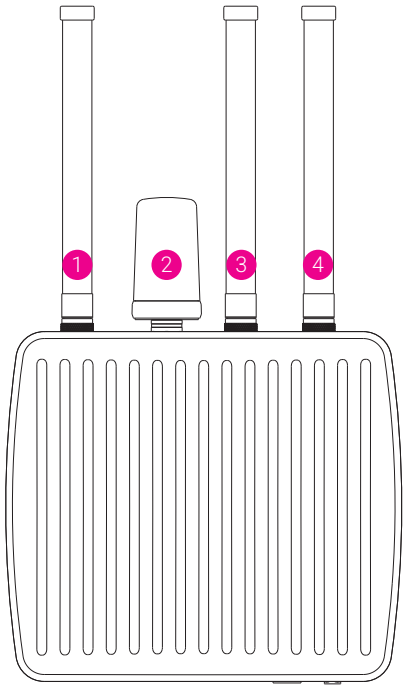
Mounting
- Mounting holes: 60mm x 60mm
- Screw: M6 x 12 mm, 4 pcs
- Robust pole mount kit with adjustable angle (optional accessory)

Environment
- Operating temperature: Ambient with air flow: -5°C~60°C (41°F~140°F)
- Storage temperature: -20°C~80°C (-4°F~176°F)
- Relative humidity: 10%~ 90% (non-condensing)
- Vibration protection: Random: 1.15 Grms@1~200Hz

Certifications
- CE
- FCC

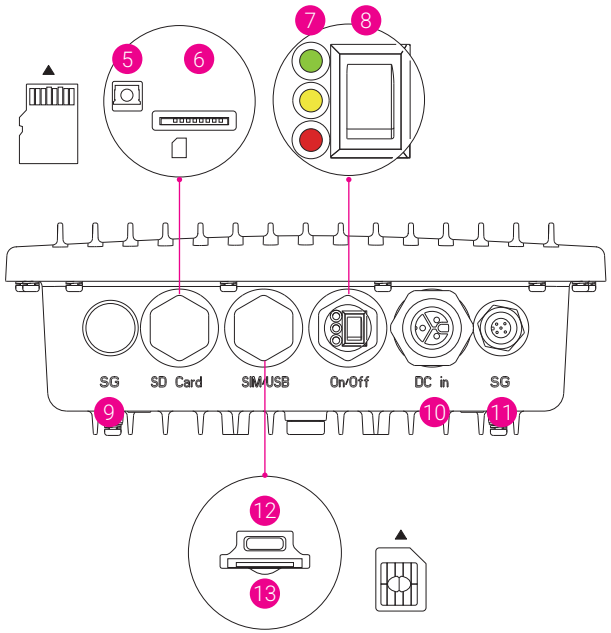
Physical Features

Top View



1. LoRa antenna
2. GPS antenna
3. NB-IoT antenna
4. Wi-Fi antenna (RN-30-EG01 only)

Bottom View



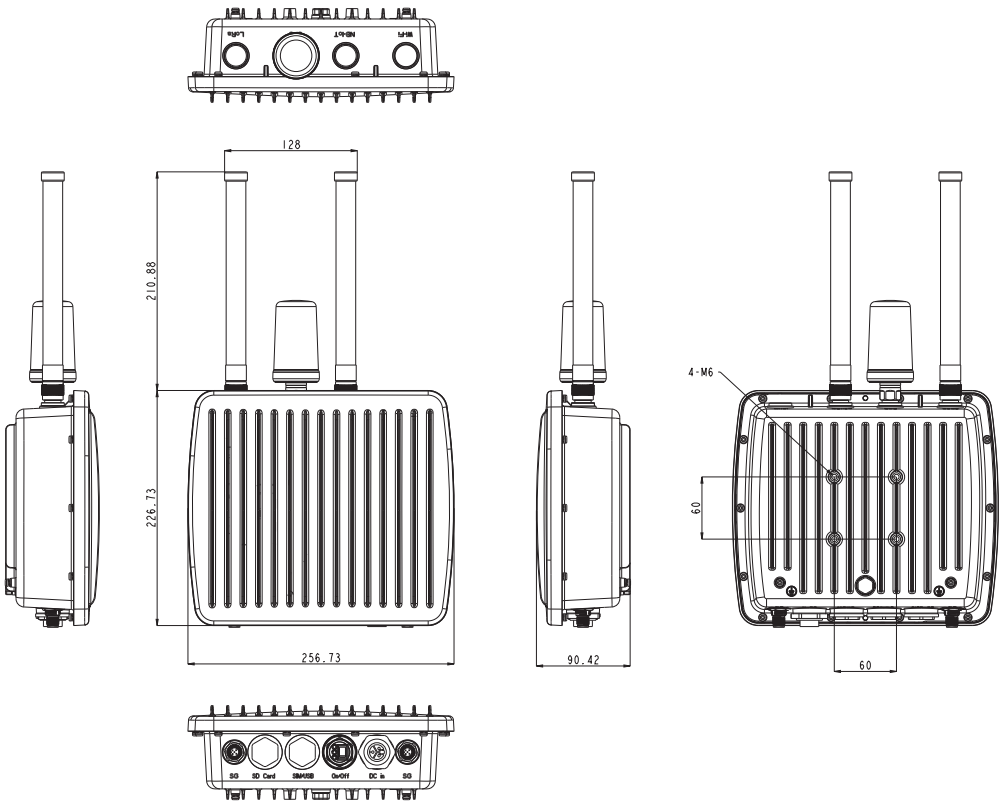
5. Press to reboot the system and directly update the firmware.
6. SD card slot*
   *Insert the SD card with the golden fingers facing upward.
7. LED indicators

Green	OFF	NB-IoT Disconnected / Sleeping Mode
	Blinking	Searching NB-IoT
	ON	NB-IoT Connected
Yellow	OFF	LoRa Disconnected / Sleeping Mode
	Blinking	Searching LoRa
	ON	LoRa Ready for Connecting
Red	Blinking	Searching Staff Gauge RN-30-SG01 or RN-30-SG02
	OFF	Connected Staff Gauge

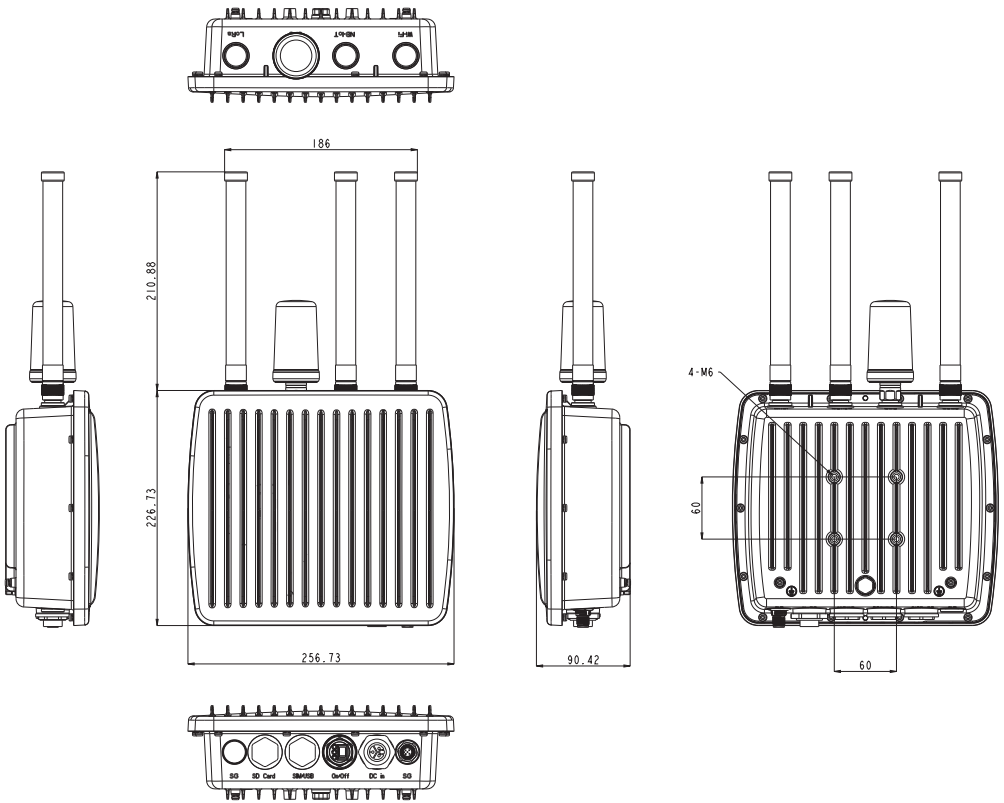
8. Power button
9. Sensor port 1 for RN-30-SG01 or RN-30-SG02
   (M12 A-coded, 5-pin female connector)
10. DC power input or solar panel connection
11. Sensor port 2 for RN-30-SG01 or RN-30-SG02
    (M12 A-coded, 5-pin female connector)
12. USB Type-C connector
    Supports indoor USB charging only.
    Compatible USB charging adapters:
    - USB-C adapter: 5V DC, 2.4~3A output
    - USB-C PD adapter: 15V DC, 3A output (RN-30-EG01 requires this designated adapter for power.)
13. SIM card slot*
    *Insert the SIM card with the chip facing upward.

Mechanical Dimensions

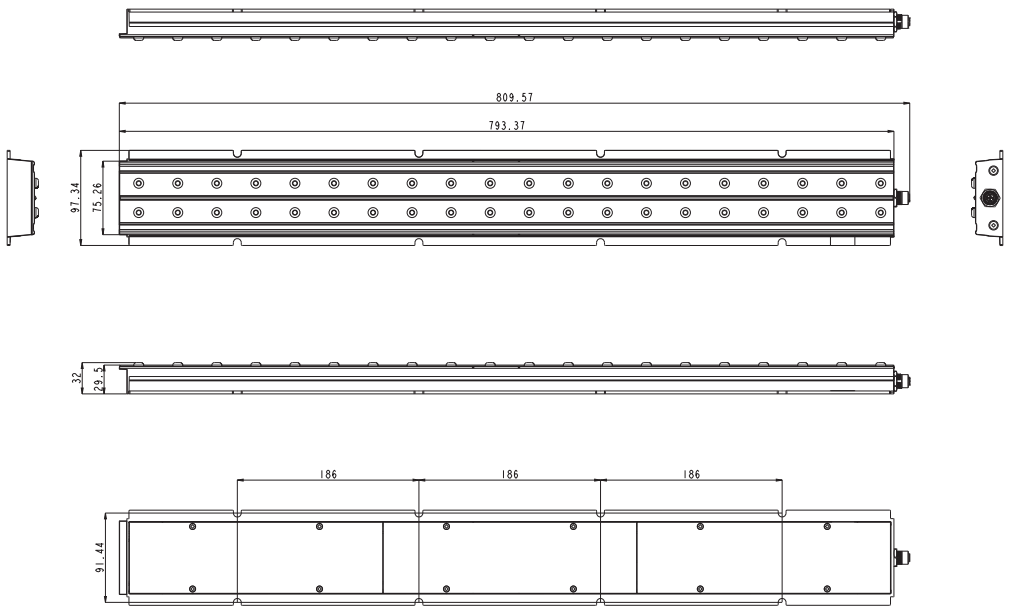
RN-30-ND01/02



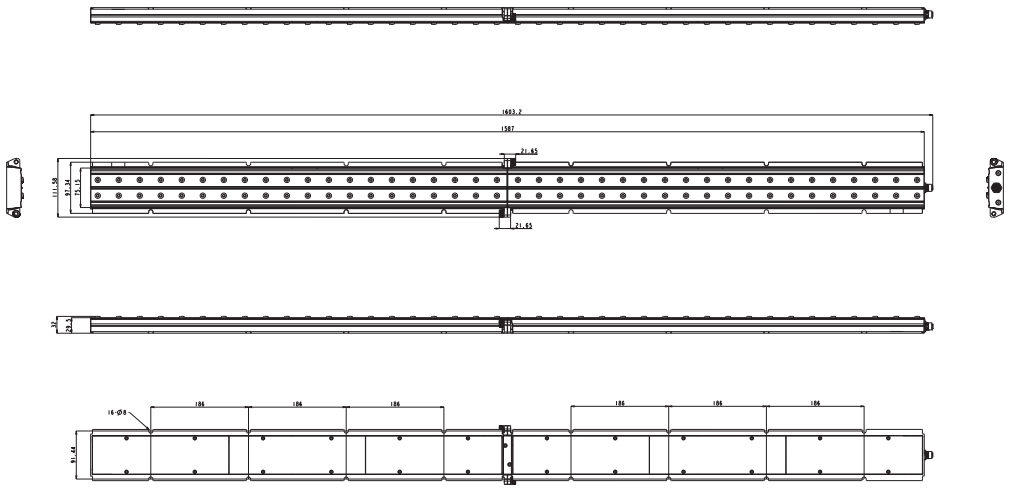
RN-30-EG01



RN-30-SG01



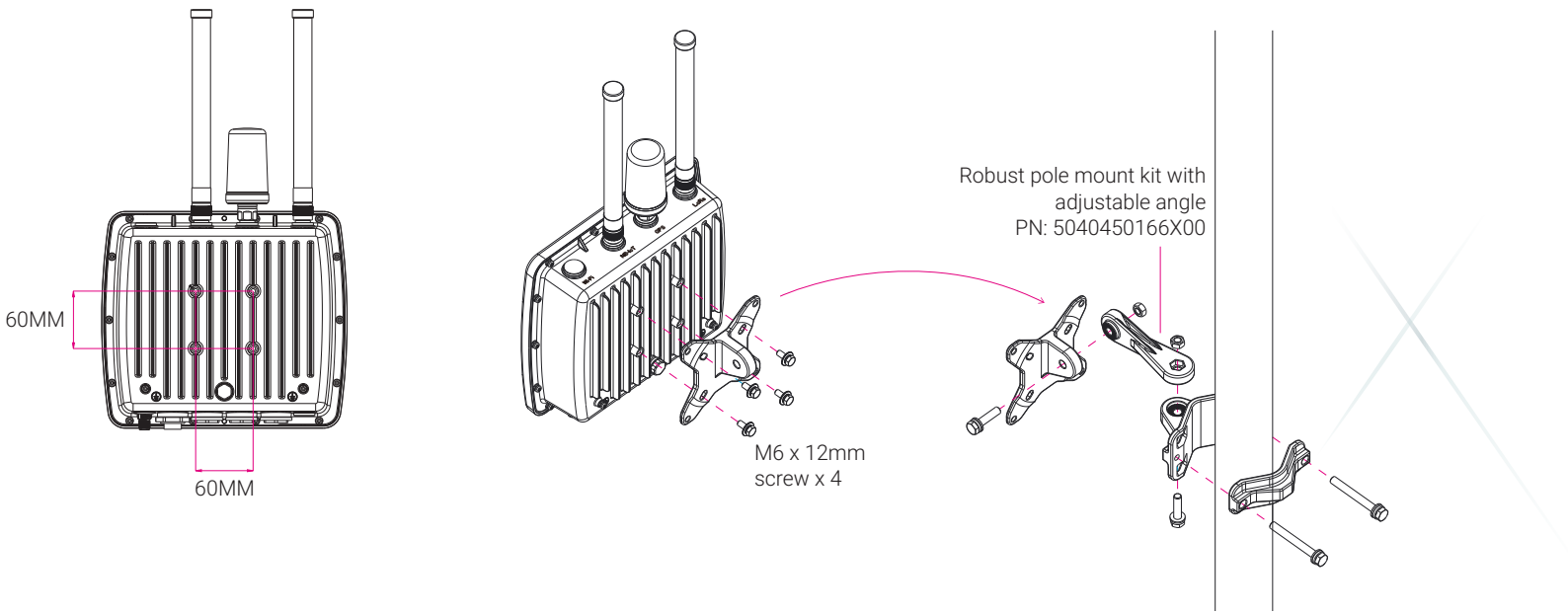
RN-30-SG02



Chapter 2: Device Installation

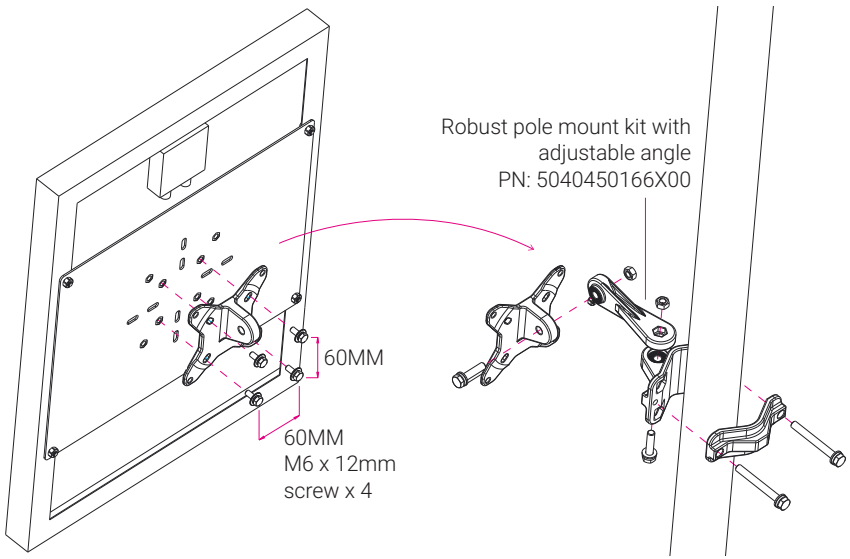
This system is designed for outdoor installation and can be powered by a single solar panel. The system and the solar panel can be mounted on separate support poles. Refer to this section for detailed instructions on installing each device onto its respective support pole.

System Installation

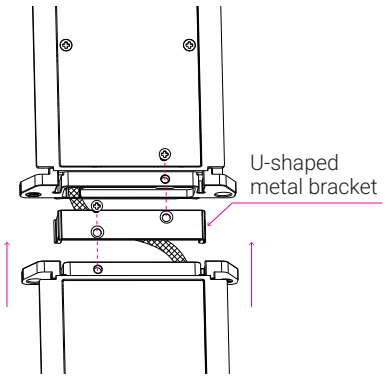


Solar Panel Installation

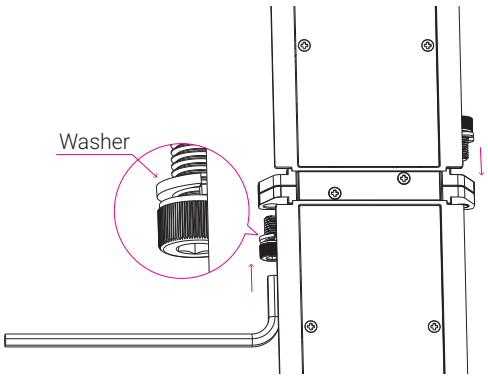
The solar panel is oriented southward (in the Northern Hemisphere) and tilted at a 45-degree angle toward the sky, based on the optimal local installation angle.



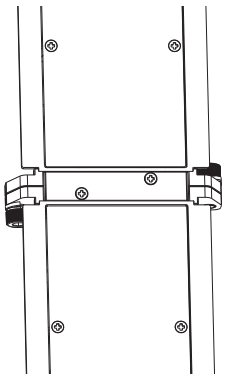
Smart Staff Gauge Assembly (RN-30-SG02 160cm)



1. Join the two staff gauge sections using a U-shaped metal bracket, secured in place with two screws.

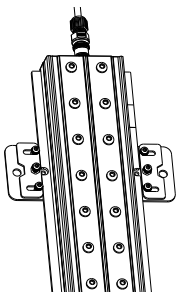


2. Place a washer onto each screw. Align the mounting holes on both sides of the staff gauge's fixed locking brackets. Insert the screws with washers into the mounting holes. Using a hex key, tighten the screws to firmly secure the brackets on both sides of the staff gauge.

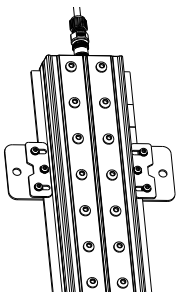


3. Once installation is complete, it will appear as shown in the above image.

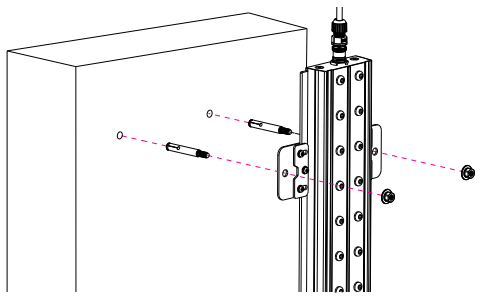
Installation Reference for Smart Staff Gauge



1. Position the mounting bracket kit at the notch location.



2. Tighten the screws to secure the bracket. Repeat these steps to install the remaining mounting brackets.

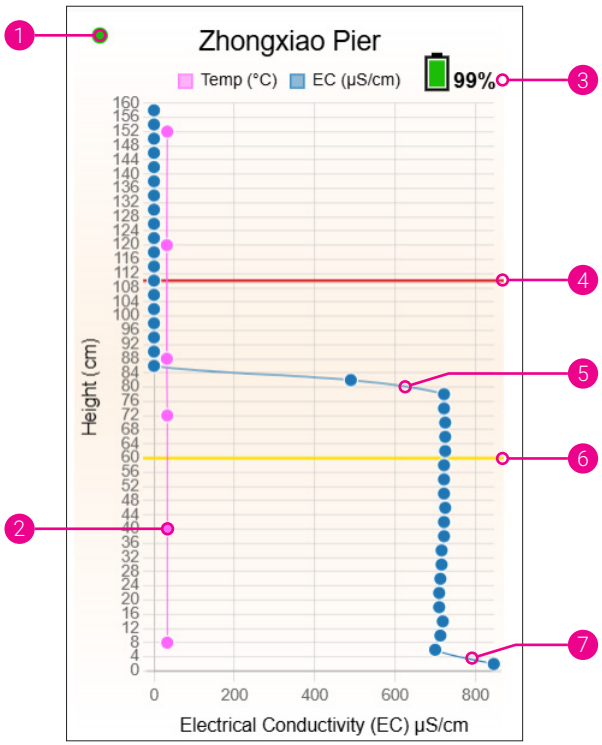


3. Mount the smart staff gauge onto the surface wall.

Steps 1 to 3 apply only to the upper bracket kit. Repeat these steps to install the other bracket kits for the smart staff gauge.

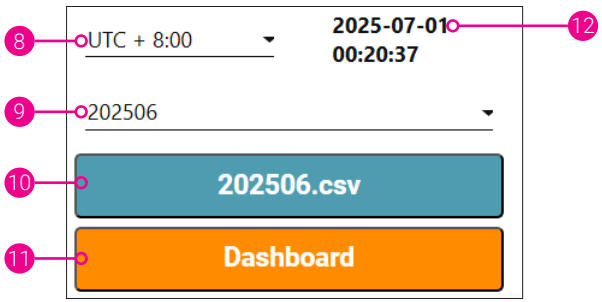
Chapter 3: Smart Staff Gauge Profile & Dashboard Overview

Profile



To access the Profile page, enter the pre-defined shipping address (customized per user and may vary) into the browser's address bar.

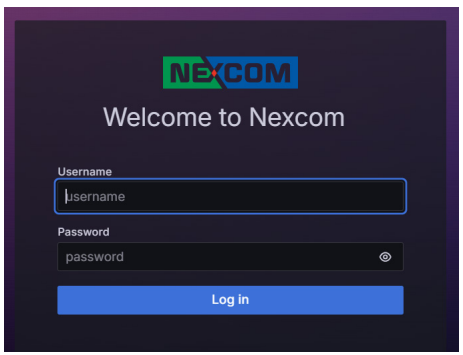
1. Status indicator
   Green: device working
   Red: Sensor exception
2. Temperature
3. Battery level
4. High water level alarm
5. Water level
6. Low water level alert
7. Mud level



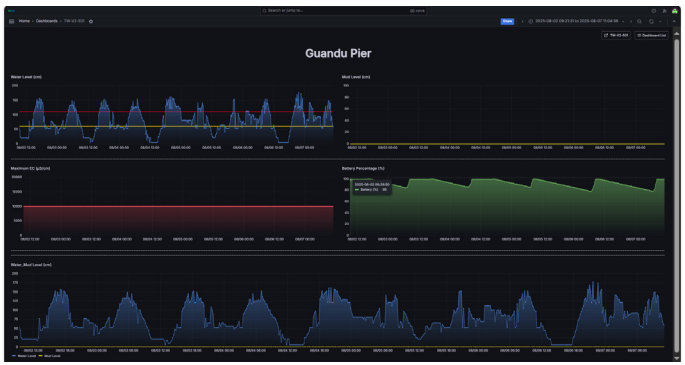
8. Time zone selection
9. Historical row data selection
10. Historical row data download
11. Accessing the dashboard
12. Profile time

Dashboard

1. Follow the instructions in the previous section to click the dashboard button and access it. Once clicked, a welcome window will pop up, and you will be prompted to log in. Enter the pre-configured username and password (customized per user and subject to variation).

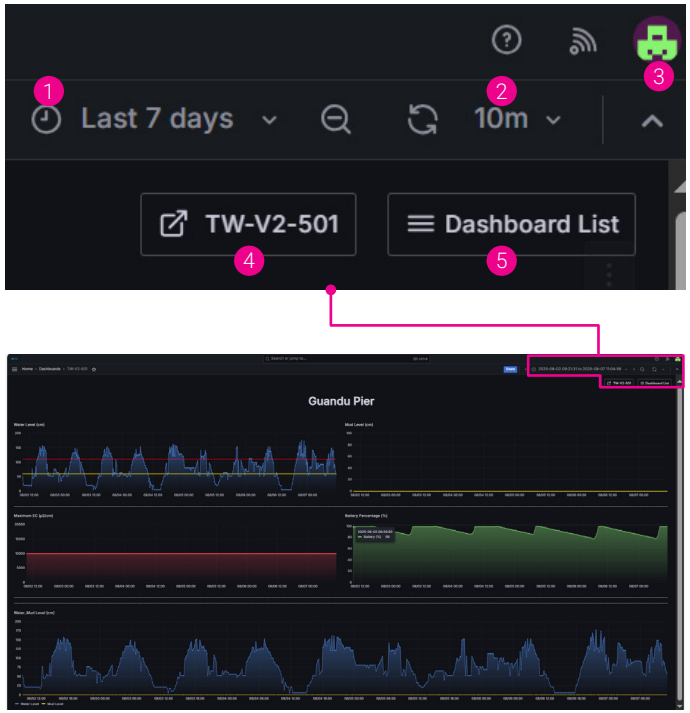


2. After logging in, the dashboard screen will appear and display the related information.



Dashbaord Configuration

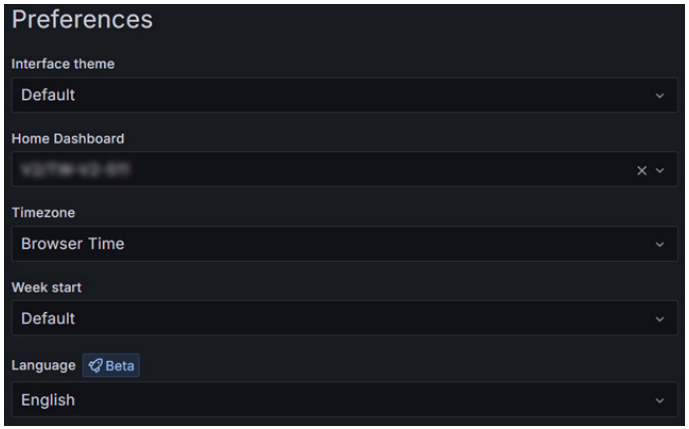
Additional configuration features are available in the upper-right corner of the Dashboard. Select an option to access advanced settings.



1. Timeline selection.
2. Refresh interval
3. Preference settings

Profile	Name	Configure a desired name
	Email	Configure a desired email
	Username	Configure a username
Sign out	Log off your account	
Preference	Refer to next page	

4. Return to Staff Guage Profile
5. Select another staff gauge



Interface theme	Default	Default theme of the dashboard
	Dark	Dark theme
	Light	Light theme
	System preference	Refer to the OS settings to adjust the theme color as needed
Home Dashboard	User's dashboard list	Select a dashboard to set as your default
Timezone	Browser time	The time zone is determined by your browser's default settings. However, users may manually specify a preferred time zone if needed.
	Other timezones	Select a timezone to use as your default.
Week start	Default	First day of week: Sunday (default)
	Saturday	First day of week: Saturday
	Sunday	First day of week: Sunday
	Monday	First day of week: Monday
Language	Default	Default language: English
	Other language	中文(簡体), Deutsch, English, Español, Français, Portugues Brasileiro