RUNIONE

RUNIONE

RS50

RS SERIES
USER MANUAL

Runione Tech Co,. Ltd

Contents

1 Overview

By reading this chapter, you will gain a general understanding of Runione Tech Co., Ltd. and the RS Series RTK Surveying System.

1.1 Introduction

Welcome to the Runione High-Precision GNSS RTK Surveying System.

Runione was founded by an engineering team from leading GNSS companies together with professionals from the smart mobile terminal industry. The company has long been dedicated to the research, development, and manufacturing of engineering-grade high-precision positioning and field surveying equipment. Leveraging more than ten years of technical expertise in GNSS high-precision positioning and engineering reliability, combined with the mature experience of smart mobile terminals in lightweight design and human–machine interaction, Runione has built a comprehensive engineering technology solution that covers "survey–inspect" application scenarios and seamlessly integrates with management-oriented software systems. This solution is designed to deliver stable, efficient products and services to users in the global surveying and engineering industries.

This manual uses the Runione RTK Surveying System as an example to describe system installation, basic configuration, accessory usage, and RTK operational workflows. Even if you have previously used Runione or other brands of RTK products, it is recommended that you read this manual carefully before first use to ensure correct operation and to fully utilize the system's performance.

For more product information, technical support, or the latest updates, please visit the official Runione website.**www.runione.com**

2 RS Series Surveying System Introduction

By reading this chapter, you will gain a detailed understanding of the components, installation, and functions of the RS Series RTK Surveying System.

2.1 General Overview

The RS Series RTK Surveying System mainly consists of three parts: the main unit, data collector, and accessories, as shown in the figure below.
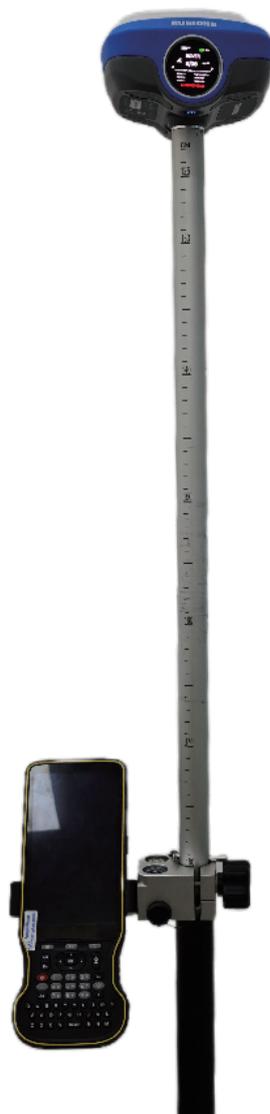
2.2 Main Unit Introduction

2.2.1 Main Unit Appearance

2.2.2 Structure and Interfaces

| Interfaces and Structure	Description
5-pin LEMO port	power supply，RS232，external radio communication port
USB Type-C	Charging, data download
SIM Card Slot	Nano-SIM card slot
TNC	UHF antenna interface
Button	Power

2.2.3 Indicator LED Description

Operating Status	Red LED	Blue LED
Power on (Normal operation)	Solid on	Off
Power on (Low battery warning)	Flashing	Off
Power on (Charging)	Off	Flashing
Power off (Charging)	Off	Flashing
Charging disconnected while powered on	Solid on or flashing: 1. Battery level < 15%: Flashing 2. Battery level ≥ 15%: Solid on	Off
Charging disconnected while powered off	Off	Off
Fully charged (Powered on)	Solid on	Off
Fully charged (Powered off)	Off	Solid on

2.3 Screen UI Introduction

2.3.1 Status Interface Description

After power-on, the screen displays the current working status using icons and text.
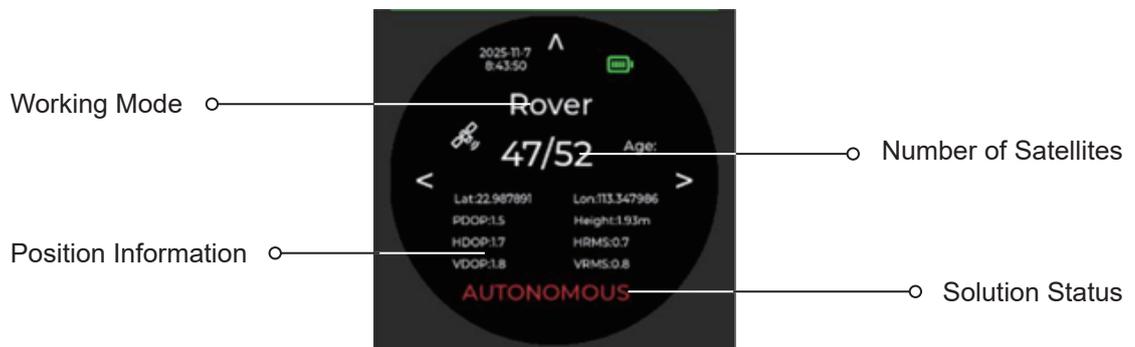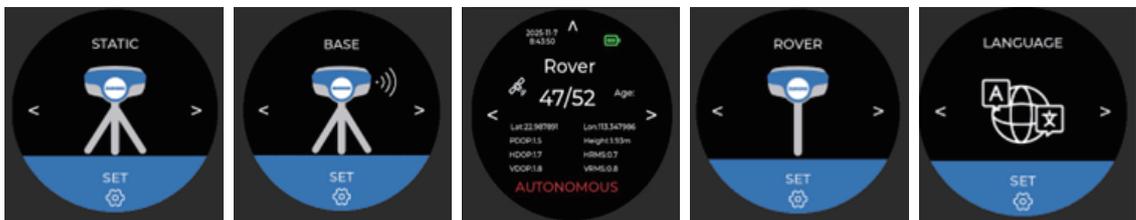
2.3.2 Screen Operation Instructions
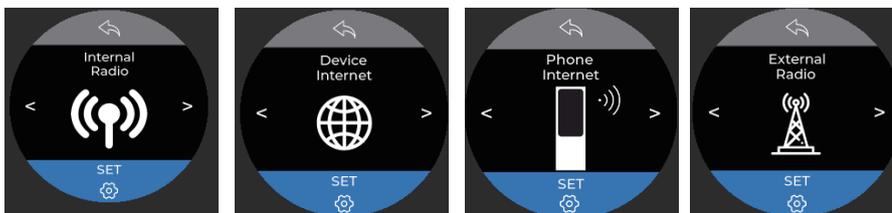
1、Startup Screen

2、Main Interface

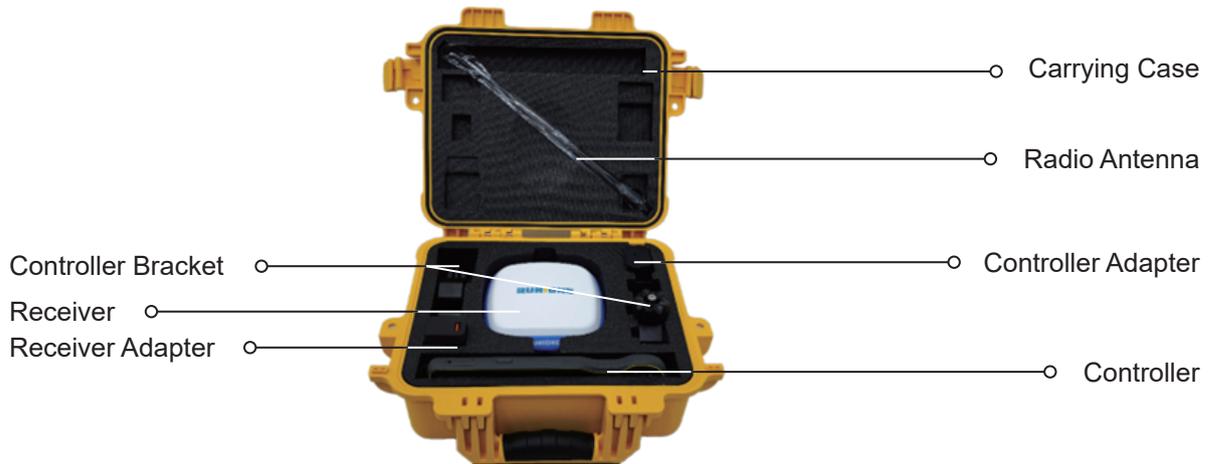Static、Base、Rover、Device Information、Language Settings

3、Data Link Selection

Internal Radio、Device Internet、Phone Internet、External Radio

2.4 Main Unit Accessories

Carrying Case

Radio Antenna

Controller Bracket

Receiver

Receiver Adapter

Controller Adapter

Controller

3 Instrument Setup and Configuration
3.1 Static Survey Operation

1) Set up the tripod at the control point, attach the base, carefully center over the survey mark, and level the instrument.

2) Measure the instrument height three times. The difference between the three measurements shall not exceed 3 mm, and the average value should be used. The instrument height is measured from the center of the control mark to the outer edge of the survey target plate.

3) Record the receiver ID, point name, instrument height, and start time.

4) Power on the receiver and launch the Runione Survey software. Set the receiver to Static Mode, and configure the following recording parameters as needed: point name for static file, PDOP limit, elevation mask, logging interval, antenna parameters, etc.
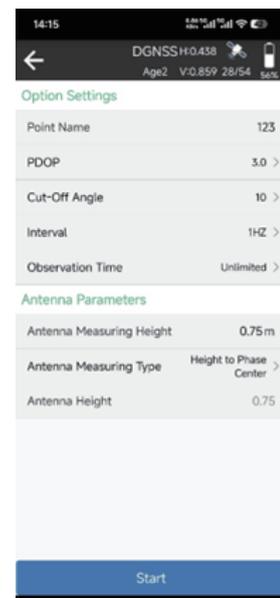
3.2 Rover Operation (Radio Mode)

1、 After confirming that the base station is transmitting
successfully, begin setting up the rover. Mount the receiver on
the tribrach, attach the radio antenna, install the controller
bracket, and secure the controller.

2、 Configure Rover Mode:

（1） Power on both the receiver and the controller, launch the
Runione Survey software, and connect via Bluetooth.

（2） Tap [Device] → [Rover]. Selecting Rover Settings will
automatically switch the receiver to Rover Mode and set
the data link to Internal Radio by default.
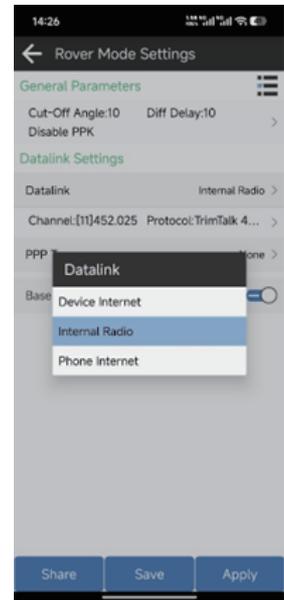
（3） Tap [Datalink] → [Internal Radio] and select the corresponding radio channel and protocol.
Make sure that the protocol and frequency of the rover radio match those of the transmitting
base station. Only then can the rover properly receive radio data. If the frequency of the
selected channel does not match the base station channel, tap "Default Settings" to modify
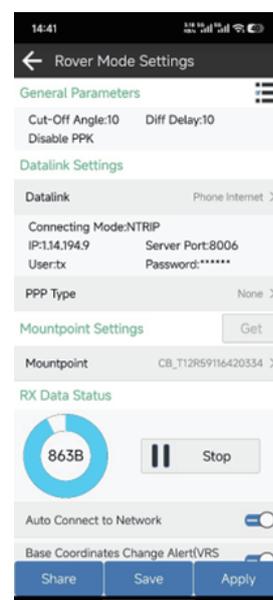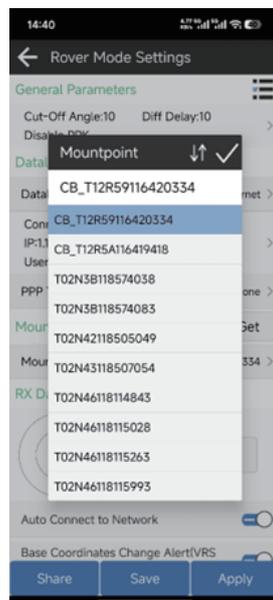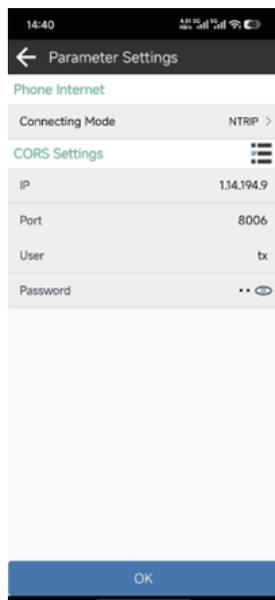the frequency assigned to each channel.
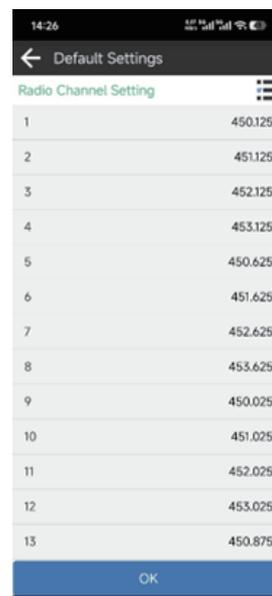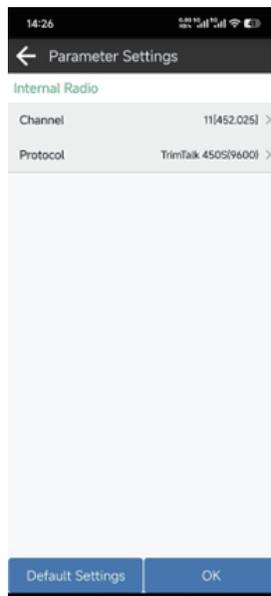
3.3 Rover Operation (CORS Mode)

The advantage of Network CORS Mode is that no base station setup is required. If a local CORS network is available, users can apply for an account from the CORS management center. Within the coverage of the CORS network, a single rover is sufficient for surveying operations.
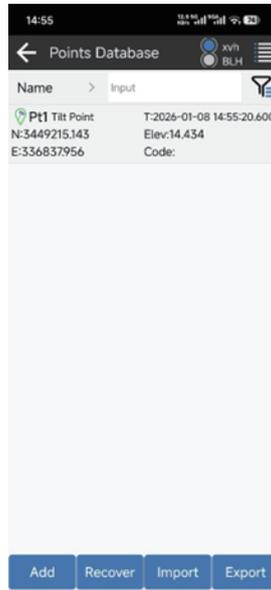
1）Power on the receiver and controller, launch the Runione Survey software, tap [Device] → [Rover], and set the datalink to Phone Internet. (Ensure the controller has internet access.)
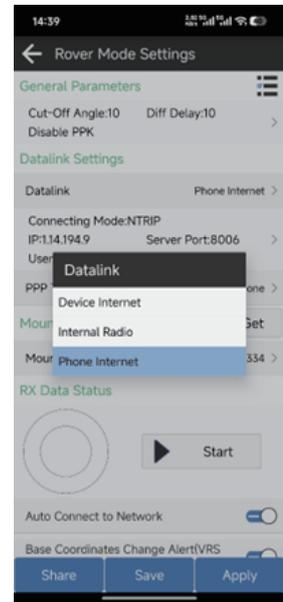

2）Tap Parameters, select Connecting Mode → NTRIP, and enter the corresponding IP address, port, username, and password. After configuring the parameters, retrieve the mount point and select the desired mount point to connect and receive differential data. Tap Start Connection. If the configuration is correct, the data reception progress bar will start moving. If the progress bar does not show any data, verify that all parameter settings are correct.

4 Common Function Usage

4.1 Point Measurement / Laser Measurement

Once the receiver reaches Fixed Solution status and the software parameters have been properly configured, you can proceed to the point measurement. The steps are as follows:

1、Tap [Survey] → [Point Survey]

2、Place the receiver over the point to be measured (center the tribrach over the target, e.g., the top center of a steel nail). Level the tribrach bubble, enter the point name, and tap to complete the measurement and record the point coordinates.

3、Tap ![icon] You can browse the collected point data. Tap a point name to view its detailed information.


4、After the IMU initialization is completed,tap ![icon] , enable laser measurement，tap ![icon Aim] , activate laser-assisted aiming. When using laser-assisted aiming, the device must be connected to Wi-Fi.
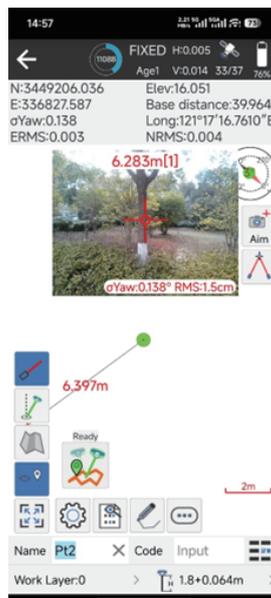
4.2 Visual Stakeout Function

This function is used in the Point Stakeout interface and requires IMU initialization. It works in conjunction with the IMU function.

After completing IMU initialization, select the point to be staked out, tap the [AR] icon on the right side of the screen, and follow the on-screen directions and position guidance to complete the stakeout.
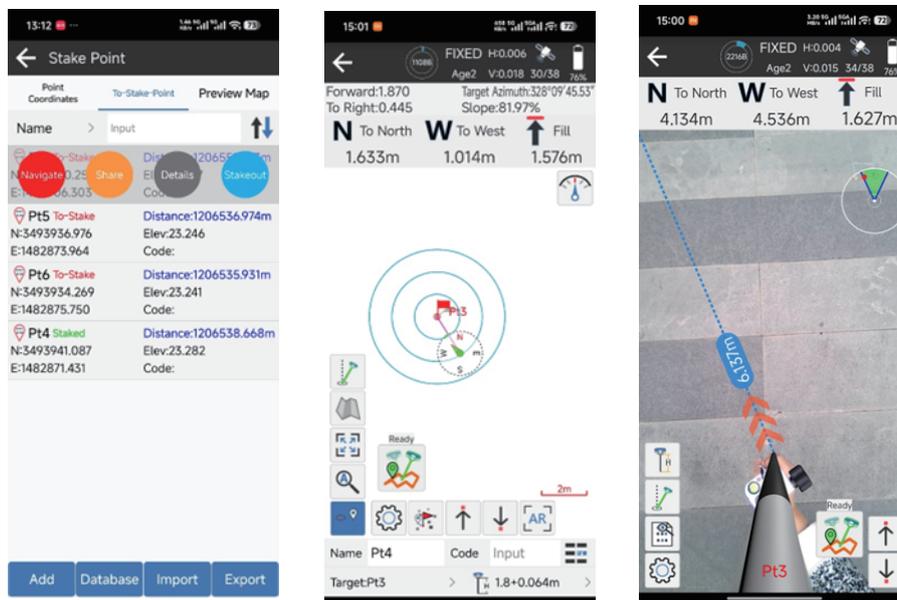

4.3 Accuracy Verification

4.3.1 IMU Accuracy

Tap [Device] → [Inspection Accuracy].

This function uses the IMU measurement at a fixed location to collect a series of tilted measurement points. The maximum coordinate difference among the collected points is calculated to evaluate the accuracy of the IMU measurement.

If the test results indicate poor accuracy, you can use the Pole Calibration function to correct tilt measurement errors caused by tribrach misalignment.
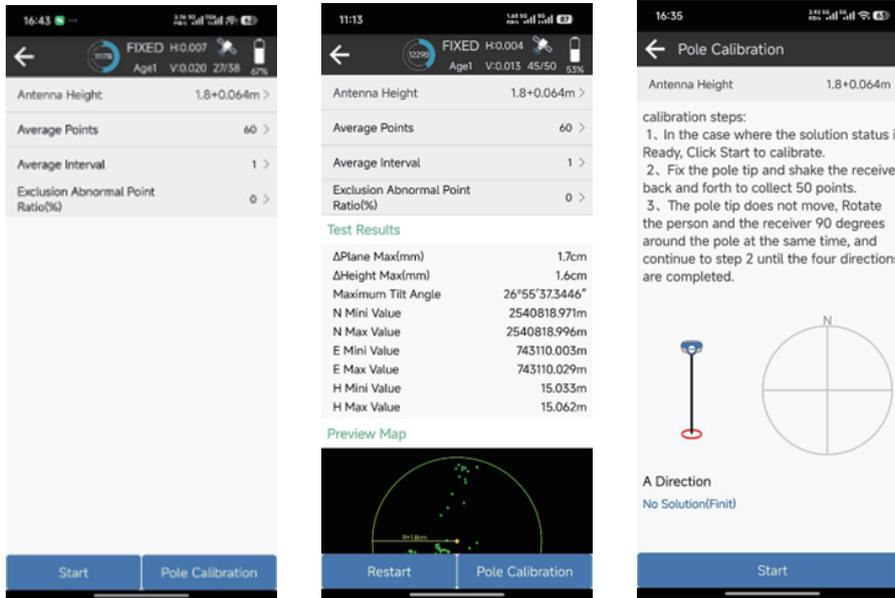
4.3.2 Laser Measurement Accuracy

1、 Enable the IMU and complete initialization. Measure a tilted point on a wall, ensuring the tilt angle is within 30°.

2、 Enable Point Stakeout and use the laser to stake out the measured tilted point. Ensure that σYaw remains within 0.2.

4.4 Web Configuration

1、 Power on the receiver normally. Using a laptop, smartphone, or other mobile device, enable Wi-Fi and connect to the receiver's hotspot. Open a web browser and enter 192.168.10.1 to access the Web UI. From this page, you can view system status and perform various function configurations.
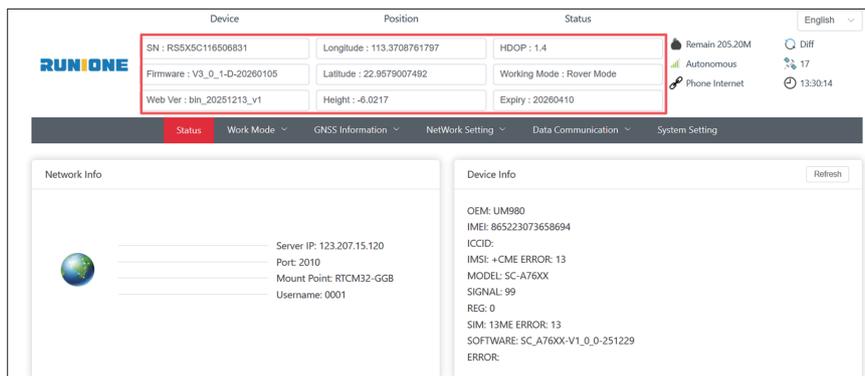
2、Set and switch between different operating modes through the Web UI.
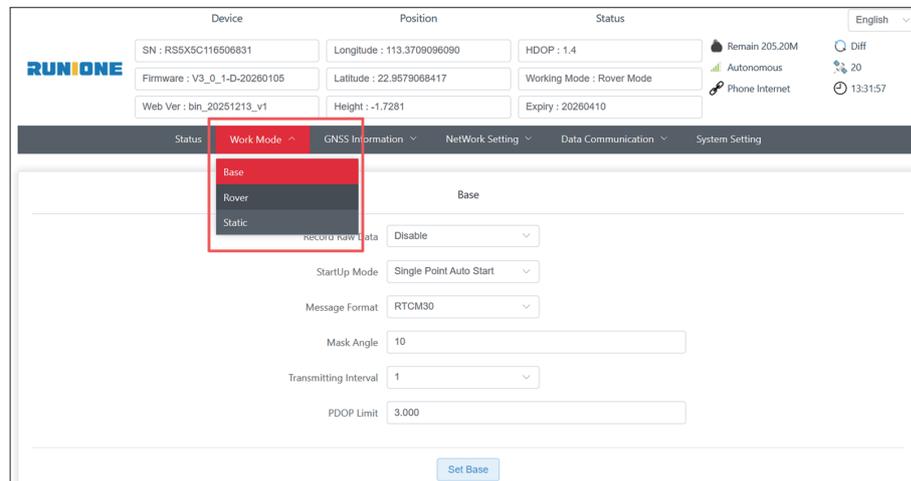
3、System settings options, such as Factory Reset, Reboot, OEM Reset, Firmware Upgrade, and Registration.
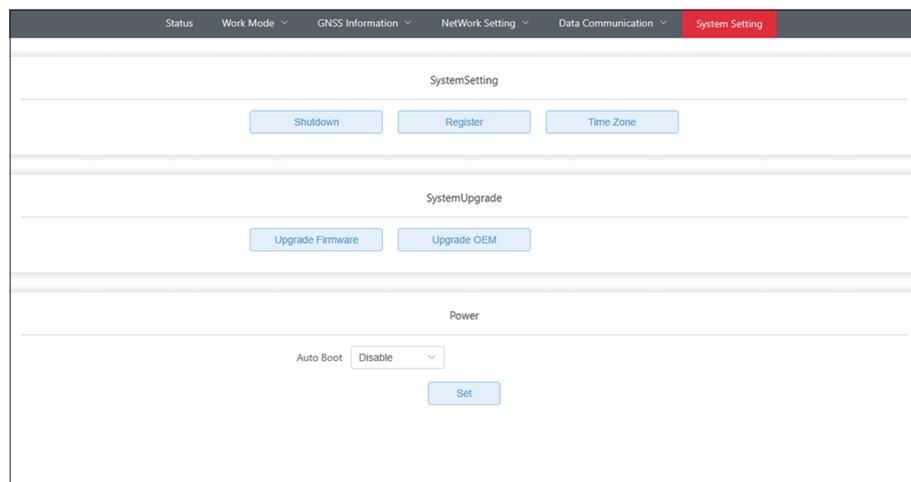
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